



XIII Меѓународен симпозиум

Интердисциплинарност на логистиката и сообраќајот

XIII International symposium

Interdisciplinarity of Logistics and Traffic

ЗБОРНИК НА ТРУДОВИ

Collection of Symposium papers

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АСУЦ „Боро Петрушевски“ на Град Скопје, Бул.Александар Македонски 26, Скопје
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**XIII МЕЃУНАРОДЕН СИМПОЗИУМ
ИНТЕРДИСЦИПЛИНАРНОСТ НА
ЛОГИСТИКАТА И СООБРАЌАЈОТ**

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- ✓ Реформи во образовниот систем;
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**XIII. INTERNATIONAL SYMPOSIUM
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LOGISTICS AND TRAFFIC**

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- ✓ Connecting the economy and education
- ✓ Reforms in the educational system;
- ✓ Exchange of experiences and knowledge in the field of technique and technology, in logistics and transport;
- ✓ Exchange of experiences in the field of road traffic safety.

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1. Traffic safety;
2. Protection of the environment;
3. Integral logistics systems;
4. Transport, distribution and logistics;
5. Transport and logistics infrastructure;
6. Traffic planning;
7. Intermodal transport;
8. Intelligent transport systems;
9. Technology of logistics processes;
10. Educational systems;
11. Traffic policy;
12. Quality of transport and logistics systems
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АВТОСООБРАЌАЕН УЧИЛИШЕН
ЦЕНТАР „Боро Петрушевски“ на Град
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1. JAVNI POLNAČI ZA ELEKTRIČNI TROTINETI – JPET

APSTRAKT

Vo transportot se trošat značajni količini energija koja seriozno go zagaduva vazduhot i sozdava urbana toplotna zavesa koja e neizdržliva. Za da se ublaži zgolemeniot pritisok vrz životnata sredina i za nejjina zaštita, zgolemena e pobaruvačkata na električni vozila so mobilnost na povik (vozila koi možat da se spodeluvaat pomegju korisnicite vo realno vreme).

Eksplzivniot razvoj na električnite trotineta i nivnoto prisustvo vo golemite gradovi e očigledno. Noviot „gostin“ vo soobrakjajot navleze skoro vo site pori na urbaniot transport i počna da gi zadovoluva potrebite vo prviot i posledniot kilometar na dostava. Električnite trotineta koristat mnogu malo količestvo energija i zaradi svoje mali dimenzii imaat pogolema fleksibilnost vo odnos na drugite vidovi javen transport.

Sepak, poradi ograničeniot kapacitet na baterijata, na trotineta im e potrebno često polnenje što značitelno ja namaluva dostupnosta i spodeluvanje na trotineta.

Edna studija od 2019 godina [1] koja bila sprovedena vo dve oblasti vo Singapur gi dala slednive rezultati: 31,60% odnosno 7,87% od vkupnite putovanja so trotineta vo ovie oblasti bile usloveni od mestoto kade se vršelo polnenje na baterijata na trotineta. Kako rezultat na toa korisnicite koi upravuvale so trotineta so podalečna dostupnosta do polnač trebalo redovno da gi polnat bateriite, sto značitelno go namalovalo putovačkiot domet na trotineta.

Cenata na električnata energija ne e mala. Iako električnite trotineta trošat malku električna energija, sepak trošocite na lujeto što gi koristat ovie trotineta značitelno se zgolemuvaat.

Različni kompanii vo Amerika što se zanimavaat so iznajmuvanje na ovie trotineta [2], plakjaat pomegju 5 i 12 dolari za električna energija za polnenje na trotineta, a neкои od niv plakjaat i od 5 do 25 dolari. Zaključok od ova e deka polnenjeto na trotineta pretstavuva tesno grlo vo biznisot za iznajmuvanje trotineta.

Za da se nadmine ovoj problem, edno od možnite resenija e da se konstruiraaat fotovoltaični platformi koi bi služele kako javni polnači za električni trotineta (JPET) i za

drugi elektronski uredi. Ovie vidovi platformi vekje se razvieni za električnite vozila, pa sledstveno se praveni slični ekološki i ekonomski analizi [3] za polnenje na električnite trotineti od javnata električna mreža. Se pokazalo deka JPET se odlično rešenje za polnenje na bateriite na električnite trotineti, pri što istražuvanjeto opfatile optimizacija na lokacijata i goleminata na ovie polnači.

Konečno, prilagoduvanjeto na JPET vo ambientot i nivnata postavenost koja bi ovozmožila proizvodstvo na dovolno količestvo električna energija skladirana vo baterii bi go nadminalo problemot so ograničenoto dviženje na električnite trotineti. Imeno, JPET so instalirani fotovoltaični moduli treba da se instaliraat na lokaciji so otvoren pristap do sončeva svetlina vo gustite urbani sredini i da ovozmožat dostapnost za postojano polnenje na bateriite na trotinetite.

VOVED

Mobilnost znači dviženje. Najprvo, toa podrazbira dviženje na lugje, a potoa i dviženje na motorni vozila. Dviženjeto na pešacite i velosipedistite e od golemo značenje vo slučai kade što e potrebno da se postigne napredok vo održivosti na soobrakjajniot sistem, zgolemuvanje na bezbednosta a namaluvanje na zagaduvanjeto, kontrola na klimatskite promeni, namaluvanje na bučavosta i drugi faktori.

Postojano se diskutira za globalno zatoplivanje i staklenički gasovi i stremežot da se namalat i da se kontroliraat ovie pojavi e na visoko nivo.

Koga stanuva zbor za „održivi gradovi“ se misli na toa deka stanuva zbor za dostapni gradovi, dobro organiziran javen transporten sistem, bezbedna infrastruktura za pešaci, velosipedisti i motorni vozila, dovolno zeleni površini, malo zagaduvanje, namalena bučavost itn. Sekako, ova e sovršena situacija koja se težnee da se postigne. Postoečkata situacija i soočuvanjeto so postoečkite problemi dovede do možni resenija i razvoj na t.n. mikromobilnost.

Spored ITF (Megjunaroden Transporten Forum) mikromobilnosta se definira kako upotreba na mikrovozila, so težina do 350 kg i brzina na dviženje do 45 km/h.

Mikromobilnosta vkučuva koristenje samo na lesni vozila, kako što se velosipedi, trotineti, e-velosipedi i e-trotineti, električni motorcikli, so najefikasno koristenje na postoečkata patna infrastruktura i so osvrt na čovekovoto zdravje, čovekovata bezbednost, razvojot na urbanite sredini i konečno idnina na čoveštvo.

Mikromobilnitate vozila proizveduvaat mala količina izduvni gasovi ili voopšto ne zagaduvaat, a isto taka imaat i mnogu nisko nivo na bučavost i go rešavaat problemot so t.n. „posleden kilometar“ („the last mile problem“). Tie se odlični za patuvanje na kratki rastojanija.

Rešavanjeto na problemot so „posledniot kilometar“ ne e za zanemaruvanje zatoa što e predizvikuvacka komponenta na logističkiot i na transportniot prostor. Ova od pričini što vo transportnata mreža e dobro poznat faktot deka isporakata na dobra vo „posledniot kilometar“ opfaka okolu 30 - 35% od vkupniot trošok za isporaka i stanuva očigledna vo site vidovi na transport: paten, železnički, voden i vozdušen.

Golem broj gradovi vo Evropa rabotat na sproveduvanje na održivi planovi za urbana mobilnost. Vo ovoj kontekst se obeshrabruva motorniot soobračaj istovremeno davajќi prioritet i pobobruvanje na alternativnite formi na mobilnost.

Mikromobilnosta treba da se razviva vo soglasnost so ostanatit motoren soobračaj, postepeno namaluvajќi go istiot vo segmentite kade što e toa vozmožno, no bez pritoa da se zanemaruvaat pešacite i velosipedistite kako jadro na alternativnata mobilnost.

1. ANKETA ZA KORISTENJETO NA ELEKTRIČNITE TROTINETI VO REPUBLIKA MAKEDONIJA

Za potrebite na ovoj trud, a so cel da se kreira edna bazična slika za svesnosta na Makedonskite građjani za mikromobilnosta, avtorot na ovoj trud sprovede samostojna istražuvacka anketa so građjanite na Grad Skopje. Anketata beše sprovedena na den 02.09.2023 godina (sabota) na primerok od 60 slučajni minuvači vo naselbata Aerodrom vo Skopje, na prostorot pred TC CAPITOL. Lokacijata e izbrana namenski zaradi golemata frekfencija na luge od različni vozrasni grupi i se naogja neposredno do pogolem broj javni i privatni ustanovi, firmi, pridavnici, avtobuski postojki i slično, no isto taka se naogja i neposredno do golem kompleks na stanbeni objekti.

Analizata na sobranite rezultati od anketata beše napravena so podelba na ispitanicite vo slednive starosni granici:

1. Nad 65 godini;
2. Od 50 do 64 godini;
3. Od 30 do 49 godini; i
4. Od 18 do 30 godini.

Kako glavni celi na anketata bea postaveni slednive:

1. Da se dobijat osnovni podatoci za informiranosta na našite sograđjani za postoenjeto na električnite trotineti kako opcija za javen prevoz;
2. Da se osoznae koja bi bila najznačajnata cel za koristenjeto električen trotinet i dali postoji potencijal za negovo koristenje za javen prevoz do odredeni lokaciji;
3. Da se dobie informacija dali našite sograđjani bi dale prednost na kupuvanieto ili na iznajmuvanieto električen trotinet; i
4. Da se kreira slika za toa kolku našite sograđjani umeat da identifikuvaat nekoi od prednostite i nedostatocite od upotrebata na elektricnite trotineti.

So analiza na dobienite rezultati od sprovedenata anketa se izvlečeni slednite zaključoci:

1. Informiranost na našite sograđjani za postoenjeto na električnite trotineti kako opcija za javen prevoz.

Preku polovinata od ispitanicite (51%) potvrdija deka imaat nekakov stepen na poznavanje za električnite trotineti kako opcija za javen prevoz.

13% od ispitanicite imaa poseopfatni znaenja koi vključuvaa duri i poznavanje na cenata na neкои modeli električni trotineti.

34% od ispitanicite imaa mali ili nikakvi informacii za toa deka električnite trotineti mozat da bidat opcija za javen prevoz.

Analizata spored starosnite grupi pokaža deka nivoto na informiranost e povisoko kaj ispitanicite vo starosnata grupa od 18-30 godini.

Interesen e podatokot od analizata koj pokažuva deka samo 5% od ispitanicite nekogaš imaat koristeno električen trotinet i go koristat redovno ili povremeno.

3% od ispitanicite imaat koristeno iznajmen trotinet (od prijatel, Bin-Bin ili sl.).

95% od ispitanicite nikogaš voopšto ne koristele električen trotinet.

2. Najznačajna cel za korištenjeto električen trotinet i dali postoji potencijal za negovo korištenje za javen prevoz do odredeni lokacii?

Megju redovnite i povremenite korisnici, najgolem del od ispitanicite trotinetot go koristele za zabava (68%).

Bezmalku edna tretina od ispitanicite (32%) go koristele električniot trotinet za prevoz kon odredena cel vključuvajki do rabotnoto mesto, do lokalnite objekti, do obrazovnite institucii, do sopstveniot dom ili do domovite na rodnini ili prijateli.

Najgolem del od ispitanicite, značajni 65% od onie koi se izjasnija deka ke kupat ili ke iznajmat električen trotinet bi prestanale da koristat najmalku eden vid javen transport.

Ostanatite 35% povremeno bi go koristele električniot trotinet, no nikako ne bi go napustile javniot prevoz i prevozot so individualen avtomobil.

3. Prednost na kupuvanjeto ili na iznajmuvanjeto električen trotinet.

Rezultatite od sprovedenata anketa pokažuvaa deka 1 od 20 ispitanici smeta deka verovatno bi kupil električen trotinet, a 15 % od ispitanicite se izjasnija deka poprho bi iznajmилe električen trotinet.

Pomladite ispitanici vo starosnata granica od 18 – 30 godini se izjasnija deka najverovatno bi kupile električen trotinet.

4. Kolku naši sogragjani umeat da identifikuvaa neкои od prednostite i nedostatocite od upotrebata na elektricnite trotineti?

Vo sprovedenata anketa 70% od ispitanicite može da se setat na barem edna prednost na elektricnite trotineti. Pritoa kako prednosti bea spomnati odgovorite deka električniot trotinet ne ja zagaduva životnata sredina, ne sozdava bučavost, lesen e za upravuvanje, cenata na transport so električen trotinet e niska, trotinetot ima mali dimenzii, prikladen e za kratki relacii, vozenjeto e zabavno, brzo i lesno se uci kako da se upravuva itn.

Karakteristični se nedostatocite za koi se izjasnija del od anketiranite sogragjani vo starosnata granica nad 65 godini: nebezbeden prevoz, nestabilno upravuvanje na neramen teren, nepotporna infrastruktura vo gradovite, visoka cena za lična nabavka na električen trotinet, nemožnost za vozenje pri nepovolni vremenski uslovi, ja zagrozuvaa bezbednosta na pešacite poradi tivkoto rabotenje, zgolemen rizik za korisnicite na trotineti pri učestvo vo soobraќaj so ostanatite prevozni sredstva i sl.

2. NEKOLKU FAKTI ZA SONČEVATA ENERGIJA

Imajki gi predvid dobienite rezultati od sprovedenata anketa i sledstveno dobienite rezultati za zainteresiranosta na našite sogragjani za koristenje električni trotineti kako javen prevoz, samata po sebe se nametnuva potrebata i za kreiranje možnost za izgradba na javni polnači za električni trotineti. Uste poveke, bidejki raspolagame so relativno evtina tehnologija za besplatno polnenje na bateriite so pomoš na sončeva energija, nekolku entiteti vo državata gi združija silite i so zaedničko zalaganje naskoro ke go puštat vo upotreba prvot javen polnač na električni trotineti (JPET) vo Makedonija kako pilot-proekt, so možnost istiot da se multiplicira i vo drugi regioni od državata.

2.1 Zošto sončeva energija?

Obnovlivate izvori na energija pokraj toa što proizvoduvaat električna energija, isto taka pridonesuvaat za namaleno zagaduvanje i trošoci za električna energija.

Sončevata energija e besplatna, obnovliva, sigurna i ekološka, a našeto podnebjje ja ima vo izobilstvo. So okolu 260 sončevi denovi vo godinata odnosno preku 2.300 sončevi časovi godišno Makedonija e megju zemjite so najpovoloni uslovi za proizvodstvo na sončeva energija vo Evropa i ima odličan potencijal za iskoristuvanje na sonceto.

Vo slednata tabela se pomesteni podatoci za brojot na sončevi denovi za nekolku gradovi od svetot vo različni gradovi [4].

Grad	Država	Broj na sončevi denovi
Keln	Germanija	65
Murmansk	Rusija	76
London	Velika Britanija	142
Nju Jork	SAD	184
Marsej	Francija	230
Strumica	Makedonija	230
Skopje	Makedonija	260
Valensija	Španija	300
Las Vegas	SAD	320
Fodza	Italija	330
Akapulko	Meksiko	338

Tabela 1 Broj na sončevi denovi vo različni gradovi i državi

3. KARAKTERISTIKI NA SONČEVOTO ZRACENJE VO REPUBLIKA MAKEDONIJA

Republika Makedonia e podračje vo koe spored merenjata [5], intenzitetot na sončevoto zračenje e povolno za dobivanje energija. Globalnoto sončevo zračenje vo Makedonija e maksimalno vo jugozapadniot planinaski region (Ohrid i Struga). Negovata maksimalna **godišna** vrednost iznesuva okolu 1500 kWh/m².

Skopje se naogja vo region so **godišno** sončevo zračenje od 1497,3 kWh/m². Goleminata na **dnevno** sončevo zračenje vo neкои gradovi vo Makedonija (spored istiot izvor) iznesuva:

- Bitola - 4150 Wh/m²
- Berovo - 4250 Wh/m²
- Ohrid - 4350 Wh/m²
- Prilep - 4200 Wh/m²
- Skopje - 4000 Wh/m²
- Lazaropole - 4050 Wh/m²

Месец	Кочани		Скопје		Битола	
	KWh/m ² на ден	KWh/m ² на месец	KWh/m ² на ден	KWh/m ² на месец	KWh/m ² на ден	KWh/m ² на месец
Јануари	0.64	19.9	0.57	17.67	0.66	20.46
Фебруари	1.52	42.5	1.2	33.6	1.3	36.4
Март	2.26	70.2	2.03	62.93	2.2	68.2
Април	2.96	88.75	2.56	78.8	2.83	84.9
Мај	3.23	100.2	3.24	100.44	3.01	93.31
Јуни	3.55	106.5	3.08	92.4	3.58	107.4
Јули	3.8	117.7	4.03	124.82	3.92	121.52
Август	4.55	141	4.87	150.97	4.62	143.22
Септември	3.12	93.75	3.57	107.1	3.6	108
Октомври	2.4	72.45	2.18	66.96	2.45	75.95
Ноември	1.28	39.7	1.08	32.4	1.5	45
Децември	0.67	20.7	0.61	18.91	0.71	22
Годишно		912.2		885		926.36

Tabela 2. Mesečno sončevo zračenje vo kWh/m² po gradovi vo Makedonija

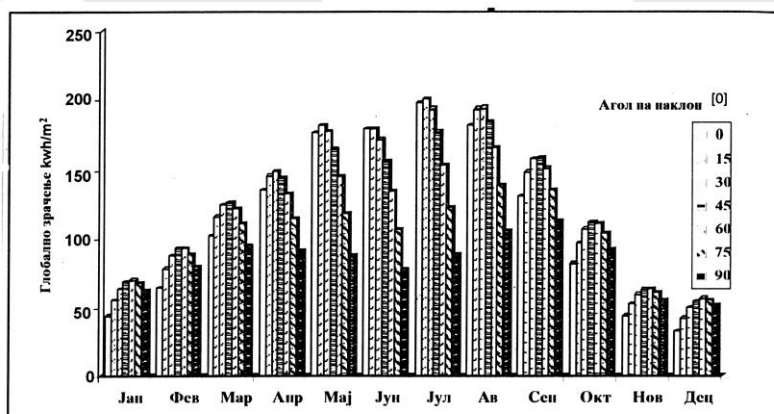


Tabela 3. Sredno godišno globalno zračenje za Skopje

4. SOLARNO POLNENJE NA ELEKTRICNI TROTINETI

So cel maksimalno da odgovori za svojata namena, eden javen solaren polnač na trotineti kako električen ured treba da zadovolji nekolku ključni kriteriumi:

1. Da bide postaven na povolna osončena lokacija;
2. Da ima soodveten kapacitet na baterii za skladiiranje na proizvedenata električna energija od primenata sončeva svetlina;
3. Da bide konfiguriran taka što da može da obezbedi dovolno električna energija za polnenje na električni trotineti vo tekot na celoto denonokie;
4. Da bide bezbeden od električen struen udar za korisnicite na uredot;
5. Da ovozmožuva soodvetno parkiranje na električnite trotineti postaveni na polnenje od negoviot izvor.

Edna studija [6] pokaža deka izgradbata na stanicite za polnenje na električni trotineti e relativno evtina i brza, održuvanieto e ednostavno, a periodot na nivnata otplata trae samo nekolku meseci. Ušte poveke, izgradbata na mreža od javni polnači soodvetno raspredeleni vo odredeni regioni neminovno ke dovede do namaleni operativni trošoci za korisnicite, neznačitelni operativni trošoci za održivanje i sekako namaleno optovarivanje na potrošivačkata na električna energija vo sporedba so toa koga istiot broj električni trotineti bi se polnel preku povrzivanje so nacionalnata elektricna mreža.

5. ELEKTRIČNI TROTINETI VO REPUBLIKA MAKEDONIJA

Pri izrabortkata na ovoj trud beše napraveno istraživanje vo koe bea opfateni poveke temi za analiza:

- Kompanii - zastapnici na proizvodeli na električni trotineti;
- Tipovi trotineti koi najčesto se koristat vo Makedonija;
- Tipovi polnači za direktno polnenje na trotinetot;
- Dolžina na destinacii na koi se koristat električnite trotineti;
- Podračje so najgolema koncentracija na korisnici na električni trotineti;
- Dizajn na JPET;
- Prostor za korisnicite na JPET;
- Videonadzor poradi vandalizam.

Kompanii - zastapnici na proizvođiteli na električni trotineti

Kompanii - zastapnici	Model	Karakteristiki na baterijata
e-Mobility	Kaabo Mantis 10 Dual Pro+ Wolf Warrior 11	Vo zavisnost od goleminata i moќnosta na trotinetot, baterijata vo prosek se polni za 3 do 6 ĉasa.
Mi -elektricni trotineti	Xiaomi	
Elipso	Xiaomi	
HAMACI MOTORCYCLES	Hamachi	Potreben e standarden Ńteker. Bateriskite sistemi se od 24 do 48 V Kapacitetot se dviŃi od 5 000 do 10 000 mAh.
Tehnomarket	Hamachi, SEGWAY DENVER TREVI MS ENERGY ROCES	
NEPTUN	SEGWAY Xiaomi	
BIN-BIN	BIN-BIN	

Tabela 4. Distributeri za električni trotineti vo Republika Makedonia

Ovie trotineti moŃat da pominat rastojanija od 45km so maksimalna brzina do 30km/h, na ramen teren pri optimalno optovaruvanje.

6. JAVEN POLNAC ZA ELEKTRICNI TROTINETI

Prezentiraniot javen polnaĉ na električni trotineti (JPET) nudi kompletno reŃenie za parkiranje i polnenje na električni trotineti. Toj vsuŃnost pretstavuva razviena ideja za edna inovativna parking-stanica koja istovremeno e funkcionalen polnac no i mesto za odmor na svoite korisnici.

6.1 INSTALACIJA NA JPET VO OOU „ALEKSANDAR MAKEDONSKI“ nas. AERODROM, SKOPJE

OOU „Aleksandar Makedonski“ od naselba Aerodrom vo Skopje e puŃteno vo upotreba vo 2013 god. Veke edna decenija uĉiliŃteto raboti so uspeh na obrazovanie, vospitanie i izdignuvanje na mladi generacii, davajki svoeviden pridonos vo nivnoto natamoŃno Ńkoluvanje i vkluvuvanje vo site sferi na opŃtestveniот Ńivot.



SI 1. OOU „Aleksandar Makedonski“, nas.Aerodrom - Skopje



SI 2. Mapa na opština AERODROM, Skopje

Naselbata Aerodrom e izbrana kako lokacija za izvedba na JPET od poveќе priçini. Imeno, ova skopska naselba pretstavuva frekventno mesto so pretežno mlado naselenie i prepolni ulici so lugje i vozila. Problemot so prostorot kako vo celiot grad taka i vo ova naselba e navistina golem. Zagaduvanjeto spored rezultatite što se dobivaat od mernite stanici koi se postaveni vo naselbite lisiçe i Aerodrom pokažuvaat visoko nivo na prisustvo na PM3 čestički.

Vo sorabotka so Gradonačalnikot na Opštinata „Aerodrom“, Direktorkata na OOU „Aleksandar Makedonski“, Amerikanskata ambasada vo Republika Makedonija, NVO „Centar za klimatski promeni“ i izveduvacot na instalacijata na JPET – privatnata kompanija Daris inženering DOOEL od Skopje, ke se izgradi eden takov ured vo dvorot na ova učiliste. Celta na sorabotnicite e da se iskoristi poleznosta na proektot kako ideja za namaluvanje na zagaduvanjeto na naselbata i da se namali problemot so nedostigot na parkirališta.

Repliciranjeto na vakviot pristap kaj poveketo opštini vo gradot može da pridonese za sproveduvanje na idejata za pomalo zagaduvanje i poevtini rešenija za javen prevoz.

7. TEHNIČKI KARAKTERISTIKI NA JPET

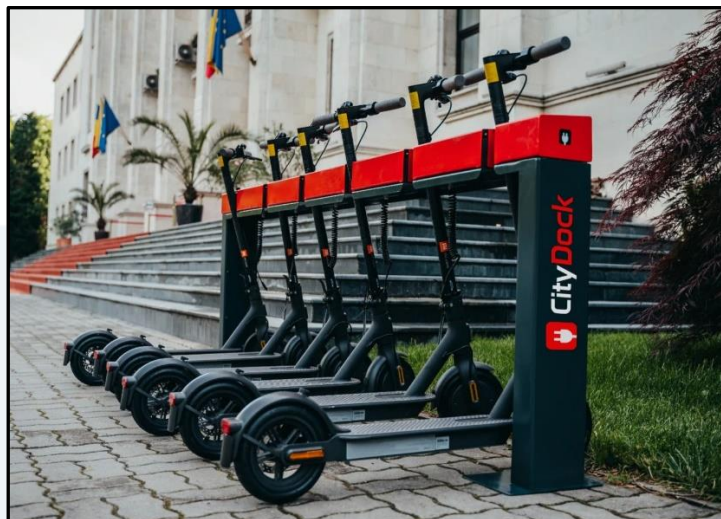
Osnovni komponenti na JPET se slednite:

- Off-grid sistem za električno napajanje na JPET koj vključuje:
 - Solarni paneli so skupno instalirana električna moč $P = 1100\text{Wp}$;
 - Solaren inverter;
 - Solaren kontroler;
 - Zatvorena kutija za skladiščenje na elektronske komponente na ured;
 - Baterijska banka za skladiščenje na proizvedeno električno energijo;
 - DC preklopnik za baterije i balansir na polnjenje;
 - Kutija za varno skladiščenje na baterijsko banka.
- Parking-mesta za istovremeno parkiranje/polnjenje na maksimalno štiri trojine;
- Priklopnici za možnost za istovremeno polnjenje na maksimalno 4 (štiri) električne trojine, preko namenske kabele so sodoben priključek (jack);
- Priklopnici za možnost za istovremeno polnjenje na maksimalno 4 (štiri) elektronske urede so USB priključek;
- Konstrukcija na Polnačot so maksimalna višina $H=2\text{m}$;
- Izvedba na 2 (dve) integrirane klupe za odmor na korisnike na Polnačot;
- Bezbednosno zezemljivanje na metalne komponente na Polnačot;
- Bezbednosno-informativna tablica za korišćenje na Polnačot.

8. PREDNOSTI NA JPET

- JPET e energetska samostojna i ekološka ureda za polnjenje električne trojine i prenosne elektronske urede;
- JPET ja podržuje ekološka borba protiv izduvne CO_2 gasove;
- JPET ja namaluje domašnja smetka za električno energijo;
- JPET pridonosuje za namalovanje na optovarivanje na javna električna mreža;
- JPET ovozmožuje prijatno mesto za odmor za njegove korisnike;
- JPET e ureda koj ima laka i brza instalacija (na podgotvena zemlja ili betonska podloga se instalira ureda koj e veke izrađen u radilnica);
- JPET ovozmožuje organiziranje i podređivanje na trojine;
- JPET ne iziskuje nikakve posebne instalacije niti povezivanja;
- JPET e jednostavan za korišćenje i može da se upotrebuje odmah po instaliranju (t.n. Plug-and-Play sistem);
- JPET zafaka malo prostora za instalaciju;
- JPET e sklop čije održavanje e lako i jednostavno, bez ugrađenih specifičnih komponenti sklona kvari;
- So pravilno i domaćinsko korišćenje i redovno održavanje, životni vek na komponente na JPET može da dostigne i do 20 (dvadeset) godina;
- JPET e relativno jeftin za izvedbu i instaliranje;

- JPET nima omejitve pri uporabi, saj jo lahko namestijo tako lokalne oblasti kot zasebne institucije ali podjetja.
- JPET je modularni in razširljiv sistem, ki omogoča večje površine za več uporabnikov in vključuje funkcije za električno polnjenje in druge vrste prenosnih elektronskih naprav.



Sl.3 Javni polnaci na električni trotineti od nekih svetovnih metropol

Vo Germaniji se vse bolj uporabljajo podobni javni polnilišča za električne skuterje, kjer je poleg polnilne plošče nameščena tudi tablica s priporočili za varno uporabo.



Sl.4 Javni polnaci na električni trotineti, instalirani v Germaniji

ZAKLUČOK

Iako vo odredeni opšttestveni krugovi [7] postoji somnež vo mikromobilnosta i dodeka se sugerira deka trotinetite i e-velosipedite se momentalen trend, zgolemuvanjeto na nivniot broj na gradskite ulici niz celiot svet ne može da se ignorira. Kako podrška na ova tvrdenje stojat brojni istraživanja koi pokažuvaat deka do 2024 godina vo svetot ke ima okolu 4,6 milioni trotineti. Toa e skok od skoro 600% vo odnos na 2019 godina koga se procenuva deka imalo 774.000 trotineti i e-velosipedi [8].

Na električnite trotineti im se potrebni stanici za polnenje bidejki rabotat na baterii koi treba periodično da se dopolnuvaat. JPET se uredi koi ovozmožuvaat besplatno polnenje na električniot trotinet bez pritoa toj da se nosi doma ili da se ostava na ulica.

JPET vovglavno se postavuvaat na javni mesta, kako sto se avtobuski stanici, postojki, parkovi, parkinzi, gradinki, učilista, fakulteti, fabрики itn. za da bidat dostapni za site. Montažata na JPET vo OOU „Aleksandar Makedonski“ vo nas.Aerodrom vo Skopje ke ovozmoži da se rešat del od problemite povrzani so namaluvanje na domašnite smetki za električna energija, namaluvanje na optovaruvanjeto na javnata električna mreža, zgolemuvanje na dosegot na vozenje, namaluvanje na optovarenosta na javniot gradski prevoz, ke se izbegne vandalizmot vrz trotinetite, nivno bezbedno polnenje i bezbedno parkiranje, ke se pridonese kon namaluvanje na aerozagaduvanjeto vo toj del od Grad Skopje, ke se namali pritisokot za pogolem broj parking-mesta i niza drugi realni problemi.

Prezentiraniot JPET ke dade pottik i pridones na urbanata mikro-mobilna revolucija vo Grad Skopje, no i vo Makedonija vooopšto. Site opštini, pomali ili pogolemi koi sakaat da go ohrabrat razvojt na mikromobilnosta, lesno i evtino možat da instaliraat održiva infrastruktura za polnenje na električni trotineti na nivnata teritorija. Blagodarenie na fleksibilnosta na idejata za JPET, tie možat da se koristat i da se postavuvaat pred sekoja zgrada koja saka da bide vo čekor so novoto vreme, pred trgovski centri, univerziteti, institucii pa duri i fabрики i ostanati industriski kapaciteti za da obezbedat opcija za pametno parkiranje namesto grižata kade da se ostavi trotinetot.

Mikromobilnosta e nov fenomen koj brzo stanuva popularen vo site gradovi, no se prifaka i kako nužnost kaj golem broj javni i privatni entiteti. Dojdeno e vremeto koga gradskite arhitekti, gradonačalnicite i drugite politički činiteli moraat da se soočat so novite predizvici povrzani so električnite trotineti kako aktivni učesnici vo soobraќajot i da kreiraat uslovi za nivno vklucuvanje vo sekojdnevieto kako faktor za olesnuvanje na transportot na svoite sogradjani i kako aktivni pridonesuvači za namaluvanje na pritisokot vo javniot gradski prevoz, potrebite za zgolemen broj parking-mesta, namaluvanjeto na aerozagaduvanjeto, namaluvanjeto na bučavosta i mnogu drugi fenomeni od urbanoto živeenje.



CAR TRAFFIC SCHOOL CENTER "BORO PETRUSHEVSKI"

Authors:

M-r. Snežana Božinoska Risteska *dipl. soob. inž.*

1. PUBLIC CHARGERS FOR ELECTRIC SCOOTERS

Significant amounts of energy are consumed in transport, which seriously pollutes the air and creates an urban heat curtain that is unsustainable. In order to alleviate the increased pressure on the environment and for its protection, the demand for electric vehicles with on-call mobility (vehicles that can be shared between users in real time) has increased.

The explosive development of electric scooters and their presence in big cities is obvious. The new "guest" in the traffic has penetrated almost all the pores of the urban transport and started to satisfy the needs in the first and last kilometer of the delivery.

The price of electricity is not low. Although electric scooters consume little electricity, the cost of electricity used by these scooters increases significantly.

Various companies in America that are interested in renting these scooters [2] charge between \$5 and \$12 for electricity to charge the scooter, and some of them charge from \$5 to \$25. The bottom line is that charging scooters is a problem in the scooter rental business.

To overcome this problem, one of the possible solutions is the construction of photovoltaic platforms that would serve as public chargers for electric scooters (JPET) and other electronic devices. These types of platforms have already been developed for electric vehicles, so similar environmental and economic analyzes [3] have been made for charging electric scooters from the public power grid. JPET proved to be an excellent solution for charging electric scooter batteries, while the research included optimization of the location and sizes of these chargers.

Finally, the adaptation of JPETs to the environment and their position, which would allow the production of a sufficient amount of electricity stored in batteries, would overcome the problem of limited movement of electric scooters. Namely, JPET with built-in photovoltaic modules should be installed in locations with open access to sunlight in

dense urban environments and allow availability for constant charging of tricycle batteries.

INTRODACTION

Mobility means movement. First, it means movement of people, and then movement of motor vehicle. The movement of pedestrians and cyclists is of great importance in cases where it is necessary to achieve progress in the sustainability of the traffic system, to increase safety and reduce pollution, to control climate change, to reduce noise and other factors.

Global warming and greenhouse gases are still being discussed, and efforts to reduce and control these phenomena are at a high level, organized public transport system, safe infrastructure for pedestrians, cyclists and motor vehicles, sufficient green areas, low pollution, reduced noise, etc. Of course, this is the perfect situation to strive for. The current situation and facing the current problems led to a possible review and development of the so-called micromobility.

According to the ITF (International Transport Forum), micromobility is defined as the use of micro-vehicles, with a weight of up to 350 kg and a speed of up to 45 km/h. Micromobility involves the use of light vehicles only, such as bicycles, scooters, e-bikes and e-scooters, electric motorcycles, with the most efficient use of existing road infrastructure and with regard to human health, human safety, urban development and finally the future of humanity.

Micromobile vehicles produce a small amount of exhaust gases or do not pollute at all, and they also have a very low noise level and solve the so-called "last mile" ("the last mile problem"). They are great for traveling short distances.

Solving the "last mile" problem is not to be neglected as it is a challenging component of the logistics and transportation field. This is one of the reasons why it is well known in the transport network that the delivery of goods in the "last kilometer" covers about 30 - 35% of the total costs of delivery and is evident in all types of transport: road, rail, water and air.

A number of cities in Europe are working to implement sustainable urban mobility plans. In this context, motorized traffic is discouraged, while prioritizing and improving alternative forms of mobility.

Micromobility should be developed in agreement with the rest of motor traffic, gradually decreasing in segments where possible, but without neglecting pedestrians and cyclists as the core of alternative mobility.

1. SURVEY ON THE USE OF ELECTRIC SCOOTER IN MACEDONIA

For the needs of this effort, and with the aim of creating a basic picture for the awareness of Macedonian citizens about micromobility, the author of this effort conducted an independent research survey with the citizens of the City of Skopje. The survey was conducted on a sample of 60 random passers-by in the Aerodrom neighborhood in Skopje, in the area in front of TC CAPITOL. The location was chosen specifically because of the high frequency of people from different age groups and is located directly to a large number of public and private institutions, companies, shops, bus stops and the like, but it is also located directly to a large complex of residential objects.

The analysis of the collected results of the survey was made by dividing the respondents into the following age limits:

1. Over 65 years old;
2. From 50 to 64 years;
3. From 30 to 49 years; and
4. From 18 to 30 years

The main objectives of the research were set as follows:

1. To obtain basic data for informing our fellow citizens about the existence of electric scooters as an option for public transportation.
2. To identify what would be the most important purpose for using an electric scooter and whether there is a potential for its use for public transportation to certain locations.
3. To get information if our household would like to buy or rent an electric scooter.
4. To create a picture of how many of our fellow citizens are able to identify some of the advantages and disadvantages of using electric scooters.

By analyzing the results obtained from the conducted survey, the following conclusions were drawn:

1. Informing our residents about the status of electric scooters as an option for public transportation

More than half of the respondents (51%) confirm that they have some level of knowledge about electric scooters as an option for public transportation.

13% of respondents have general knowledge that includes even knowing the prices of some models of electric scooters.

34% of respondents have little or no information that electric scooters can be an option for public transportation.

The analysis according to age groups shows that the level of information is higher among respondents in the age group of 18-30 years.

The data from the analysis is interesting, which shows that only 5% of the respondents have ever used an electric scooter and use it regularly or occasionally.

3% of the respondents have used a rented scooter (from a friend, Bin-Bin or similar).

95% of respondents never used an electric scooter.

2. What would be the most important purpose for using an electric scooter and is there a potential for its use for public transport to certain locations

Among regular and occasional users, the largest part of the respondents used it for fun (68%).

Almost one third of the respondents (32%) used the electric scooter for transportation with a specific purpose, including to the workplace, to local facilities, to educational institutions, to their own home or to the homes of relatives or friends.

3. Do you buy or rent an electrical scooter

1. Advantage of buying or renting an electric scooter.

The results of the conducted survey show that 1 out of 20 people surveyed thought that they would probably buy an electric scooter, and 15% of the people surveyed stated that they would rather rent it.

The younger respondents in the age group of 18–30 declared that they would very likely buy an electric scooter.

2. How many of our fellow citizens can identify some of the advantages and disadvantages of using electric scooters?

In the conducted survey, 70% of the respondents could think of at least one advantage of an electric scooter. Thus, the respondents' answers were that the electric scooter does not pollute the environment, does not create noise, is easy to manage, the price of transportation is low, the scooter has small dimensions, it is suitable for short distances, driving is fun, fast and it is user friendly etc.

Most of the surveyed residents over the age of 65 stated that the scooter's disadvantages are: unsafe transportation, difficulty while driving through rough terrain, bad street infrastructure, high price for personal use, difficulty while driving in bad weather conditions, and it unsafe for the pedestrians due to the silence of the scooter, increased risk in traffic, etc

2. SOLAR ENERGY FACTS

After obtaining the results from the survey and the results that showed the people's interest in using electric scooters as public transportation, it imposes the need for public spots where they can charge their scooter's battery. Moreover, since we have a relatively cheap technology for recharging the battery with the help of solar energy, several entities in the country have joined forces and soon will put the first public electric scooter charger (JPET) in Macedonia into use as a pilot-project, with the possibility of being replicated into the rest of the country.

2.1 What is (Why) solar energy?

Renewable energy sources, in addition to producing electricity, also contribute to reducing pollution, the carbon footprint and lowering the cost of electrical energy consumption.

Solar energy is free, renewable, safe and good for the environment, and our region with our climate we already have it in abundance. With around 260 sunny days per year, or over 2,300 sunny hours per year, Macedonia is among the countries with the most favorable conditions for the production of solar energy in Europe and has excellent potential for the use of solar energy.

The following table contains data on the number of sunny days in several cities around the world [4].

City	Country	Number of sunny days
Cologne	Germany	65
Murmansk	Russia	76
London	UK	142
New York	USA	184
Marsey	France	230
Strumica	Macedonia	230
Skopje	Macedonia	260
Valencia	Spain	300
Las Vegas	USA	320
Foggia	Italy	330
Akapulko	Mexico	338

Tabela 1. Number of sunny days in different cities and countries

3. Republic of Macedonia's Solar radiation characteristics

The Republic of Macedonia is an area where according to measurements [5], the intensity of solar radiation is great for obtaining solar energy. Global solar radiation in Macedonia is maximum in the southwestern mountain region (Ohrid and Struga). Its maximum annual value is around 1500 kWh/m².

- Skopje is located in the region with annual solar radiation of 1497.3 kWh/m².
- The amounts of daily solar radiation in some cities in Macedonia (according to the same source) are:
 - Bitola - 4150 Wh/m²
 - Berovo - 4250 Wh/m²
 - Ohrid - 4350 Wh/m²
 - Prilep - 4200 Wh/m²
 - Skopje - 4000 Wh/m²
 - Lazaropole - 4050 Wh/m²

Месец	Кочани		Скопје		Битола	
	KWh/m ² на ден	KWh/m ² на месец	KWh/m ² на ден	KWh/m ² на месец	KWh/m ² на ден	KWh/m ² на месец
Јануари	0.64	19.9	0.57	17.67	0.66	20.46
Февруари	1.52	42.5	1.2	33.6	1.3	36.4
Март	2.26	70.2	2.03	62.93	2.2	68.2
Април	2.96	88.75	2.56	78.8	2.83	84.9
Мај	3.23	100.2	3.24	100.44	3.01	93.31
Јуни	3.55	106.5	3.08	92.4	3.58	107.4
Јули	3.8	117.7	4.03	124.82	3.92	121.52
Август	4.55	141	4.87	150.97	4.62	143.22
Септември	3.12	93.75	3.57	107.1	3.6	108
Октомври	2.4	72.45	2.18	66.96	2.45	75.95
Ноември	1.28	39.7	1.08	32.4	1.5	45
Декември	0.67	20.7	0.61	18.91	0.71	22
Годишно		912.2		885		926.36

Table 2. Monthly solar radiation in kWh/m² by cities in Macedonia

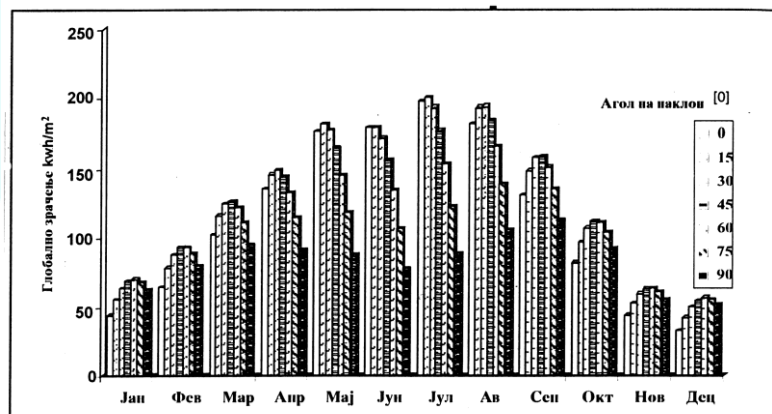


Table 3. Average annual global radiation for Skopje

4. Solar charging of scooters

In order to be maximally suitable for its purpose, a public solar charger for scooters as an electric office should satisfy several key criteria:

1. To be located on a suitable sunny location;
2. To have adequate capacity of the batteries for storing the produced electricity from the application of sunlight;
3. To be configured in such a way that it can provide enough electricity to charge the electric scooters during the entire period;
4. To be safe from electric shock for users of the office;
5. To allow adequate parking of electric scooters that are charged from his source.

A study [6] showed that the construction of charging stations for electric scooters is relatively cheap and fast, maintenance is simple, and their payback period lasts only a few months. Even more, the construction of a network of public chargers appropriately distributed in certain regions will inevitably lead to reduced operating costs for users, insignificant operating costs for maintenance and of course a reduced burden on the consumption of electricity compared to when the same number of electric scooters would be charged through connection to the national electrical grid.

5. Electric scooters in the Republic of Macedonia

During the development of this study, several topics were covered for analysis:

- Companies - representatives of producers of electric scooters;
- Types of scooters that are most often used in Macedonia;
- Types of chargers for direct charging of the scooter;
- Length of destinations where electric scooters are used;
- The area with the largest concentration of users of electric scooters;
- Design of JPET;
- Space for JPET users;
- Video surveillance for vandalism.

Companies - representatives of producers of electric scooters

Companies - representatives	Model	Battery characteristics
e-Mobility	Kaabo Mantis 10 Dual Pro+	Depending on the size and wetness of the scooter, the battery is charged in an average of 3 to 6 hours, and a standard plug is required. Battery systems are from 24 to 48 V, and the capacity is from 5 000 to 10 000 mAh
Mi -elektricni trotineti	Xiaomi	
Elipso	Xiaomi	
HAMACI MOTORCYCLES	Hamachi	
Tehnomarket	Hamachi, SEGWAY DENVER TREVI MS ENERGY ROCES	
NEPTUN	SEGWAY Xiaomi	
BIN-BIN	BIN-BIN	

Table 4. *Electric scooter distributors in the Republic of Macedonia*

These scooters can cover a distance of 45 km with a maximum speed of up to 30 km/h, on the flat terrain with optimal loading.

6. PUBLIC CHARGER FOR ELECTRICAL SCOOTERS

The presented public electric scooter charger (JPET) offers a complete solution for parking and charging electric scooters. This reality represents a developed idea for an innovative parking station that is both a functional charger and a place for its users to rest.

6.1 INSTALLATION AT JPET IN OOU "ALEKSANDAR MAKEDONSKI" MUNC. AERODROM, SKOPJE

OOU "Aleksandar Makedonski" from MUNC. Aerodrom in Skopje was put into use in 2013. For more than a decade, the school has been successfully working on the education, upbringing and development of the young generation, making an obvious contribution to their further education and inclusion in all spheres of social life.



Fig 2. OOU „Aleksandar Makedonski“, munc.Aerodrom - Skopje



Fig 2. Map of the municipality AERODROM, Skopje

Municipality Aerodrom was chosen as the location for the implementation of JPET for several reasons. Namely, this Skopje municipality represents a frequented place with a predominantly young population and crowded streets with people and vehicles. The problem with space, both in the whole city and in this municipality, is really big. According to the results obtained from the measuring stations set up in the settlements of Lisiče and Aerodrom, the pollution shows a high level of the presence of PM3 particles.

In cooperation with the Mayor of the Municipality "Aerodrom", the Director of OOU "Aleksandar Makedonski", the American Embassy in the Republic of Macedonia, the NGO "Centar za klimatski promeni" and the contractor of the installation of JPET - the private company Daris engineering DOOEL from Skopje, will build one such an office in the yard of this school. The goal of the collaborators is to use the usefulness of the project as an idea to reduce the pollution of the municipality and to reduce the problem with the lack of parking spaces.

Replication of this approach in most municipalities in the city can contribute to the implementation of the idea of low pollution and cheaper solutions for public transport.

7. Technical characteristics of JPET

Basic components of JPET are:

- Off-grid system for electric power supply of JPET which includes:
 - Solar panels with total installed electrical power $P = 1100\text{Wp}$;
 - Solar inverter;
 - Solar controller;
 - Closed box for storing the electronic components of the office;
 - Battery bank for storage of produced electricity;
 - DC battery switch and charge balancer;
 - Box for safe storage of the battery bank.
- Parking spaces for simultaneous parking/charging of a maximum of four tricycles;
- Connectors for simultaneous charging of a maximum of 4 (four) electric scooters, via a dedicated cable with a suitable connector (jack);
- Connectors for simultaneous charging of a maximum of 4 (four) electronic devices with a USB connector;
- Charger construction with maximum height $H=2\text{m}$;
- Performance of 2 (two) integrated benches for charger users;
- Safety grounding of the metal components of the Charger;
- Safety-informative plate for using the charger.

8. ADVANTAGES OF JPET

- JPET is an energy-independent and ecological office for charging electric tricycles and portable electronic offices;
- JPET supports the ecological fight against emitted CO2 gases;
- JPET reduce the domestic bill for consumed electricity;
- JPET contributes to reducing opt-out of the public electricity network;
- JPET provides a pleasant place to rest for his users.
- JPET is a device that has an easy and fast installation (a device that has already been made in the workshop is installed on the prepared ground or concrete base);
- JPET enables organization and ordering of the scooters;
- JPET does not require any special installations or connections;
- JPET is easy to use and can be used immediately after installation (the so-called Plug-and-Play system);
- JPET It takes up very little space for installation;
- JPET is an assembly whose maintenance is easy and simple, without built-in specific components prone to failure;
- With proper domestic use and regular maintenance, the lifespan of JPET components can reach up to 20 (twenty) years;
- JPET is relatively cheap to implement and install;
- JPET has no restrictions on applications such that, except as a project of the municipal authorities, other public and private entities (public and private institutions, companies, etc.) can install it for their own needs.
- JPET is a modular upgradeable system that can be expanded with more places for a larger number of users and can be used for electric charging and other types of portable electronic devices

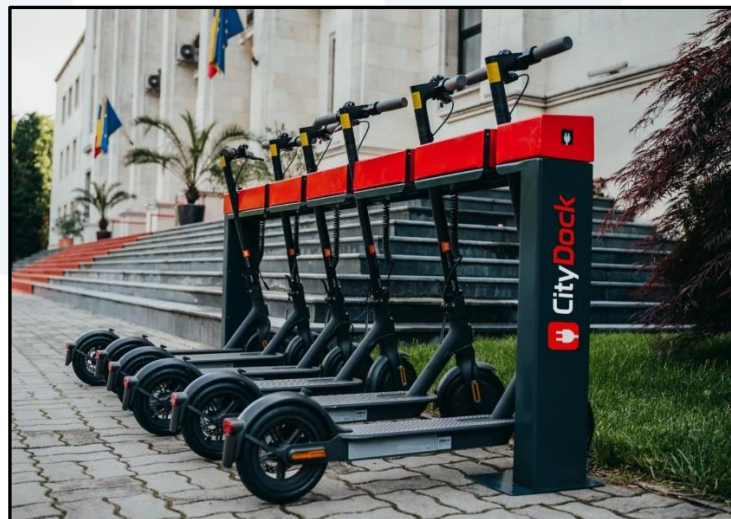


Fig.3 Public chargers for electric scooters from some world metropolises

In Germany, similar public chargers for electric scooters have been installed in recent years and there is a board on which recommendations for the safe use of the charger are written.



Fig.4 Public chargers for electric tricycles installed in Germany

CONCLUSION

Although in certain social circles [18] there is doubt about micromobility and while it is suggested that tricycles and e-bikes are a current trend, the increase in their number on city streets around the world cannot be ignored. In support of this claim, there are numerous studies that show that by 2024 there will be around 4.6 million triplets in the world. That is a jump of almost 600% compared to 2019, when it is estimated that there were 774,000 scooters and e-bikes [17].

Electric scooters need a charging station because they work on batteries that need to be recharged periodically. JPET is arranged to allow free charging of the electric scooter without having to take it home or leave it on the street.

JPETs are generally placed in public places, such as bus stations, stations, parks, parking lots, kindergartens, schools, faculties, factories, etc. to be available for the all. The installation of JPET in OOU "Aleksandar Makedonski" in munc. Airport in Skopje will make it possible to solve some of the problems related to reducing domestic electricity bills, reducing the load on the public electric network, increasing the driving range, reducing the load on public city transport, to avoid vandalism on the tricycles, their safe charging and safe parking, to contribute to the reduction of air pollution in that part of the city of Skopje, to reduce the pressure for a larger number of parking spaces and a number of other real problems.

The presented JPET will encourage and contribute to the urban micro-mobile revolution in the City of Skopje, but also in Macedonia in general. Any municipality, small or large, that wants to encourage the development of micromobility, can easily and cheaply install a sustainable infrastructure for charging electric tricycles in their territory. Thanks to the flexibility of the JPET idea, they can be used and placed in front of any building that wants to be in step with the new era, in front of shopping centers, universities, institutions and even factories and other industrial facilities to provide an option for smart parking instead of worrying about leaving the trotinetot.

Micromobility is a new phenomenon that is quickly becoming popular in all cities, but it is also accepted as a necessity in a large number of public and private entities. The time has come when city architects, mayors and other political actors have to face the new challenges related to electric scooters as active participants in the traffic and create conditions for their inclusion in every place as a factor to facilitate the transport of their fellow citizens and as active contributors to reduce the pressure on public city transport, the need for an increased number of parking spaces, the reduction of air pollution, the reduction of noise and many other phenomena of urban life





Škola za cestovni promet

ŠKOLA ZA CESTOVNI PROMET, ZAGREB

Autori:

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2. MODERNIZACIJA STRUKOVNOG OBRAZOVANJA U REPUBLICI HRVATSKOJ – SEKTOR PROMET I LOGISTIKA

Sažetak:

Agencija za strukovno obrazovanje i obrazovanje odraslih je nositelj projekta "Modernizacija sustava strukovnog obrazovanja i osposobljavanja. Svrha projekta je razvoj strukovnog obrazovanja koje je privlačno, inovativno i povezano s tržištem rada, te jačanje kompetencija odgojno-obrazovnih djelatnika za uvođenje i provedbu kurikuluma.

Kroz nove kurikulume uvodi se i modularna nastava. Modul povezuje oblike učenja na radu, učioničko i izvanučioničko učenje i poučavanje u smislenu te međusobno povezanu i zaokruženu cjelinu, povećava se učinkovitost organizacije rada i smislenije učenje. Ovim pristupom omogućava se planiranje i organiziranje nastave usmjerene na učenika, primjenjivanje nastavnih metoda i strategija kojima se potiče samostalno, odgovorno i aktivno učenje, povezivanje potreba svijeta rada s ishodima učenja, problemsko, projektno i istraživačko učenje. Tijekom izrade novih kurikuluma stavljeno je težište na učenje temeljeno na radu.

Ključne riječi:

- Standard zanimanja,
- Standard kvalifikacija
- Strukovni kurikulum

MODERNIZACIJA STRUKOVNOG OBRAZOVANJA U REPUBLICI HRVATSKOJ – SEKTOR PROMET I LOGISTIKA

1. Modernizacija strukovnog obrazovanja

Agencija za strukovno obrazovanje i obrazovanje odraslih je nositelj projekta "Modernizacija sustava strukovnog obrazovanja i osposobljavanja", koji se provodi od studenoga 2017. do rujna 2023. godine. Cilj projekta je Modernizacija ponude strukovnog obrazovanja te podizanje njegove kvalitete u svrhu povećanja zaposlenosti učenika kao i mogućnosti za daljnje obrazovanje.

Svrha projekta je razvoj strukovnog obrazovanja i osposobljavanja koje je privlačno, inovativno, relevantno, povezano s tržištem rada te koje će omogućiti učenicima stjecanje kompetencija za osobni i profesionalni razvoj te nastavak obrazovanja i cjeloživotno učenje, a ostvaruje se kroz razvoj inovativnih i fleksibilnih sektorskih i strukovnih kurikuluma temeljenih na potrebama tržišta rada te jačanja kompetencija odgojno-obrazovnih djelatnika za uvođenje i provedbu kurikuluma. Izrađeno je 120 novih kurikuluma za strukovne škole te se radi na uvođenju modularne nastave. Modul povezuje oblike učenja na radu, učioničko i izvan učioničko učenje i poučavanje u smisleni te međusobno povezanu i zaokruženu cjelinu, povećava se učinkovitost organizacije rada (odgojno-obrazovnoga procesa) i smislenije učenje. Ovim pristupom omogućit će se planiranje i organiziranje nastave usmjerene na učenika, primjenjivanje nastavnih metoda i strategija kojima se potiče samostalno, odgovorno i aktivno učenje, povezivanje potreba svijeta rada s ishodima učenja, povezivanje informalnoga učenja i neformalnog obrazovanja s formalnim obrazovanjem, problemsko, projektno i istraživačko učenje.

Naglasak je na vertikalnoj i horizontalnoj prohodnosti kroz strukovno obrazovanje i kroz odgojno obrazovne cikluse. Odgojno-obrazovni ciklusi su odgojno-obrazovna razvojna razdoblja učenika koja čine jednu cjelinu. Obuhvaćaju jednu ili više godina obrazovanja, a određuju se prema zajedničkim odgojno-obrazovnim ciljevima i ishodima učenja koja učenik treba postići. U strukovnom obrazovanju odgojno-obrazovni ciklusi razlikuju se ovisno o razini kvalifikacije.

Kvalifikacije u strukovnom obrazovanju prema Hrvatskom kvalifikacijskom okviru (HKO):

- Kvalifikacija razine 3 – kvalifikacije stečene završetkom srednjoškolskog obrazovanja u trajanju kraćem od tri godine. Ukupno radno opterećenje za stjecanje kvalifikacije minimalno je 60 CSVET bodova na razini 3 ili višoj razini ishoda učenja.
- Kvalifikacija razine 4.1. – kvalifikacije stečene završetkom srednjoškolskog obrazovanja u trajanju od tri ili dužem od tri, a kraćem od četiri godine. Ukupno radno opterećenje za stjecanje kvalifikacije minimalno je 180 CSVET bodova, od kojih je najmanje 120 CSVET bodova na razini 4 ili višoj razini ishoda učenja.

- Kvalifikacija razine 4.2. – kvalifikacije stečene završetkom srednjoškolskog obrazovanja u trajanju od četiri ili više godina. Ukupno radno opterećenje za stjecanje kvalifikacije minimalno je 240 CSVET bodova, od kojih je najmanje 150 CSVET bodova na razini 4 ili višoj razini ishoda učenja
- Kvalifikacija razine 5. – kvalifikacije stečene završetkom stručnih studija kojima se stječe manje od 180 ECTS ili CSVET bodova; strukovnoga specijalističkog usavršavanja; programa za majstore uz najmanje dvije godine vrednovanoga radnog iskustva. Ukupno radno opterećenje za stjecanje kvalifikacije minimalno je 60 CSVET ili 120 ECTS bodova, od kojih je najmanje 30 CSVET ili 60 ECTS bodova na razini 6 ili višoj razini ishoda učenja. Uvjet je pristupanja posjedovanje prethodne kvalifikacije na razini 4.1 ili više.

Modernizaciji sustava strukovnog obrazovanja i osposobljavanja se pristupilo kroz nekoliko koraka u kojima su radne skupine formirane od Agencija za strukovno obrazovanje i obrazovanje odraslih izrađivale slijedeće dokumente:

- Standard zanimanja – koji se izrađuje u suradnji s poslodavcima a sadrži popis ključnih poslova na radnom mjestu i pripadajućih kompetencija potrebnih za rad na jednom ili više radnih mjesta.
- Standard kvalifikacija – izrađen na temelju Standarda zanimanja a sukladno s Hrvatskim klasifikacijskim okvirom i koji se temelji na kurikularnom pristupu i ishodima učenja.
- Sektorski i strukovni kurikulum – izrađen na temelju Standarda kvalifikacije, a dovodi do racionalizacije broja kurikuluma, koji omogućavaju učenicima lakše uključivanje na tržište rada, bolju horizontalnu prohodnost, profesionalni razvoj ali i nastavak obrazovanja sa naglaskom na učenje temeljeno na radu.
- Smjernice za primjenu strukovnih kurikuluma i priručnika za nastavnike – kako bi se pružila podrška školama za provedbu novog pristupa i modela, sa naglaskom na fleksibilnost i autonomiju škola



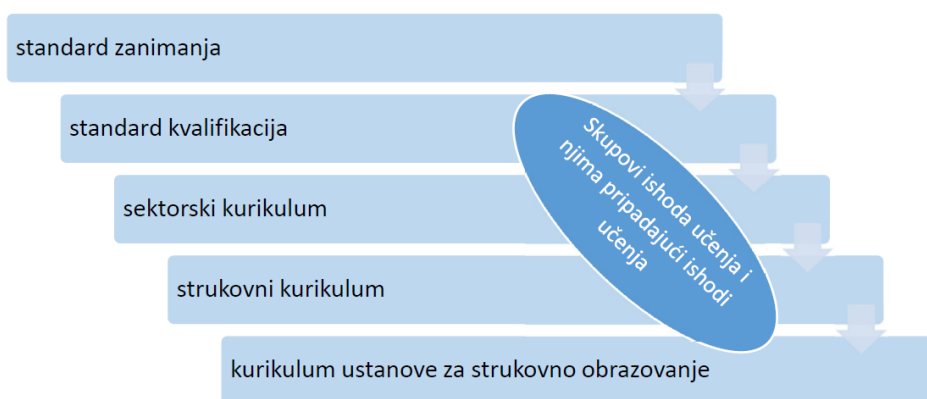
Slika 1.: Struktura Sektorskog kurikulumuma – izvor: Agencija za strukovno obrazovanje i obrazovanje odraslih - <https://www.asoo.hr/projekti-i-suradnja/esf-projekti/modernizacija-sustava-strukovnog-obrazovanja-i-osposobljavanja/>

2. Standard zanimanja

Standard zanimanja je opis poslova koje pojedinac obavlja u određenom zanimanju te sadrži popis ključnih poslova i kompetencija, potrebna znanja i vještine, te razinu samostalnosti i odgovornosti koju učenik treba imati kako bi bilo sposoban raditi u navedenom zanimanju. Za izradu standarda zanimanja osnovane su radne skupine za izradu standarda zanimanja iz redova nastavnika, poslodavaca i predstavnika poslodavaca te radnika u zanimanju. Provedene su ankete poslodavaca o standardu zanimanja prema novoj Metodologiji izrade standarda zanimanja. Prilikom izrade Standarda zanimanja bilo je potrebno navesti dokaze utemeljenosti prijedloga standarda zanimanja i opisati stratešku, sektorsku i analitičku utemeljenost standarda zanimanja na temelju odabranih pokazatelja tržišta rada.

Standard zanimanja sadrži opis zanimanja ili skupa kompetencija, popis ključnih poslova na radnom mjestu i pripadajućih pojedinačnih kompetencija potrebnih za rad.

U Republici Hrvatsko trenutno je u sklopu modernizacije strukovnog obrazovanja izrađeno 120 standarda zanimanja u svim obrazovnim sektorima. U sektoru promet i logistika modernizirani su ili izrađeni novi standardi zanimanja na kvalifikacijskim razinama 3, 4.1, 4.2 i 5 i to za zanimanja: Vozač motornog vozila u prijevozu tereta, Vozač motornog vozila u prijevozu putnika, Skladištar u logistici, Tehničar cestovnog prijevoza, Tehničar za sigurnost cestovnog prometa, Tehničar prometne logistike, Tehničar za inteligentne transportne sustave u cestovnom prometu, Vozač/ Vozačica tramvaja, Instruktor vožnje, Stručni voditelj autoškole, Autotaksi vozač, Vozač tramvaja, Tehničar za marine i jahte, Pomorski nautičar, Nautičar unutarne plovidbe, Strojovođa, Prometnik vlakova, Vlakopratelj, Tehničar za poštu i poštansku logistiku, Poštar, Prometni redar.



Slika 2.: Odnos standarda zanimanja, standarda kvalifikacija i kurikuluma u strukovnom obrazovanju – izvor Metodologija izrade sektorskog kurikuluma, strukovnog kurikuluma i kurikuluma ustanove za strukovno obrazovanje – Agencija za strukovno obrazovanje i obrazovanje odraslih

3. Standard kvalifikacija

Standard kvalifikacije sadrži ključne ishode učenja koje mora sadržavati svaki program koji vodi do te kvalifikacije. Standarde kvalifikacije izrađivale su ustanove imenovane od Agencije, koje su oformile radne skupine iz redova nastavnika, sveučilišnih profesora i predstavnika poslodavaca. Prilikom izrade Standarda kvalifikacije bilo je potrebno navesti opis standarda kvalifikacije, opravdanost uvođenja i ulogu kvalifikacije (potreba tržišta rada i/ili nastavak obrazovanja i/ili druge potrebe pojedinca i društva), prijedlog HKO razine kvalifikacije za koju se predlaže standard, popis skupova ishoda učenja (postojeći u Registru HKO-a ili novo izrađeni za određeni standard kvalifikacije), uvjete za pristupanje stjecanju kvalifikacije.

Osnovi dio standarda kvalifikacije sadrži skupove ishoda učenja sa sljedećim podacima i dijelovima: naziv prijedloga skupa ishoda učenja, razina skupa ishoda učenja prema HKO-u, prijedlog obujma, popis ishoda učenja (u pravilu 3 - 10 ishoda učenja), uvjeti za pristupanje stjecanju skupa ishoda učenja, materijalni i kadrovski uvjeti potrebni za stjecanje/vrednovanje skupa ishoda učenja, postupak i primjer vrednovanja skupa ishoda učenja.

U sektoru promet i logistika izrađeni su sljedeći standardi kvalifikacije: SK Vozač motornog vozila, SK Skladištar u logistici, SK Tehničar cestovnog prometa, SK Tehničar prometne logistike, SK Tehničar za inteligentne transportne sustave u cestovnom prometu, SK Instruktor vožnje B kategorije, SK Prometnik vlakova, SK Strojovođa, SK Vlakopratelj, SK Tehničar za zračni promet, SK Pomorski nautičar, SK Tehničar za marine i jahte, SK Nautičar unutarnje plovidbe, SK Tehničar za poštu i poštansku logistiku.

4. Strukovni kurikulum

Strukovni kurikulum dokument je kojim se određuju procesi, načini i uvjeti stjecanja kvalifikacija. Strukovni kurikulum sadržava skupove ishoda učenja, nastavne cjeline za svaki modul, preporuke okruženja za učenje, načine praćenja stjecanja skupova ishoda učenja i načine vrednovanja ishoda učenja. Strukovni kurikulum propisuje stjecanje najmanje 70 %

kreditnih bodova obveznih skupova ishoda i do 30 % kreditnih bodova izbornih skupova ishoda učenja od ukupnoga obujma kvalifikacije čime se stvara fleksibilan okvir za kombiniranje skupova ishoda učenja u skladu s potrebama lokalnih zajednica i lokalnog tržišta rada.



Slika 3.: Povezanost kurikulumskih dokumenata – izvor Metodologija izrade sektorskog kurikuluma, strukovnog kurikuluma i kurikuluma ustanove za strukovno obrazovanje – Agencija za strukovno obrazovanje i obrazovanje odraslih

U sektoru promet i logistika izrađeni su slijedeći strukovni kurikulumi: Vozač motornog vozila, Skladištar u logistici, Tehničar cestovnog prometa, Tehničar prometne logistike, Tehničar za inteligentne transportne sustave u cestovnom prometu, Instruktor vožnje B kategorije, Prometnik vlakova, Strojovođa, Vlakopratelj, Tehničar za zračni promet, Pomorski nautičar, Tehničar za marine i jahte, Nautičar unutarnje plovidbe, Tehničar za poštu i poštansku logistiku.

5. Sektorski kurikulum

Sektorski kurikulum predstavlja mapu sektora kroz koju se prikazuju kvalifikacije i skupovi ishoda učenja koji pripadaju određenom sektoru. Sektorski kurikulum sadrži popis svih kvalifikacija obrazovnoga sektora, popis skupova ishoda učenja iz standarda kvalifikacija unutar obrazovnog sektora, načine i uvjete za ostvarivanje horizontalne i vertikalne prohodnosti u sklopu sektora, modele i preporuke za provođenje svih oblika učenja temeljenog na radu na razini sektora, prosječno ukupno vrijeme koje učenik treba utrošiti za stjecanje pojedinih skupova ishoda učenja iskazano u CSVET bodovima. 1 CSVET bod obuhvaća od 15 do 25 sati u trajanju od 60 minuta potrebnih za stjecanje odgovarajućih ishoda učenja.



Slika 4.: Sastavnice sektorskog kurikuluma za razinu 4.2. za sektor Promet i logistika i njihova međusobna povezanost na razini podsektora i grana prometa – izvor -Sektorski kurikulum za sektor Promet i logistika

6. Zaključak

Obzirom na zastarjelost nastavnih planova i programa kao i neujednačenost kurikulumskih dokumenta u sustavu strukovnog obrazovanja i osposobljavanja bilo je nužno započeti sustavnu i opsežnu modernizaciju strukovnog obrazovanja.

Agencija za strukovno obrazovanje i obrazovanje odraslih od 2019. započela je provoditi opsežnu modernizaciju sustava strukovnog obrazovanja i osposobljavanja kroz ESF-ov projekt koji za cilj ima razvoja inovativnih i fleksibilnih sektorskih i strukovnih kurikuluma temeljenih na potrebama tržišta rada uz jačanje kompetencija odgojno-obrazovnih radnika za uvođenje i provedbu kurikuluma. Modernizacija strukovnog obrazovanja usmjerena je na procese učenja koji su snažno povezani s poslovima koje će učenici obavljati stvarnim uvjetima na budućem radnom mjestu, a kako bi se postigli ti učinci nužna je snažna povezanost svih dionika, odnosno učenika, nastavnika u ustanovama za strukovno obrazovanje i/ili u regionalnim centrima kompetentnosti i ustanovama za obrazovanje odraslih, mentora kod poslodavca i drugih.

Takvim pristupom ostvarit će zahtjevi da se strukovni kurikulumi planiraju na temelju kompetencija potrebnih na radnom mjestu dok će se proces učenja i poučavanja realizirati u realnim ili simuliranim situacijama radnih aktivnosti.

Za potrebe ostvarivanja učenja temeljenog na radu što predstavlja smisao i cilj strukovnog obrazovanja Agencija za strukovno obrazovanje i osposobljavanje je od 2019. godine do danas napravila detaljne analize i ispitivanja tržišta, izradila 120 standarda zanimanja, preko 140 standarda kvalifikacija i više od 120 modularno strukturiranih strukovnih kurikuluma koje prate zahtjeve suvremenog tržišta rada.

Ovakvim pristupom strukovno obrazovanje i osposobljavanje u Republici Hrvatskoj ima mogućnost postati privlačno, inovativno, relevantno, inkluzivno i povezano s tržištem rada što bi budućim učenicima u strukovnim školama omogućilo stjecanje dostatnih kompetencija za osobni i profesionalni razvoj kao i nastavak obrazovanja i cjeloživotno učenje, a gospodarstvu nužno potreban kvalitetan i stručan kadar.



Škola za cestovni promet

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2. MODERNIZATION OF VOCATIONAL EDUCATION IN THE REPUBLIC OF CROATIA - TRANSPORT AND LOGISTICS SECTOR

Summary:

The executing agency of the project "Modernization of the Vocational Education and Training System" is the Agency for Vocational and Adult Education. The aim of the project is to develop an attractive, innovative and labor market-oriented vocational education and to strengthen the competences of the educational staff in the introduction and implementation of the curriculum.

The new curricula introduce modular teaching. The module combines workplace learning, classroom and extracurricular learning and teaching into a meaningful, interconnected and well-rounded unit, increasing the efficiency of the organization of the educational process itself and more meaningful learning. This approach enables the planning and organization of student-centered instruction, the use of teaching methods and strategies that promote independent, responsible, and active learning, the linking of labor market needs to learning outcomes, and problem-based, project-based and inquiry-based learning. In creating the new curricula, emphasis was placed on work-based learning.

Keywords:

- Occupational standard,
- Qualification standard
- Vocational curriculum

MODERNIZATION OF VOCATIONAL EDUCATION IN THE REPUBLIC OF CROATIA - TRANSPORT AND LOGISTICS SECTOR

1. Modernization of vocational education

The Agency for Vocational Education and Adult Education is the executing agency of the "Modernization of the Vocational Education and Training System" project, which will run from November 2017 to September 2023. The aim of the project is to modernize the provision of vocational education and increase its quality in order to improve the employability of students as well as the possibility of continuing education.

The purpose of the project is to develop an attractive, innovative, relevant and labor market-oriented vocational education that enables students to acquire competencies for personal and professional development as well as for continuing education and lifelong learning. This is achieved through the development of innovative and flexible sectoral and vocational curricula based on the needs of the labor market, as well as through strengthening the competencies of education staff for curriculum introduction and implementation. To date, 120 new curricula have been developed for vocational schools, and the introduction of modular teaching is underway. The module combines the forms of workplace learning, in-school and out-of-school learning and teaching into a meaningful, interconnected and well-rounded whole, which simultaneously increases the efficiency of the organization of the educational process itself and more meaningful learning. This approach allows for the planning and organization of student-centered instruction, the use of teaching methods and strategies that promote independent, self-directed, and active learning, the linking of labor market needs to learning outcomes, the linking of informal learning and informal education with formal education, problem-based, project-based, and research-based learning.

The focus is on vertical and horizontal mobility through vocational education and training and through educational cycles. Educational cycles are the phases of students' educational development that form a unit. They span one or more years of education, and are defined in terms of common educational goals and learning outcomes that the student is expected to achieve. In vocational education, educational cycles differ according to the level of qualification.

Qualifications in vocational education according to the Croatian Qualifications Framework (HKO):

- Level 3 qualification – qualifications acquired at the end of less than three years of secondary education. The total workload for acquiring the qualification is at least 60 CSVET points at level 3 or a higher level of learning outcomes.
- Level 4.1 qualification - qualifications acquired through completion of secondary education of three years or more but less than four years duration. The total workload for obtaining the qualification is at least 180 CSVET points, of which at least 120 CSVET points are at Level 4 or a higher level of learning outcomes.
- Level 4.2 qualification - qualifications obtained through completion of four or more years of secondary education. The total workload for obtaining the qualification is at

XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

least 240 CSVET points, of which at least 150 CSVET points correspond to learning outcomes at level 4 or higher.

- Level 5 qualification – qualifications obtained through completion of a professional study program with less than 180 ECTS or CSVET points, a professional technical training program or a master's degree program with at least two years of assessed work experience. The total workload for obtaining the qualification is at least 60 CSVET or 120 ECTS credits, of which at least 30 CSVET or 60 ECTS credits correspond to learning outcomes at level 6 or higher. A prerequisite for participation is possession of a previous qualification at level 4.1 or higher.

The modernization of the vocational education system was approached in several steps, during which the working groups formed by the Agency for Vocational and Adult Education developed the following documents:

- Occupational Standard - which is developed in collaboration with employers and contains a list of key occupations in the workplace and the associated competencies required to work in one or more jobs.
- Qualification standard –which is created based on the occupational standard in accordance with the Croatian Classification Framework and is based on the curricular approach and learning outcomes.
- Sectoral and vocational curriculum - prepared on the basis of the qualification standard in order to rationalize the number of curricula, and provide students with easier access to the labor market, better horizontal mobility, professional development, but also continuing education with focus on work-related learning.
- Guidelines for the use of vocational curricula and manuals for teachers - to help schools implement the new approach and model, focusing on flexibility and autonomy of schools.



Figure 1: Structure of the Sectoral Curriculum - source: Agency for Vocational Education and Adult Education - <https://www.asoo.hr/projekti-i-suradnja/esf-projekti/modernizacija-sustava-strukovnog-obrazovanja-i-osposobljavanja/>

2. Occupational standard

The occupational standard is a description of the tasks that a person performs in a particular occupation and contains a list of the most important tasks and competencies, the required knowledge and skills, and the related independence and responsibility that a trainee should have in order to work in the specified occupation. A working group of teachers, representatives of employers and employees of the profession was formed to create the occupational standards. In accordance with the new methodology for drafting occupational standards, surveys of employers on occupational standards were conducted. During the elaboration of the occupational standard it was necessary to prove the validity of the proposed occupational standard, to describe the validity of the occupational standard on the basis of selected indicators of the labor market, namely strategic validity, sectoral validity and analytical validity.

The occupational standard contains a description of the occupation or a set of competences, a list of the most important activities at the workplace and related individual competences required for work at one or more workplaces, a list of competence groups with related competences.

In the Republic of Croatia, 120 occupational standards were developed in all educational sectors as part of the project Modernization of Vocational Education. In the transport and logistics sector, new occupational standards were modernized or developed at qualification levels 3, 4.1, 4.2 and 5 for the following occupations: Freight Transport Driver, Passenger Transport Driver, Logistics Warehouse Worker, Road Transport Technician, Road Safety Technician, Transport Logistics Technician, Intelligent Road Transport Systems Technician, Tramway Driver, Driving Instructor, Vocational Driving School Manager, Car Taxi Driver, Marina and Yacht Technician, Navigation Navigator, Inland Navigation Navigator, Train Driver, Train Dispatcher, Postal and Postal Logistics Technician, Postman, Traffic Supervisor.



Figure 2.: Relation between occupational standards, qualification standards and curriculum in vocational education - source Methodology for creating sectoral curriculum, vocational

curriculum and curriculum of vocational education institution - Agency for Vocational and Adult Education

3. Qualification standard

The qualification standard contains the key learning outcomes that any program leading to a qualification must include. The qualification standards were developed by institutions appointed by the Agency, which formed working groups from among teachers, college professors, and employer representatives. In developing the qualification standard, it was necessary to provide a description of the qualification standard, the rationale for its introduction and the role of the qualification (needs of the labor market and/or continuing education and/or other needs of the individual and society), the HKO proposal for the qualification level for which the standard is proposed, a list of learning outcomes sets (existing in the HKO register or newly created for a particular qualification standard), conditions for access to the qualification.

The basic part of the qualification standard contains learning outcome sets with the following data and parts: Name of the proposed learning outcome set, level of the learning outcome set according to HKO, proposed scope, list of learning outcomes (usually 3 - 10 learning outcomes), access conditions for acquiring learning outcome set, material and personnel requirements for acquiring/assessing a learning outcome set, procedure and example for assessing a learning outcome set.

The following qualification standards have been developed for the transport and logistics sector: QS Motor Vehicle Driver, QS Warehouse Worker in Logistics, QS Technician in Road Transport, QS Technician in Transport Logistics, QS Technician in Intelligent Transport Systems in Road Transport, QS Driving Instructor Class "B", QS Driving Supervisor, QS Engine Driver, QS Train Attendant, QS Technician in Air Transport, QS Technician in Maritime Transport, QS Technician in Maritime Transport and Yachts, QS Technician in Inland Waterway Transport, QS Technician in Postal and Postal Logistics.

4. Vocational curriculum

A vocational curriculum is a document that specifies the processes, methods and conditions for acquiring qualifications. The vocational curriculum includes sets of learning outcomes, units of instruction for each module, recommendations for the learning environment, ways to monitor the acquisition of sets of learning outcomes, and methods for assessing learning outcomes. The vocational curriculum prescribes the acquisition of at least 70% of the credits of the mandatory sets of learning outcomes and up to 30% of the credits of the optional sets of learning outcomes from the total volume of the qualification, providing a flexible framework for combining sets of learning outcomes in accordance with the needs of local communities and the local labor market.



Figure 3.: Coherency of curriculum documents - source *Methodology for creating sectoral curriculum, vocational curriculum and curriculum of a vocational education institution - Agency for Vocational and Adult Education*

In the transportation and logistics sector, the following vocational curricula have been developed: Motor vehicle driver, Warehouse worker in logistics, Technician in road transport, Technician in transport logistics, Technician for intelligent transport systems in road transport, Driving instructor category "B", Train dispatcher, Train driver, Train attendant, Technician for air transport, Seafarer, Technician for marinas and yachts, Navigator for internal navigation, Technician for mail and postal logistics.

5. Sectoral curriculum

The sectoral curriculum is a map of the sector showing the qualifications and learning outcomes that belong to a particular sector. The sectoral curriculum contains a list of all qualifications of the education sector, a list of learning outcomes from qualification standards within the education sector, opportunities and conditions for horizontal and vertical mobility within the sector, models and recommendations for the implementation of all forms of in-service learning at the sector level, the average total time that the student must spend to acquire certain learning outcomes, expressed in CSVET points. 1 CSVET point comprises 15 to 25 hours of 60-minute duration required to acquire the corresponding learning outcomes.

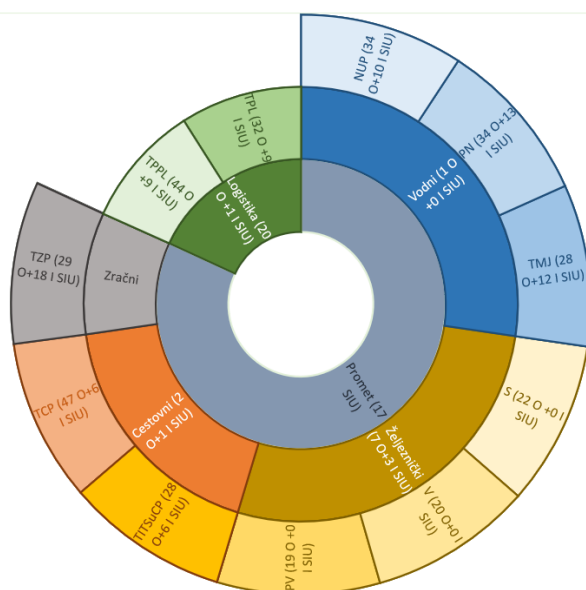


Figure 4.: Components of the sectoral curriculum for level 4.2. for the Transport and Logistics sector and their interconnection at the level of sub-sectors and branches of transport - source - Sectoral curriculum for the Transport and Logistics sector

6. Conclusion

Considering the obsolescence of curricula and the inconsistency of curriculum documents in the vocational education system, it was necessary to initiate a systematic and comprehensive modernization of vocational education.

Since 2019, the Agency for Vocational and Adult Education has begun to implement a comprehensive modernization of the vocational education system under the ESF project, which aims to develop innovative and flexible sectoral and vocational curricula based on the needs of the labor market, while strengthening the competencies of education personnel for the introduction and implementation of the curriculum. Modernization of vocational education focuses on learning processes that have a strong relation to the tasks that trainees will perform under real conditions in the future workplace. To achieve these effects, a strong connection of all stakeholders, i.e. trainees, teachers in vocational training institutions and/or in regional competence centres, adult education institutions, and mentors at the employer's site is necessary.

With such an approach, the requirements for planning vocational curricula based on competencies needed in the workplace are met, while the learning and teaching process is realized in real or simulated situations of work activities.

In order to achieve work-based learning, which is the purpose and goal of vocational education, from 2019. to the present, the Agency for Vocational Education and Training has conducted detailed market analysis and testing, created 120 occupational standards, more than 140 qualification standards, and more than 120 modularly structured vocational curricula that the requirements of the modern labor market.

With such an approach, vocational education in the Republic of Croatia has the chance to become attractive, innovative, relevant, inclusive and connected to the labor market. This would enable future students in vocational schools to acquire sufficient competences for

personal and professional development as well as for further education and lifelong learning, and employers would have the necessary high-quality and professional staff at their disposal.





Škola za cestovni promet

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3. IZRADA STRUKOVNOG KURIKULUMA TEHNIČAR ZA INTELIGENTNE TRANSPORTNE SUSTAVE

Sažetak:

Tijekom proteklih šest godina, Agencija za strukovno obrazovanje i obrazovanje odraslih je kroz ESF realizirala projekt pod nazivom „Modernizacija strukovnog obrazovanja i osposobljavanja“. Cilj projekta je modernizacija strukovnog obrazovanja i osposobljavanja kroz razvoj inovativnih i fleksibilnih sektorskih i strukovnih kurikuluma temeljenih na potrebama tržišta rada. Kroz projekt modernizirano je 120 standarda zanimanja isto toliko standarda kvalifikacija i strukovnih kurikuluma. Oni predstavljaju potpuno novi zaokret u strukovnom obrazovanju koje će biti usmjereno na procese učenja snažno povezanih s poslovima koje će učenici obavljati u stvarnim uvjetima na budućem radnom mjestu.

U sektoru Promet i logistika moderniziran je ili novo izrađen: 21 standard zanimanja, 14 standarda kvalifikacija i 15 strukovnih kurikuluma. Kao jedan od primjera zajedničkog rada obrazovnog i realnog sektora na kojem se jasno vide potrebe tržišta rada i mogućnosti obrazovnog sektora razvijen je potpuno novi strukovni kurikulum pod nazivom Tehničar za inteligentne transportne sustave. On je suvremen i inovativan, usmjeren na korištenje suvremenih digitalnih i računalnih tehnologija, a cilj mu je optimizacija i unaprjeđenje cestovnog prometa.

Ključne riječi:

- Modernizacija strukovnog obrazovanja i osposobljavanja,
- Strukovni kurikulum,
- Tehničar za inteligentne transportne sustave

IZRADA STRUKOVNOG KURIKULUMA TEHNIČAR ZA INTELIGENTNE TRANSPORTNE SUSTAVE

1. Modernizacija strukovnog obrazovanja i osposobljavanja u Republici Hrvatskoj

U Republici Hrvatskoj, u prosjeku svake školske godine, oko 70% redovnih učenika upiše neki strukovni program/kurikulum u jednoj od 318 škola za strukovno obrazovanje, od kojih ukupno 23 izvode programe iz cestovnog prometa kao strukovnog područja. Većina učenika upisuje četverogodišnje, nešto manje od trećine njih trogodišnje programe, a manje od 1 % učenika upisuje dvogodišnje ili jednogodišnje te programe obrazovanja za učenike s teškoćama. (Izvor: MZO, 2022.). Strukovno obrazovanje u RH provodi se u ustanovama za strukovno obrazovanje i dijelom kod poslodavaca, a učenje temeljeno na radu (UTR) prisutno je u tri oblika: kombinirani programi ili naukovanje, u školi s razdobljima osposobljavanja kod poslodavca, integrirano u programu strukovnog obrazovanja i osposobljavanja.

U sustavu strukovnog obrazovanja velik broj nastavnih planova i programa (NPP) razvijeni su prije više od 20 godina, JMO programi početkom 2000-ih, a samo 30-ak strukovnih kurikuluma u zadnjih 6 godina. Postojeći programi nisu razvijani sustavno te postoje velika preklapanja među njima jer su dosadašnji reformski potezi bili ograničenog obuhvata ili su zahvatili samo dio strukovnog obrazovanja. Osim zastarjelosti nastavnih planova i programa, isti se ne temelje na ishodima učenja i nisu odraz potreba tržišta rada, ne omogućavaju fleksibilnost u provedbi, a kao jedan od glavnih nedostataka strukovnih programa identificiran je nedostatan udjela učenja temeljenog na radu kod poslodavaca. Ovakvo stanje rezultiralo je određenim negativnim trendovima na tržištu rada, te je u razdoblju od 2010. do 2018. po podacima Hrvatskog zavoda za zapošljavanje (HZZ) moguće uočiti da se najveći broj registriranih nezaposlenih osoba, prosječno čak 57,5 %, odnosi na osobe sa završenim srednjoškolskim strukovnim obrazovanjem u trajanju od 1- 4 godine. Kako bi se zaustavio ovakav trend teškog zapošljavanja učenika po završetku strukovnog obrazovanja nužno je bilo pristupiti ulaganju u poboljšanje i prilagodbu sustava strukovnog obrazovanja koje će odgovoriti na potrebe tržišta rada, a čime bi se izbjegle nepodudarnosti ponude i potražnje za vještinama na tržištu rada.

Tijekom proteklih šest godina, odnosno od studenog 2017. godine do rujna 2023. godine Agencija za strukovno obrazovanje i obrazovanje odraslih je kroz ESF realizirala projekt pod nazivom „Modernizacija strukovnog obrazovanja i osposobljavanja“ kojemu je osnovni cilj razvoj strukovnog obrazovanja i osposobljavanja koje je privlačno, inovativno, relevantno, povezano s tržištem rada te koje će omogućiti polaznicima stjecanje kompetencija za osobni i profesionalni razvoj te nastavak obrazovanja. Specifičan cilj je jačanje kompetencija odgojno-obrazovnih djelatnika za uvođenje i provedbu novih kurikuluma.

Ovim projektom pristupilo se modernizaciji strukovnog obrazovanja u RH i razvoju novih strukovnih kurikuluma s jakom poveznicom s potrebama tržišta rada kroz izrađene

standarde zanimanja i standarde kvalifikacija sukladno HKO-u a koji će se temeljiti na kurikularnom pristupu i ishodima učenja. Kroz projekt „Modernizacija strukovnog obrazovanja i osposobljavanja“ modernizirano je ili izrađeno potpuno novih 120 standarda zanimanja isto toliko standarda kvalifikacija i strukovnih kurikuluma kojima je napravljen potpuno novi zaokret u strukovnom obrazovanju. Ono će biti usmjereno na procese učenja snažno povezanih s poslovima koje će učenici obavljati u stvarnim uvjetima na budućem radnom mjestu. Sektorskim kurikulumom koji je razvila ASOO, došlo je do racionalizacije broja kurikuluma, a učenicima je omogućeno lakše uključivanje na tržište rada, bolja horizontalna prohodnost, profesionalni razvoj ali i nastavak obrazovanja. Naglasak je stavljen na učenje temeljno na radu u različitim obujmima, sukladno Nacionalnom kurikulumu za strukovno obrazovanje. Kroz projekt će se omogućiti značajna podrška školama za provedbu novog pristupa i modela, uz naglasak na fleksibilnost i autonomiju škola uključujući i razvoj priručnika i pomoćnih nastavnih sredstava. Ciljana skupina bit će odgojno-obrazovno osoblje, odnosno nastavnici strukovnih predmeta te ravnatelji ustanova za strukovno obrazovanje. Kroz kontinuirane medijske kampanje podići će se i vidljivost strukovnog obrazovanja u društvu, među poslodavcima i u široj javnosti.

2. Modernizacija strukovnog obrazovanja u sektoru Promet i logistika

Na razvoju potpuno novih strukovnih kurikuluma kao i na unaprijeđenu postojećih radile su mnogobrojne radne skupine kojima je cilj bila modernizacija strukovnog obrazovanja, a bile su sastavljene od relevantnih stručnjaka iz ministarstava, obrazovnog sektora, ravnatelja ustanova, poslodavaca i predstavnika poslodavaca, radnika u zanimanju te stručnjaka iz realnog sektora. Kao i u ostalim sektorima strukovni kurikulumi modernizirani su i sektoru Promet i logistika u kojem do sada osuvremenjeno jedanaest postojećih kurikuluma, a izrađena su potpuno nova tri kurikuluma. S obzirom na sve zahtjevnije tržište rada kao i na potrebe gospodarstva za radnom snagom koja je u stanju prati nove suvremene trendove u proizvodnji usluge prijevoza u sektoru Promet i logistika, stručnjaci u radnim skupinama razvili su i izradili potpuno nove strukovne kurikulume kojima je osnovni cilj podrška i unaprjeđenje gospodarstva.

Kao primjer zajedničkog rada obrazovnog i realnog sektora u kojem su vidljive potrebe tržišta rada i mogućnosti obrazovnog sektora, između ostalih, razvijen je vrlo zanimljiv novi strukovni kurikulum pod nazivom Tehničar za inteligentne transportne sustave u cestovnom prometu. To je suvremen i inovativan kurikulum usmjeren na korištenje suvremenih digitalni i računalnih tehnologija u cilju optimizacije i unaprjeđenja cestovnog prometa.

S obzirom da inteligentni transportni sustavi predstavljaju cjelokupnu, upravljačko i informacijsko – komunikacijsku nadgradnja klasičnog sustava prometa i transporta kojim se postiže znatno poboljšanje performansi odvijanja prometa, učinkovitiji prijevoz putnika i roba, poboljšanja sigurnosti u prometu, udobnosti i zaštite putnika, manjeg onečišćenje okoliša i sl. razumljivo je zašto je izrađen ovakav strukovni kurikulum.

Nakon izrađenog standarda zanimanja u kojem su opisani poslovi koje pojedinac obavlja u određenom zanimanju i sadrži popise ključnih kompetencija, potrebna znanja i vještine koje učenik treba imati kako bi bilo sposoban raditi u navedenom zanimanju, izrađen je standard kvalifikacija sa svim ključnim ishodima učenja koje mora sadržavati svaki program

koji vodi do te kvalifikacije. Završna faza kojom je omogućen ulazak ovog kurikuluma u strukovne škole je izrada i prihvatanje strukovnog kurikuluma kojima se određuju procesi, načini i uvjeti stjecanja kvalifikacija, a sadržava skupove ishoda učenja, nastavne cjeline za svaki modul, preporuke okruženja za učenje, načine praćenja stjecanja skupova ishoda učenja i načine vrednovanja ishoda učenja.

3. Strukovni kurikulum Tehničar za inteligentne transportne sustave u cestovnom prometu

Strukovni kurikulum Tehničar za inteligentne transportne sustave u cestovnom prometu pripada sektoru Promet i logistika i predstavlja 4.2 razinu kvalifikacije prema HKO. Uvjeti za upis ovog strukovnog kurikuluma su: stečena razina 1, odnosno završetak osnovnog obrazovanja i liječnička potvrda nadležnog školskog liječnika o zdravstvenoj sposobnosti. Za završetka ovog programa strukovnog obrazovanja, odnosno stjecanja kvalifikacije potrebno je steći 135 CSVET bodova (od kojih najmanje 120 CSVET bodova na razini 4 ili višoj razini SIU) i 105 HROO bodova (od kojih najmanje 30 bodova na razini 4 ili višoj razini SIU) te izrađen i obranjen završni rad. Uvjeti u kojima se stječu kompetencije propisani su Državnim pedagoškim standardom srednjoškolskog sustava odgoja i obrazovanja (Narodne novine, broj 63/2008 i 90/2010) i Pravilnikom o načinu organiziranja i izvođenja nastave u strukovnim školama (Narodne novine, broj 140/2009 i 130/2020).

U drugi, odnosno treći i četvrti razred polaznik prelazi nakon pozitivno ocijenjenih svih skupova ishoda učenja/modula u prvom, drugom i trećem razredu. Obrani završnog rada polaznik pristupa nakon što je pozitivno ocijenjen iz svih skupova ishoda učenja/modula u četvrtom razredu.

Obrazovanje za stjecanje kvalifikacije Tehničar za inteligentne transportne sustave u cestovnom prometu/Tehničarka za inteligentne transportne sustave u cestovnom prometu usmjereno je na:

- ostvarenje ishoda učenja neophodnih za stjecanje kompetencija odnosno kvalifikacija za rad
- razvoj kognitivnih, praktičnih i socijalnih vještina te jačanje samostalnosti i odgovornosti za postupanja u određenim situacijama
- razvoj organizacijskih i komunikacijskih sposobnosti polaznika.

Učenje se temelji na problemskim situacijama i zadacima iz stvarnog života, na provođenju projektnih zadataka te stjecanju kompetencija u stvarnom radnom procesu koji se izvodi u specijaliziranim učionicama ustanove, praktikumima za simulacije, specijaliziranim poduzećima odnosno u robnim skladištima/robnim terminalima. Kod polaznika se potiče asertivnost i razvijanje suradničkih odnosa s ostalim polaznicima u zajedničkom radu, ali i razvijanje samostalnosti i odgovornosti za donošenje odluka. Od polaznika se očekuje aktivno sudjelovanje u procesu učenja i poučavanja kao i u procesu

vrednovanja i samovrednovanja postignutih ishoda učenja te redovito pohađanje svih oblika nastave.

Od nastavnika se očekuje da bude kreator procesa učenja te da prihvati odgovornost za ostvarivanje ishoda učenja, da koristi nove tehnologije kako bi kompetentno mogao voditi proces učenja u skladu sa stvarnim potrebama tržišta rada. Jednako tako, nastavnik treba prepoznati potrebe i mogućnosti polaznika te im prilagođavati sadržaje, metode i oblike rada kako bi na učinkovit način ostvarili ishode učenja odnosno kako bi polaznici stekli kompetencije izabrane kvalifikacije primjereno svojim mogućnostima i darovitosti.

Općeobrazovni nastavni predmeti tijekom obrazovanja za stjecanje kvalifikacije Tehničar za inteligentne transportne sustave u cestovnom prometu/Tehničarka za inteligentne transportne sustave u cestovnom prometu na razini su 4. te je omogućena prohodnost u drugu kvalifikaciju iste ili niže razine uz polaganje razlikovnih sadržaja specifičnih za pojedinu kvalifikaciju.

Nakon stečene kvalifikacije Tehničar/Tehničarka za inteligentne transportne sustave u cestovnom prometu moguć je nastavak školovanja na višem stupnju obrazovanja. Znanja i vještine stečene strukovnim kurikulumom dobra su podloga za nastavak obrazovanja na razini 6 HKO-a u području tehničkih znanosti, a posebno za studijski program Promet i studijski program Inteligentni transportni sustavi i logistika.

U okviru ovog strukovnog kurikuluma predviđeno je učenje temeljeno na radu koje se provodi kroz dva oblika:

- integrirano u strukovni kurikulum kroz rad na situacijskoj i problemskoj nastavi u školskim specijaliziranim učionicama i praktikumima za simulaciju
- učenje na radnome mjestu (specijalizirana poduzeća odnosno putnički i teretni terminali) za vrijeme praktične nastave kod poslodavca gdje se polaznici postupno uvode u posao te sudjeluju u radnom procesu u kontroliranim uvjetima uz mentora.

Rad na radnome mjestu dio je programa strukovnog obrazovanja i osposobljavanja koji vodi do formalne kvalifikacije.

2. razred TITS	<--- Prvo polugodište ---> Drugo polugodište --->											
1. razred	Rujan	Listopad	Studeni	Prosinac	Siječanj	Veljača	Ožujak	Travanj	Svibanj	Lipanj		
Ukupno strukovni	Organizacija poduzeća u cestovnom prometu											
35	Organizacija poduzeća za prijevoz putnika u cestovnom prometu					Organizacija poduzeća za prijevoz tereta u cestovnom prometu						
	5					5						
Strukovni obvezni	Informatička sigurnost											
31	Sigurnost u virtualnom okruženju					Informatički sustavi u prometu						
	4					4						
Strukovni izborni	Poslovno komuniciranje u prometu					Prometno - geoinformacijski sustavi						
4	Poslovno komuniciranje u prometu					Prometno - geoinformacijski sustavi						
	4					4						
	Primijenjeno programiranje											
	Primijenjeno programiranje											
	5											
						Psihologija rada						
						Psihologija rada						
						4						
						Osnove mehanike materijalne točke						
						4						
						Kinematika	Dinamika	Energija	Gravitacija			
						1	1	1	1			
CSVET	3,5	4	4	3	3	3,5	4	3,5	3,5	3		

Slika 1.: Primjer razrade vremenskog plana (izvor: Strukovni kurikulum Tehničar za inteligentne transportne sustave)

Postupci vrednovanja usmjereni su na praćenje i provjeru postignuća prema ishodima učenja. Isto se provodi u kombinaciji:

- hibridnog vrednovanja kroz pisane provjere znanja i vještina polaznika, gdje institucija osigurava dostupnost sadržajno i metodološki provjerenih zadataka i ispita iz određenih cjelina, a nastavnici koriste pojedine skupine zadataka ili cijele ispite radi dobivanja povratnih informacija o rezultatima učenja polaznika
- unutarnjeg vrednovanja koje se provodi u ustanovi i u radnom okruženju tijekom cjelokupnog strukovnog obrazovanja, a provode ga nastavnici i mentori te polaznici kroz samovrednovanje svoj rada. Naglasak se stavlja na provjeru postignuća ishoda učenja temeljenog na radu.

U procesu praćenja kvalitete i uspješnosti strukovnog kurikuluma provode se sljedeće aktivnosti:

- istraživanje i anonimno anketiranje polaznika o izvođenju nastave, literaturi i resursima za učenje, strategijama podrške polaznicima, izvođenju i unapređenju procesa učenja i poučavanja, radnom opterećenju polaznika (CSVET), provjerama znanja te komunikaciji s nastavnicima
- istraživanje i anketiranje nastavnika o istim pitanjima kao u prethodnoj stavci
- analiza uspjeha, transparentnosti i objektivnosti provjera znanja i ostvarenosti ishoda učenja
- analiza materijalnih i kadrovskih uvjeta potrebnih za izvođenje procesa učenja i poučavanja.

Nastavnici putem ankete procjenjuju svoj odnos prema procesu učenja i poučavanja, radnoj okolini i polaznicima (samoevaluacija). Područja procjene osobito se odnose na:

- uvjete održavanja nastave te stanje postojeće opreme i potrebe za novom opremom i odgovarajućom literaturom
- uspješnost ostvarenja ishoda učenja
- utjecaj metoda i oblika rada na razine ostvarenosti ishoda učenja
- redovitost pohađanja nastave te aktivnosti i angažiranosti učenika u procesu učenja i poučavanja.

Usporedbom rezultata anketa među polaznicima i nastavnicima dobit će se pregled uspješnosti izvedbe strukovnog kurikuluma, a nastavnici će dobiti uvid u pouzdanost procjene kvalitete svoga rada. Kriteriji za vrednovanje ostvarenosti ishoda učenja određeni su strukovnim kurikulumom, a vrednovanje provode nastavnici u ustanovi i mentor kod poslodavca koji o tome vode propisane evidencije te polaznici kroz postupke vrednovanja za učenje i kao učenje. Podatci o praćenju napredovanja polaznika temelje se na provjeri

postignuća ishoda učenja s pomoću procjena razvoja odgovornosti, samoinicijativnosti te komunikacije i suradnje.

4. Zaključak

Brzi razvoj znanosti, tehnike i tehnologije uvjetuje potrebu za novim znanjima, vještinama i kompetencijama. Tako se u sektoru Promet i logistika, razvojem inteligentnih transportnih sustava, ukazala potreba za djelatnicima koji mogu upravljati i održavati navedene sustave, što je rezultiralo izradom kurikuluma za zanimanje čijim se završetkom stječu kompetencije i ishodi učenja potrebni suvremenom tržištu rada.

Kroz projekt Agencije za strukovno obrazovanje i obrazovanje odraslih namijenjenom modernizaciji sustava strukovnog obrazovanja i osposobljavanja izrađeni su dokumenti potrebni za uvođenje novog programa u obrazovni sustav Republike Hrvatske. Izrađen je novi Standard zanimanja, Standard kvalifikacije i Strukovni kurikulum za stjecanje kvalifikacije Tehničar za inteligentne transportne sustave u cestovnom prometu / Tehničarka za inteligentne transportne sustave u cestovnom prometu. Strukovni kurikulum za stjecanje kvalifikacije Tehničar za inteligentne transportne sustave u cestovnom prometu / Tehničarka za inteligentne transportne sustave u cestovnom prometu planiran je na temelju kompetencija potrebnih na radnom mjestu dok će se proces učenja i poučavanja realizirati u realnim ili simuliranim situacijama radnih aktivnosti.

Nakon završetka navedene kvalifikacije učenici će moći : koristiti računalo i računalne aplikacije u optimiziranju, organiziranju i nadzoru cestovnog prometa, izraditi baze podataka za potrebe optimiziranja, organiziranja i nadzora prometnog poduzeća, primijeniti odrednice zakonske regulative u unutarnjem i međunarodnom prijevozu i koristiti cestovnu dokumentaciju u organiziranju rada poduzeća u cestovnom prometu, koristiti digitalne i realne kartografske prikaze cestovne mreže za prikupljanje, čuvanje, pretraživanje, analizu i prikaz prostornih podataka cestovnih prometnica kao i za praćenje i navigaciju vozila, primijeniti metode zaštite podataka na osobnom računalu i ojačati sigurnosti operacijskog sustava i mrežnih uređaja, izvršiti analizu pokazatelja rada prijevozničkog poduzeća, provesti analizu tehničko-eksploatacijskih karakteristika ceste i ostalih cestovnih građevina za potrebe održavanja cestovne infrastrukture, koristiti uređaje i opremu kojom se omogućava automatizirana mobilnost, primijeniti pravila marketinga i tehnologijskog marketing u cilju povećanja ekonomske učinkovitosti poduzeća u cestovnom prijevozu, izraditi simulacije cestovnog prometa i simulirati upravljanje cestovnim prometom, provesti analizu stanja sigurnosti cestovnog prometa i ponuditi rješenja za unaprjeđenje odvijanja cestovnog prometa uvažavajući prometno - tehničke zakonitosti cestovnog prometa, koristiti bespilotne letjelice za nadzor cestovnog prometa, koristiti metode za primjenu umjetne inteligencije u klasificiranju prometnih podataka i predviđanju prometne potražnje.



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3. CREATION OF VOCATIONAL CURRICULUM TECHNICIAN FOR INTELLIGENT TRANSPORT SYSTEMS

Summary:

Over the past six years, the Agency for Vocational and Adult Education, through the ESF, has implemented a project entitled "Modernization of Vocational Education." The goal of the project is to modernize vocational education by developing innovative and flexible sectoral and vocational curricula based on the needs of the labor market. The project modernized 120 occupational standards as well as qualification standards and vocational curricula. They represent a completely new turn in vocational education, focusing on learning processes closely related to the tasks that students will perform in real conditions in the future workplace.

In the field of transportation and logistics, 21 occupational standards, 14 qualification standards and 15 vocational curricula were modernized or newly created. As one of the examples of the joint work of the education and real sectors, which clearly shows the needs of the labor market and the possibilities of the education sector, a completely new vocational curriculum called Intelligent Transportation Systems Technician was developed. It is modern and innovative, focuses on the use of modern digital and computer technologies, and aims to optimize and improve road transport.

Keywords:

- Modernization of vocational education and training,
- Vocational curriculum,
- Intelligent transport systems

CREATION OF VOCATIONAL CURRICULUM TECHNICIAN FOR INTELLIGENT TRANSPORT SYSTEMS

1. Modernization of vocational education and training in the Republic of Croatia

In the Republic of Croatia, on average, about 70% of regular students enroll each school year in one of 318 vocational schools, of which a total of 23, offer vocational training in the field of road transport. The majority of students enroll in four-year programs, slightly less than one-third enroll in three-year programs, and less than 1% of students enroll in two-year or one-year educational programs for students with disabilities. (Source: MZO, 2022). Vocational education in the Republic of Croatia takes place in vocational training institutions and sometimes with employers. Work-based learning (WTL) exists in three forms: combined programs or apprenticeship, in school with training phases at the employer, integrated into the vocational education program .

In the vocational education system, a large number of curricula and programs (NPP) were developed more than 20 years ago, JMO programs in the early 2000s, and only about 30 vocational curricula in the last 6 years. The existing programs were not developed systematically, and there is much overlap between them because the previous reform measures were limited in scope or covered only a part of vocational education. Apart from being outdated, the curricula and programs are not based on learning outcomes and do not reflect the needs of the labor market, do not allow flexibility in implementation, and one of the main shortcomings of the vocational programs has been found to be an insufficient amount of work-related learning. This situation has led to certain negative trends in the labor market, and in the period from 2010 to 2018, according to the data of the Croatian Employment Service (HZZ), it can be stated that the largest number of registered unemployed, 57.5% on average, is accounted for by people who have completed 1-4 years of vocational education. In order to stop this trend of difficult employment of students after completing vocational education, it was necessary to invest in the improvement and adaptation of the vocational education system in order to meet the needs of the labor market and thus avoid a mismatch between the supply and demand for skills in the labor market.

Over the past six years, i.e. from November 2017 to September 2023, the Agency for Vocational Training and Adult Education, through the ESF, has implemented a project called "Modernization of Vocational Training", whose main objective is to develop vocational training that is attractive, innovative, relevant and connected to the labor market, enabling participants to acquire competencies for personal and professional development and to continue their education. The specific objective is to strengthen the competencies of educational personnel for the introduction and implementation of new curricula.

This project initiated the modernization of vocational education in the Republic of Croatia and the development of new vocational curricula with a strong reference to the needs of the labor market through the creation of occupational standards and qualification standards in accordance with the HKO, which will be based on the curricular approach and learning outcomes. Through the "Modernization of Vocational Education" project, 120 occupational

standards have been modernized or completely redeveloped, as well as qualification standards and vocational curricula, which initiated a completely new turn in vocational education. The focus is on learning processes that are closely linked to the tasks that students will perform under real conditions in the future workplace. The sectoral curriculum developed by ASOO led to a rationalization of the number of curricula and provided students with easier entry into the labor market, better horizontal mobility, professional development, and opportunities for continuing education. The focus is on basic workplace learning in a variety of scopes, in line with the national vocational education curriculum. The project will provide significant support to schools in implementing the new approach and model, with an emphasis on school flexibility and autonomy, including the development of manuals and teaching materials. The target audience is educational staff, i.e. teachers of vocational subjects and principals of vocational education institutions. Continuous media campaigns increase the visibility of vocational education in society, among employers and the general public.

2. Modernization of vocational training in the transport and logistics sector

Numerous working groups aimed at modernizing vocational education worked on developing entirely new vocational curricula as well as improving existing curricula and were composed of relevant experts from ministries, the education sector, directors of institutions, employers and representatives of employers, employees in the profession, and experts from the real sector. As in other sectors, vocational curricula were modernized in the transport and logistics sector. Here, eleven existing curricula have been modernized and three completely new curricula have been created so far. Taking into account the increasingly demanding labor market and the economy's need for workers capable of following new modern trends in the production of transport services in the transport and logistics sector, the experts in the working groups have developed and created completely new vocational curricula, the main goal of which is to support and improve the economy.

As an example of the joint work of the educational and real sectors, in which, among other things, the needs of the labor market and the possibilities of the educational sector become visible, a very interesting new vocational curriculum called Technician of Intelligent Transportation Systems in Road Transport has been developed. It is a modern and innovative curriculum that focuses on the use of modern digital and computer technologies to optimize and improve road transport.

Given the fact that intelligent transport systems represent the entire, administrative and information-communication superstructure of the classical traffic and transport system, resulting in a significant improvement in traffic performance, more efficient transportation of people and goods, improvement of traffic safety, comfort and protection of passengers, reduced environmental impact, etc. It is understandable why such a professional curriculum was created.

After the occupational standard was created, describing the tasks that a person performs in a given occupation and containing a list of key competencies, i.e. the required knowledge and skills that a trainee should have in order to work in the specified occupation, a

qualification standard was created with all the key learning outcomes that any program leading to this qualification must contain. The final stage that enables the implementation of this curriculum in vocational schools is the creation and adoption of the vocational curriculum, which specifies the processes, methods and conditions for the acquisition of qualifications and contains sets of learning outcomes, teaching units for each module, recommendations for the learning environment, ways to monitor the acquisition of sets of learning outcomes and methods for assessing learning outcomes.

3. Occupational curriculum technician for intelligent transport systems in road transport

The vocational curriculum Technician for Intelligent Transport Systems in Road Traffic belongs to the Transport and Logistics sector and corresponds to qualification level 4.2 according to HKO. The requirements for enrolling in this vocational curriculum are: the acquired level 1, i.e. the completion of basic education and a medical certificate issued by the competent school doctor. In order to complete this vocational curriculum, i.e. obtain a qualification, 135 CSVET points (of which at least 120 CSVET points at level 4 or higher SIU) and 105 HROO points (of which at least 30 points at level 4 or higher SIU) must be acquired and the final examination passed. The conditions under which the competences are acquired are specified in the State Pedagogical Standard of the Secondary School System (Official Gazette, No. 63/2008 and 90/2010) and in the Regulations for the Organization and Implementation of Teaching in Vocational Schools (Official Gazette, No. 140/2009 and 130 /2020).

The student moves to the second or third and fourth grade after all learning outcomes/modules of the first, second and third grade have been positively evaluated. The student enters the final examination after all learning outcomes/modules of the fourth grade have been positively evaluated.

The training to obtain the qualification of Intelligent Transportation Systems Technician in Road Transport focuses on:

- achieving the learning outcomes required to acquire competencies or qualifications for the job
- developing cognitive, practical and social skills and strengthening independence and responsibility for actions in specific situations
- development of organizational and communication skills of the participants.

Learning is based on problem situations and tasks from real life, on the implementation of project tasks and the acquisition of skills in the real work process, which is carried out in specialized classrooms of the institution, simulation workshops, specialized companies, i.e. warehouses/warehouses. Students are encouraged to be assertive and develop cooperative relationships with other students in joint work, but also to develop independence and responsibility for decisions. Students are expected to actively participate in the learning and teaching process, as well as in the process of assessment and self-evaluation of learning outcomes achieved and regular participation in all forms of instruction.

The teacher is expected to be the creator of the learning process and to take responsibility for the realization of the learning outcomes, to use new technologies to competently guide the learning process in accordance with the actual needs of the labor market. Likewise, the teacher should recognize the needs and opportunities of the participants and adapt the content, methods and forms of work to achieve the learning outcomes in an effective way so that the participants acquire the competencies of the chosen qualification according to their abilities and talents.

The general education subjects during the training for Intelligent Road Transport Systems Technician are at level 4, and it is possible to move to another qualification of the same or lower level by completing certain content specific to each qualification.

After obtaining the qualification of Technician of Intelligent Transport Systems in Road Traffic, it is possible to continue the training at a higher educational level. The knowledge and skills acquired within the professional curriculum are a good basis for further education at level 6 of the HKO in the field of technical sciences, especially for the degree program in Transport and the degree program in Intelligent Transport Systems and Logistics.

Work-based learning is provided as part of this professional curriculum and is delivered in two forms:

- integrated into the vocational curriculum through work on situational and problem-based lessons in school-based specialized classrooms and simulation internships
- on-the-job learning (specialized companies, e.g. passenger and cargo terminals) during practical classes at the employer's premises, where participants are gradually introduced to the profession and participate in the work process under controlled conditions with a mentor.

Work on the job is part of the vocational training program leading to a formal qualification.

2. razred TITS		<--- Prvo polugodište Drugo polugodište --->										
1. razred		Rujan	Listopad	Studen	Prosinac	Siječanj	Veljača	Ožujak	Travanj	Svibanj	Lipanj	
Ukupno strukovni	35	Organizacija poduzeća u cestovnom prometu										
		Organizacija poduzeća za prijevoz putnika u cestovnom prometu					Organizacija poduzeća za prijevoz tereta u cestovnom prometu					
		5					5					
Strukovni obvezni	31	Informatička sigurnost										
		Sigurnost u virtualnom okruženju					Informatički sustavi u prometu					
		4					4					
Strukovni izborni	4	Poslovno komuniciranje u prometu					Prometno - geoinformacijski sustavi					
		Poslovno komuniciranje u prometu					Prometno - geoinformacijski sustavi					
		4					4					
		Primijenjeno programiranje										
		Primijenjeno programiranje										
		5										
							Psihologija rada					
							Psihologija rada					
							4					
							Osnove mehanike materijalne točke					
							4					
							Kinematika	Dinamika	Energija	Gravitacija		
							1	1	1	1		
CSVET		3,5	4	4	3	3	3,5	4	3,5	3,5	3	

Figure 1.: Example of working out a time plan (source: Vocational curriculum Technician for intelligent transport systems)

Assessment procedures aim to monitor and review performance according to learning outcomes. These are carried out in combination:

- hybrid assessment through written tests of student knowledge and skills, where the institution ensures the availability of content- and method-checked assignments and exams from specific units, and faculty use individual sets of assignments or entire exams to provide feedback on student learning outcomes

- internal assessment, which takes place at the institution and in the work environment throughout vocational training and is conducted by teachers and mentors as well as students through self-evaluation of all work. The focus is on verifying the achievement of work-related learning outcomes.

As part of monitoring the quality and success of the vocational curriculum, the following activities are conducted:

- research and anonymous survey of participants on instruction, literature, and learning resources, support strategies for participants, implementation and improvement of learning and teaching processes, participant workload (CSVET), knowledge review, and communication with teachers
- study and survey of teachers on the same questions as in the previous point
- analysis of the success, transparency and objectivity of knowledge assessment and achievement of learning outcomes
- analysis of the material and personnel conditions necessary for the implementation of the learning and teaching process.

By means of a survey, teachers evaluate their attitude to the learning and teaching process, to the working environment and to the students (self-evaluation). The areas of evaluation relate specifically to:

- the conditions for conducting instruction and the condition of existing equipment, as well as the need for new equipment and appropriate literature
- the successful achievement of learning outcomes
- the influence of methods and forms of work on the degree of achievement of learning outcomes
- the regularity of attendance in class and the activities and engagement of students in the learning and teaching process.

4. Conclusion

The rapid development of science, engineering and technology requires new knowledge, skills and competencies. For example, in the transportation and logistics industry, the development of intelligent transportation systems created a need for employees who can manage and maintain said systems, which led to the creation of a curriculum for the profession, after which the skills and learning outcomes required for the modern labor market are acquired.

Within the project of the Agency for Vocational Training and Adult Education aimed at modernization of the vocational education system, the necessary documents for introduction of a new program into the education system of the Republic of Croatia were prepared. A new professional standard, a qualification standard and a professional curriculum for acquiring the qualification of technician for intelligent transport systems in road transport

were developed. The professional curriculum for acquiring the qualification Technician for Intelligent Transport Systems in Road Traffic is planned on the basis of competences required in the workplace, while the learning and teaching process is realized in real or simulated situations of work activity.

Upon completion of the qualification, participants will be able to: use a computer and computer applications in the optimization, organization and monitoring of road transport, create databases for the needs of optimization, organization and monitoring of a transport company, apply the determinants of legal regulations in internal and international transport and use road documentation in the organization of the company's work in road transport, use digital and real cartographic representations of the road network to collect, store, search, analyze and display spatial data of road traffic, as well as for vehicle tracking and navigation, apply methods of data protection on personal computers and strengthen the security of the operating system and network devices, conduct an analysis of the performance indicators of the transport enterprise, conduct an analysis of the technical-operational characteristics of the road and other road structures for the needs of road infrastructure maintenance, use devices and equipment that enable automated mobility, apply the rules of marketing and technological marketing to increase the economic efficiency of enterprises in road transport, create road traffic simulations and simulate road traffic management, conduct an analysis of the state of road safety and provide solutions for improving the development of road traffic in compliance with the traffic engineering laws of road traffic, use unmanned aerial vehicles to monitor road traffic, apply methods for the application of artificial intelligence in the classification of traffic data and the prediction of traffic demand.



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4. MOBILNOST V PODEŽELJSKEM OKOLJU

POVZETEK

Na eni strani živimo v obdobju, ko se družba vedno bolj stara, na drugi strani pa je družbena klima vedno bolj naklonjena mladim in njihovim potrebam. To se odraža v prilagojenosti potniškega prometa mladim, če živijo starejši v podeželskem okolju so zapostavljeni, zaradi slabše logistike na vseh področjih. Zlasti aktivno družbeno življenje je zelo pomembno in je v primeru starejšega prebivalstva zapostavljeno. Ponudniki javnega potniškega prometa se v urbanem okolju bolj uspešno prilagajajo zahtevam starejšega prebivalstva kot na podeželju. Na podeželju so slabši pogoji prevoznih storitev za starejše in posledično vpliva na manjšo možnost družabnih aktivnosti.

Ključne besede: logistika, javni potniški promet, urbano okolje, podeželje

1 KAJ JE LOGISTIKA?

Skozi zgodovino so se logistični sistemi spreminjali in dopolnjevali. Metode so se dopolnjevale in spreminjale. Nujni so bili novejši pristopi, ki jih različni avtorji utemeljujejo različno.

Zgodovina logistike je vezana na različna področja. Ko sem prebirala literaturo, sem ugotovila, da je v literaturi zastopana tudi vojaška logistika. Logistika je nujna na vsakem koraku. Z razvojem gospodarstva so se pristopi dopolnjevali in razvijali. V nadaljnjih desetletjih so se pojavila različna mnenja o reševanju posameznih problemov sistema.

Zagovarjam zgodovinsko dejstvo, da je potrebno načrtovati natančno in upoštevati različne teorije.

Predstavila bom definicije uglednih strokovnjakov:

Požar pravi, da je logistika vojaškega izvora in pomeni premagovanje prostora in časa.

Kirsch: Logistika v sistemskem smislu zajema oblikovanje, krmiljenje, uravnavanje in izvedbo celotnega toka energije, informacij, oseb in posebno snovi

Jünemann: opredeljuje logistiko kot znanstveno disciplino o planiranju, upravljanju in kontroli materialnega, osebnega, energijskega in informacijskega toka v sistemih.

Jakomin, Zelenika in Medeot opredeljujejo logistiko kot skupek med seboj povezanih aktivnosti, ki služijo za premikanje surovin.

2 LOGISTIKA NA PODEŽELJU

Podeželje si predstavljam kot prostor, kjer prevladujejo kmetijske površine. Danes to okolje marsikomu predstavlja življenje v naravi in bivanje v domačem, prijetnem okolju, brez mestnega vrveža. Podeželje ima pogosto drugačne izzive kot urbano okolje in s tem povezane omejitve, zato je logistika na vseh področjih prilagojena tem posebnim potrebam.

Logistika na podeželju se osredotoča na organizacijo in oskrbo prevoza in distribucije na podeželskem območju.

Predstavila bom ključne vidike logistike na podeželju.

2.1 Infrastruktura

V podeželskem okolju je dostop do ustreznih prometnih poti in infrastruktur omejen.

2.2 Prevoz

Logistika na podeželju zahteva prilagodljivost pri izbiri prevoznih sredstev. Podeželsko okolje ima manjšo gostoto prometa, posledično je izziv za sodobno družbo, kako organizirati potniški promet, da bo dostopen vsakomur.

V transportu blaga je uporaba različnih prevoznih sredstev npr. tovornjaki, traktorji prilagojena okolju, medtem ko železnica je dostopna samo na območju, kjer je infrastruktura temu prilagojena. Za širjenje infrastrukture po navadi ni na razpolago dovolj finančnih sredstev.

2.3 Sodelovanje

Zaradi razpršenosti okolja je pomembno sodelovanje med vsemi deležniki; med kmeti, lokalnimi pridelovalci, distributerji in trgovci.

V potniškem prometu bi bilo tudi smiselno sodelovanje med uporabniki prevoznih sredstev. Težavo predstavlja časovna komponenta in zmožnost dogovarjanja.

2.4 Skladiščenje blaga

Skladiščenje blaga je zaradi manj razpoložljivi kapacitet ključnega pomena. Nujno je ustrezno upravljanje skladišč in optimalnih metod shranjevanja, zlasti v prostorih za svežo hrano.

2.5 Tehnologija

Uporaba informacijske tehnologije omogoča upravljanje logistike na podeželju, lahko izboljša sledljivost, učinkovitost in kakovost logističnih procesov. Pametna tehnologija lahko omogoči sledenje pošiljkam, upravljanje zalog, avtomatizacija in uporaba pametnih senzorjev.

2.6 Okoljska trajnost

Logistika v podeželskem okolju se vedno bolj osredotoča na trajnostno prakso v smislu zmanjševanja emisij, recikliranje embalaže, uporaba okolju prijaznih prevoznih sredstev, recikliranje in podpora lokalni pridelavi hrane in distribuciji.

3 POTNIŠKI PROMET

Potniški promet prestavlja podeželskemu prebivalstvu hudo logistično težavo v primerjavi s prebivalci v urbanem okolju.

V Sloveniji, ki je za nekoga velika država, za drugega manjša, se povprečni uporabniki srečujemo z logističnimi težavami na marsikaterem področju. Če želimo iz Celja v Koper, da na morju popijemo kavo in se sprehodimo ob morju, moramo obvezno prespati v Kopru, ker se pot nazaj ne izide v istem dnevu. Tako smo prisiljeni uporabljati osebni prevoz, kar ni v duhu varovanja okolja. Družba namenja morda več pozornosti logistiki komercialnih izdelkov kot logistiki javnega potniškega prometa. Z usmeritvijo EU, da so starejši rizična skupina v osebnih avtomobilih, si ne predstavljam logistike prevoza brez ustrezne mreže javnega potniškega prometa. V Celju, ki je po velikosti tretje največje slovensko mesto, ima dobro organizirano mrežo mestnega potniškega prometa, primestni potniški promet je logistično zelo neustrezen, lahko rečem, da ga praktično ni, če pelje avtobus v vas, ki je 5km oddaljena do središča mesta 2 krat dnevno. Kaj lahko kot občani pripomoremo, da bi se vozili z javnim prevozom. Mislim, da je enostavneje, da se peljemo s taksijem. Tu pa se kaže

razslojenost družbe in dejstvo, da postaja podeželje odrezano od javnega potniškega prometa bolj kot kdaj koli. Republika Slovenija Ministrstvo za okolje in prostor je izdalo Smernice za organizacijo javnega potniškega prometa na podeželju. Priporočajo, da morajo biti povezave časovno usklajene, konkurenčne in vezane na lokalne ukrepe. V praksi sem preverila z anketnim vprašalnikom, kako časovna usklajenost in lokalni ukrepi omogočajo uporabo javnega potniškega prometa. Vprašanje se je glasilo »KAJ POMENI JAVNI POTNIŠKI PROMET ZA PREBIVALCE PODEŽELJA?«. Na vprašanje je odgovorili 67 anketirancev. Povzela sem 5 najpogostejših in vsebinsko podobnih odgovorov:

- primestni potniški promet je zame kot, da ga ni. Ko izstopim iz vlaka, moram še 5 km peš ali pa počakati na avtobus še 1,5 ure, ker ni povezave med avtobusom in vlakom;
- na srečo se vozim z avtom, saj drugače ne bi nikamor prišel;
- vozijo me starši, ker se moj urnik ne sklada z voznim redom avtobusa. Jezi me, da se avtobusi vozijo prazni, ker prevozniki ne upoštevajo interesov krajanov;
- babico vozi ati, saj ne more 3 km peš do avtobusne postaje;
- kaj mi pa pomeni avtobus, če po voznem redu vozi 3x na dan.

Tako razmišlja 90% anketirancev, ostalih 10% se ne ukvarja z javnim potniškim prometom, ker je to za njih izguba časa.

Potniški promet na podeželju se sooča s posebnimi izzivi v primerjavi z mestnim potniškim prometom. Potniški promet na podeželju nima tako razvitega javnega potniškega prometa kot ga ima urbano območje. Manjša naselja imajo omejeno število avtobusnih linij ali pa sploh nimajo redne javne prevozne povezave. Tako so prebivalci odvisni od lastnih vozil ali alternativnih oblik prevoza.

Avtobusi so najpogostejša oblika javnega potniškega prometa v Sloveniji. V večjih mestih kot so Ljubljana, Maribor in Koper delujejo tudi mestni avtobusi, vendar ti so del mestnega potniškega prometa, ki marsikdaj za podeželje ni dosegljivo. Logistika javnega potniškega prometa se osredotoča na organizacijo mestnega javnega potniškega prometa, za primestni javni potniški promet so potrebni drugačni izzivi, saj obstajajo določene omejitve zaradi manjše gostote prebivalcev.

Ministrstvo za okolje in prostor je pripravilo smernice za organizacijo javnega potniškega prometa na podeželju.

Pri načrtovanju javnega potniškega prometa sta v ospredju dva cilja, in sicer povečanje števila potnikov in čim boljša dostopnost javnega potniškega prometa za vse prebivalce. Ukrepi za uresničitev teh dveh ciljev so različni in deloma nasprotujoči. Pojavi se težava v redkeje poseljenih območjih. Za dobro in uporabno organizacijo primestnega javnega potniškega prometa so potrebna dodatna finančna sredstva.

Gostota prebivalstva je izpostavljena kot ovira pri učinkoviti organizaciji javnega potniškega prometa. Pri celovitem urejanju javnega potniškega prometa na podeželju je ovira tudi delitev pristojnosti med državo in lokalno skupnostjo. Organizacijo javnega potniškega prometa ureja Zakon o prevozih v cestnem prometu (ZPCP-2). 50 člen govori: *«država zagotavlja javni linijski prevozu potnikov, razen javnega linijskega prevoza v mestnem*

prometu in posebnega linijskega prevoza, kot javno dobrino z gospodarsko javno službo in na podlagi javnega razpisa podeli koncesije najugodnejšim ponudnikom prevoza.» Tako občine nimajo na podeželju pristojnosti za organizacijo javnega potniškega prometa. **Smernice za organizacijo javnega potniškega prometa na podeželju: LIFE IP CARE4CLIMATE(LIFE17 IPC/SI/000007/**

Trenutna ureditev pristojnosti urejanja javnega potniškega prometa na podeželju predstavlja veliko težavo za učinkovito organizacijo javnega potniškega prometa, da bi zadovoljila »podeželske uporabnike«. Verjetno bo potrebno kaj narediti, da bi prišlo do spremembe zakonodaje. Dobro je, da je organiziran prevoz v šolo za osnovnošolce.

Če želimo z javnim potniškim prevozom iz Zadobrove v Godovič, nam Google ponudi opcijo z avtom, peš, avtobusom. Možnosti brez osebnega prevoza ali peš praktično ni. Z avtomobilom prevozimo 126 km v 1h27min.

Na osnovi teh podatkov se mi zdi nujno predstaviti tudi smernice za učinkovit javni potniški promet.

SMERNICE ZA UČINKOVIT JAVNI POTNIŠKI PROMET NA PODEŽELJU

Smernice je pripravilo Ministrstvo za okolje in prostor RS . Izhajali so iz analize razporeditev prebivalstva v Sloveniji, organizacije javnega potniškega prometa in veljavne zakonodaje.

1. Enotno omrežje javnega potniškega prometa na državni ravni

Javni potniški promet na podeželju mora biti sestavni del enotnega omrežja javnega potniškega prometa na državni ravni. Z njim mora biti prostorsko, organizacijsko in tarifno integriran.

2. Privlačne in dobro organizirane prestopne točke.

V vsaki lokalni skupnosti mora biti vzpostavljena osrednja prestopna točka, ki omogoča prestopanje med različnimi vrstami javnega potniškega prevoza., hkrati pa omogoča prestop z osebnimi vozili.

3. Časovno konkurenčna povezava podeželskih središč.

Potovalni čas v konjicah ne sme biti dosti daljši od osebnega prevoza.

4. Pristojnost lokalnih skupnosti za organizacijo javnega potniškega prometa.

Ob spremembi zakonodaje naj se lokalnim skupnostim podeli pristojnost pri organizaciji vse oblike javnega prevoza na njihovem ozemlju.

5. Integracija šolskih prevozov.

Šolski prevozi naj bodo praviloma vključeni v javni potniški promet. Vozni redi morajo biti v sodelovanju med občino, šolami in upravljalcem javnega potniškega prometa pripravljeni tako, da šoloobvezni otroci pridejo ob pravem času v šolo, hkrati pa je vozni red na osrednji prestopni točki usklajen z voznim redi drugih linij.

6. Prevozi na klic.

Prevoze na klic je smiselno uvesti ali pa z njimi nadomestiti obstoječi linijski promet javnega potniškega prometa v primerih majhnega povpraševanja in primerih, ko naselja niso razporejena v koridorju. Prostorsko in časovno jih na prestopnih točkah uskladimo z drugimi oblikami javnega potniškega prometa.

7. Omrežje postajališč in njihova kakovost.

Omrežje postajališč mora biti zasnovano tako, da imajo prebivalci v razdalji največ enega kilometra postajališče z zadovoljivo frekvenco, v razdalji največ 10 kilometrov pa primerno.

8. Podeželski taksi in druge storitve mobilnosti.

9. Informacijska infrastruktura in promocija javnega potniškega prometa.

Informacije o vseh storitvah javnega potniškega prometa in drugih oblik trajnostne mobilnosti na podeželju morajo biti integrirane v državni voznoredni iskalnik. Informacije morajo biti dostopne na postajališčih. Ključa je promocija v medijih in družbenih omrežjih.

Smernice za organizacijo javnega potniškega prometa na podeželju: LIFE IP CARE4CLIMATE(LIFE17 IPC/SI/000007/

Na podlagi novih sistemskih rešitev je ministrstvo, pristojno za promet, vložilo predlog za sprejetje Strategije razvoja prometa v Republiki Sloveniji, ki jo je Vlada RS na svoji 48. redni seji dne 29. julija 2015 tudi sprejela – sklep št. 37000-3/2015/8

Strategija razvoja prometa v Republiki Sloveniji do leta 2030

Za pripravo strategije je bil dokončno razvit in uporabljen nacionalni prometni model, ki ga sestavljajo notranji in zunanji prometni model (znotraj EU in zunaj nje) ter modeli vplivov na 9 okolje in prometno varnost. Vsi modeli so združeni v celoto in so strateške narave.

Model vplivov na okolje in prometno varnost je razvit samo za Slovenijo. Modeliran je potniški in blagovni promet. Z analizo alternative »0«, ki predvideva, da na prometnem področju v prihodnje ne bi storili nič, razen da bi ohranjali (vzdrževali) obstoječe stanje in dokončali tekoče naložbe, se je pokazala ta problematika:

- *promet z osebnimi vozili bi še naraščal,*
- *javni potniški promet pa upadal;*
- *povečeval bi se cestni tovorni promet na račun železniškega prometa;*
- *zmogljivost železniških prog bi bila skoraj povsod presežena;*
- *na cestah bi nastajali nenehni zastoji, predvsem na vpadnicah v glavno mesto;*
- *srečevali bi se z velikim pomanjkanjem parkirišč za tovornjake;*
- *na železnicah ne bi dosegli standardov za jedrno omrežje TEN-T do leta 2030, kot zahteva uredba EU na tem področju;*
- *dostopnost do regionalnih središč bi se zmanjšala;*
- *onemogočili bi razvoj koprskega pristanišča zaradi pomanjkanja zmogljivosti na železnici;*
- *poslabšala bi se prometna varnost v celoti, predvsem v cestnem prometu;*
- *neugodni vplivi prometa na okolje bi se povečali čez okvire, sprejete na ravni EU in Slovenije (onesnaževala zunanjega zraka, toplogredni plin CO₂, hrup ...);*

- *kakovost življenja v mestih in na podeželju bi se poslabšala zaradi eksternih stroškov.*

Strategija razvoja prometa v Republiki Sloveniji do leta 2030

V prispevku sem se osredotočila na podeželje. Kot predvideva »strategija« do leta 2030, se za podeželje ne bo bistveno spremenilo, kar se tiče javnega potniškega prometa, lahko pa računamo, da bomo porabili le več stroškov za prevoz. Povečala se bo gostota prometa, s tem se bo povečal izpust toplogrednih plinov in kvaliteta življenja se bo poslabšala zaradi onesnaževanja zraka.

4 ZAKLJUČEK

V Sloveniji živi skoraj polovico prebivalstva na podeželju. Pri načrtovanju ponudbe trajnostne mobilnosti je potrebno razmišljati tudi na ta del prebivalstva. Slovenija je regijsko zelo raznolika in se tudi potniški promet zelo razlikuje. Če pogledamo na Google je slika, kakšne so prometne povezave med mestom in podeželjem, lahko ugotovimo, da zelo težko uporabljamo javni potniški promet. Osnovnošolci imajo organiziran javni prevoz do šole, medem ko srednješolci so vezani na javne potniške linije. Kot je razvidno iz anketnega vprašanja, ljudem predstavlja javni potniški promet logistično oviro in če se le da, se izognejo javnemu potniškemu prometu. Tudi druge oblike logističnih tokov so v primerjavi z urbanim okoljem zahtevnejše. Morda bo politika prisluhnila prebivalcem podeželja tudi v upanju za čistejšo okolje.

Upam, da bodo smernice javnega potniškega prometa sprejete in bodo prinesle ugodnosti za uporabnike javnega potniškega prometa.



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4. MOBILITY IN A RURAL ENVIRONMENT

SUMMARY

On the one hand, we live in an age when society is getting older, and on the other hand, the social climate is more and more favourable to young people and their needs. This is reflected in the adaptation of passenger transport to young people, if the elderly live in a rural environment they are neglected, due to poorer logistics in all areas. In particular, an active social life is very important and is neglected in the case of the elderly population. Public passenger transport providers are more successful in adapting to the demands of the elderly population in urban environments than in rural areas. In rural areas, the conditions of transport services for the elderly are worse, and as a result, the possibility of social activities is reduced.

Keywords: logistics, public passenger transport, urban environment, rural areas

1 WHAT IS LOGISTICS?

Throughout history, logistics systems have changed and been supplemented. Methods were supplemented and changed. Newer approaches were necessary, which are justified differently by different authors.

The history of logistics is linked to various fields. When I was reading the literature, I realized that military logistics is also represented in the literature. Logistics is essential at every step. With the development of the economy, the approaches were supplemented and developed. In the following decades, different opinions emerged about solving individual problems of the system.

I defend the historical fact that it is necessary to plan carefully and take into account different theories.

I will present the definitions of distinguished experts:

Požar: says that logistics is of military origin and means overcoming space and time.

Kirsch: Logistics in a systemic sense includes the design, control, regulation, and implementation of the entire flow of energy, information, people and especially material.

Jünemann: defines logistics as a scientific discipline of planning, management and control of material, personnel, energy and information flow in systems.

Jakomin, Zelenika and Medeot define logistics as a set of interconnected activities that serve to move raw materials.

2 LOGISTICS IN THE COUNTRYSIDE

I imagine the countryside as a place dominated by agricultural land. Today, for many, this environment represents life in nature and living in a homely, pleasant environment, without the hustle and bustle of the city. The countryside often has different challenges than the urban environment and related restrictions, so logistics in all areas is adapted to these special needs.

Rural logistics focuses on the organization and provision of transport and distribution in rural areas.

I will present the key aspects of logistics in rural areas.

2.1 Infrastructure

In a rural environment, access to appropriate transport routes and infrastructures is limited.

2.2 Transportation

Logistics in the countryside requires flexibility in the choice of means of transport. The rural environment has a lower traffic density, as a result, the challenge for modern society is how to organize passenger traffic so that it is accessible to everyone.

In the transport of goods, the use of various means of transport, e.g., trucks, tractors adapted to the environment, while the railway is accessible only in the area where the infrastructure is adapted to it. There are usually not enough financial resources available to expand the infrastructure.

2.3 Cooperation

Due to the dispersion of the environment, cooperation between all stakeholders is important, between farmers, local growers, distributors and traders.

In passenger transport, it would also make sense to cooperate between users of means of transport. The problem is the time component and the ability to negotiate.

2.4 Storage of goods

Storage of goods is crucial due to less available capacity. Adequate warehouse management and optimal storage methods are essential, especially in fresh food areas.

2.5 Technology

The use of information technology enables the management of logistics in rural areas, can improve the traceability, efficiency, and quality of logistics processes. Smart technology can enable shipment tracking, managed inventory, automation, and the use of smart sensors.

2.6 Environmental sustainability

Logistics in a rural environment increasingly focuses on sustainable practices in terms of reducing emissions, recycling packaging, using environmentally friendly means of transport, recycling and supporting local food production and distribution.

3 PASSENGER TRAFFIC

Passenger transport poses a serious logistical problem for the rural population compared to the residents in the urban environment.

In Slovenia, which is a big country for some, a smaller one for others, average users encounter logistical problems in many areas. If we want to go from Celje to Koper to drink coffee and take a walk by the sea, we must sleep in Koper, because the return trip cannot be made in the same day. So, we are forced to use personal transport, which is not in the spirit of protecting the environment. The company pays perhaps more attention to the logistics of commercial products than to the logistics of public passenger transport. With the EU orientation that the elderly is a risk group in private cars, I cannot imagine the logistics of transport without an adequate network of public passenger transport. In Celje, which is the third largest Slovenian city in terms of size, it has a well-organized network of urban passenger transport, suburban passenger transport is logistically very inadequate, I can say that it is practically non-existent, if a bus goes to the village, which is 5 km away from the city center 2 times a day. What can we as citizens do to help them use public transport? I

think it's easier to take a taxi. This is where stratification is evident companies and the fact that the countryside is becoming cut off from public passenger traffic more than ever. Republic of Slovenia the Ministry of the Environment and Space has issued Guidelines for the organization of public passenger transport in rural areas. They recommend that links should be timed, competitive and tied to local measures. In practice, I checked with a survey questionnaire how timing and local measures enable the use of public passenger transport. The question was "WHAT DOES PUBLIC PASSENGER TRANSPORT MEAN TO RURAL RESIDENTS?". 67 respondents answered the question. I have summarized the 5 most frequent and similar answers:

- suburban passenger traffic is as if it doesn't exist for me. When I get off the train, I have to walk another 5 km or wait another 1.5 hours for the bus, because there is no connection between the bus and the train.
- luckily, I drive a car, because otherwise I wouldn't get anywhere.
- my parents drive me because my schedule doesn't match the bus schedule. It annoys me that the buses are running empty because the operators do not take into account the interests of the locals.
- he drives his grandmother, as she cannot walk 3 km to the bus stop.
- what does a bus mean to me if it runs 3 times a day according to the timetable.

90% of respondents think so, the other 10% do not deal with public passenger transport, because for them it is a waste of time.

Passenger traffic in rural areas faces special challenges compared to urban passenger traffic. Passenger transport in rural areas does not have as developed public passenger transport as in urban areas. Smaller settlements have a limited number of bus lines or no regular public transport connection at all. Thus, residents depend on their own vehicles or alternative forms of transportation.

Buses are the most common form of public passenger transport in Slovenia. In larger cities such as Ljubljana, Maribor and Koper, city buses also operate, but these are part of urban passenger traffic, which is often not available for rural areas. The logistics of public passenger transport focuses on the organization of urban public passenger transport, for suburban public passenger transport different challenges are required, as there are certain limitations due to the lower population density.

The Ministry of Environment and Space has prepared guidelines for the organization of public passenger transport in rural areas.

When planning public passenger transport, two goals are in the foreground, namely the increase in the number of passengers and the best possible accessibility of public passenger transport for all residents. The measures to achieve these two goals are different and partly contradictory. A problem arises in less populated areas. Additional financial resources are needed for a good and useful organization of suburban public passenger transport.

Population density is highlighted as an obstacle in the efficient organization of public passenger transport. The division of powers between the state and the local community is also an obstacle in the comprehensive regulation of public passenger transport in rural

areas. The organization of public passenger transport is governed by the Road Transport Act (ZPCP-2). Article 50 says: "The state provides public scheduled passenger transport, except for public scheduled transport in urban traffic and special scheduled transport, as a public good with an economic public service and grants concessions to the most favorable transport providers based on a public tender." Thus, municipalities do not have the authority in rural areas the organization of public passenger transport. Guidelines for the organization of public passenger transport in rural areas: LIFE IP CARE4CLIMATE (LIFE17 IPC/SI/000007/

The current regulation of the competence to regulate public passenger transport in rural areas presents a major problem for the efficient organization of public passenger transport in order to satisfy "rural users". It is likely that something will need to be done to bring about a change in the legislation. It is good that transport to the school is organized for primary school children.

If we want to take public passenger transport from Zadobrova to Godovič, Google offers us the option by car, on foot, or by bus. There are practically no options without personal transport or on foot. By car, we travel 126 km in 1 hour and 27 minutes.

Based on this data, I think it is necessary to present guidelines for efficient public passenger transport.

GUIDELINES FOR EFFICIENT RURAL PUBLIC PASSENGER TRANSPORT

The guidelines were prepared by the Ministry of Environment and Spatial Planning of the Republic of Slovenia. They were based on an analysis of population distribution in Slovenia, the organization of public passenger transport and current legislation.

1. Unified network of public passenger transport at the national level

Public passenger transport in rural areas must be an integral part of the unified network of public passenger transport at the national level. It must be spatially, organizationally, and tariff-integrated with it.

2. Attractive and well-organized transfer points.

In every local community, a central transfer point must be established, which enables transfer between different types of public passenger transport, and at the same time allows transfer with personal vehicles.

3. Time-competitive connection of rural centers.

Travel time in horse-drawn carriages should not be much longer than personal transport.

4. The competence of local communities for the organization of public passenger transport.

When the legislation is changed, local communities should be given the authority to organize all forms of public transport on their territory.

5. Integration of school transport.

As a rule, school transport should be included in public passenger transport. Timetables must be prepared in cooperation between the municipality, schools and the public passenger transport operator so that school-aged children arrive at school at the right time, while at the same time the timetable at the central transfer point is coordinated with the timetables of other lines.

6. Transport on call.

It makes sense to introduce on-call services or to replace the existing regular public passenger services with them in cases of low demand and in cases where the settlements are not distributed in the corridor. They are spatially and temporally coordinated with other forms of public passenger transport at transfer points.

7. The network of stops and their quality.

The network of stops must be designed so that residents have a stop with a satisfactory frequency within a distance of no more than one kilometer, and a suitable stop within a distance of no more than 10 kilometers.

8. Rural taxi and other mobility services.

9. Information infrastructure and promotion of public passenger transport.

Information on all public passenger transport services and other forms of sustainable mobility in rural areas must be integrated into the national timetable search engine. Information must be available at stops. The key is promotion in the media and social networks.

Smernice za organizacijo javnega potniškega prometa na podeželju: LIFE IP CARE4CLIMATE(LIFE17 IPC/SI/000007/

On the basis of the new system solutions, the ministry responsible for transport submitted a proposal for the adoption of the Transport Development Strategy in the Republic of Slovenia, which the Government of the Republic of Slovenia also adopted at its 48th regular meeting on July 29, 2015 - decision no. 37000-3/2015/8

Transport development strategy in the Republic of Slovenia until 2030

For the preparation of the strategy, a national transport model was finally developed and used, which consists of an internal and external transport model (within the EU and outside it) and models of impacts on the environment and traffic safety. All models are combined into a whole and are strategic in nature.

The model of impacts on the environment and traffic safety is developed only for Slovenia. Passenger and goods traffic is modelled. The analysis of the "0" alternative, which assumes that nothing would be done in the transport sector in the future, except to preserve (maintain) the existing situation and complete current investments, revealed this issue:

- traffic with personal vehicles would continue to grow,
- public passenger traffic was declining.
 - road freight traffic would increase at the expense of rail traffic.
- the capacity of railway lines would be exceeded almost everywhere.
- there would be constant traffic jams on the roads, especially on the entrances to the capital;
- we would face a great shortage of truck parking spaces;
- railways would not reach the standards for the TEN-T core network by 2030, as required by the EU regulation in this area;
- accessibility to regional centers would decrease;
- the development of the port of Koper would be impossible due to the lack of capacity on the railway;
- overall traffic safety would deteriorate, especially in road traffic;
- the adverse effects of transport on the environment would increase beyond the framework adopted at the level of the EU and Slovenia (outdoor air pollutants, greenhouse gas CO₂, noise...);
- the quality of life in cities and in the countryside would deteriorate due to external costs.

Transport development strategy in the Republic of Slovenia until 2030

In my contribution, I focused on rural areas. As the "strategy" foresees until 2030, there will not be any significant changes for rural areas as far as public passenger transport is concerned, but we can count on spending only more transport costs. The traffic density will increase, thereby increasing the emission of greenhouse gases and the quality of life will deteriorate due to air pollution.

4 CONCLUSION

In Slovenia, almost half of the population lives in rural areas. When planning the offer of sustainable mobility, it is also necessary to think about this part of the population. Slovenia is very regionally diverse and passenger traffic is also very different. If we look at Google's image of what the transport connections are between the city and the countryside, we can see that it is very difficult to use public passenger transport. Elementary school students have organized public transportation to school, while high school students are tied to public passenger lines. As can be seen from the survey question, public passenger transport is a logistical obstacle for people, and they avoid public passenger transport if possible.

Other forms of logistics flows are also more demanding compared to the urban environment. Perhaps politics will listen to rural residents in the hope for a cleaner environment.

I hope that the public passenger transport guidelines will be accepted and will bring benefits to public passenger transport users.



ЖЕЛЕЗНИЧКА ТЕХНИЧКА ШКОЛА -
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5.ДУАЛНО ОБРАЗОВАЊЕ У НЕМАЧКОЈ, ТУРСКОЈ И СРБИЈИ -ИСКУСТВА ИЗ ПРОЈЕКТА МОБИЛНОСТИ-

Сажетак: У оквиру Пројекта мобилности који су наставници Железничке школе у потпуности припремили и испланирали, и реализовали уз подршку средстава Европске Уније, седам наставника школе је посетило средње стручне школе у Немачкој и Турској. Посматрањем рада школе, разговором са наставницима и ученицима, и посетом часовима, наставници су стекли увид у карактеристике дуалног образовања Немачке и Турске. Сазнања добијена реализацијом Пројекта наставницима школе ће помоћи у предстојећој имплементацији дуалног образовања за своје образовне профиле, што је и био примарни циљ пројекта.

Кључне речи: Образовни систем, средња стручна школа, учење кроз рад, дуално образовање, инструктор, координатор.

Увод

Како би лакше и успешније савладали изазове предстојећег увођења дуалног образовања, наставницима Железничке техничке школе су, у оквиру Пројекта мобилности *Нова знања за ново доба железнице*, организоване обуке у Немачкој и Турској. Пројекат је испланирао, организовао, и реализовао Тим за међународну сарадњу школе. У Пројекту мобилности је учествовало седам наставника школе, сви предавачи стручних предмета и практичне наставе и сви инжењери електротехнике, машинства и саобраћаја.

Циљеви пројекта су били не само стицање увида у функционисање дуалних система образовања у Немачкој и Турској и препознавање организационих и практичних аспеката њихове примене, већ и уочавање различитих облика прилагођавања дуалног образовања и обучавања различитим образовним окружењима. Такође, можда и најважније, стицање знања о моделима сарадње између школа и компанија и осветљавање кључних проблема који прате сарадњу, како би се они предупредили.

Планирано је да се кроз посете школама уоче практични аспекти примене. У циљу неговања образовних вештина, наставници су посетили две школе у Берлину и

један образовни центар у Бурси. Обишли су школе, посетили часове, разговарали са ученицима и разменили искуства са колегама.

Активностима планираним Пројектом и коришћењем могућности које пружа ЕУ за наставнике, побољшане су компетенције наставника потребне за имплементацију дуалног образовања. У оквиру програма Еразмус + је, међутим, предвиђено и учешће ученика. Тако је Школи одобрен и пројекат мобилности ученика током којег ће ученици бити у могућности да стручну праксу обављају у иностранству.

Жеља аутора је да у раду презентују стечена искуства, да упоредно представе образовне системе у ове три земље, посебно истичући карактеристике средњошколског образовања уопште и у дуалном систему у оквиру њега, и да укажу на уочене проблеме имплементације дуалног образовања. Става смо да та искуства могу да помогну свакој школи која се спрема да примени дуални систем за школовање својих ученика.

Образовни системи Немачке, Турске и Србије

Образовни системи у ове три земље су, разумљиво, врло различити, и структурно и организационо. Ипак, садржаји доступни ученицима су примерени њиховом узрасту а како год се школе звале и којој год организационој целини припадале, сваки образовни систем је структуриран тако да прати природан психофизички и ментални развој ученика.

Узраст	НЕМАЧКА	разре	ТУРСКА	разре	СРБИЈА	разре	Узраст
19	ВИСОКО ОБРАЗОВАЊЕ		ВИСОКО ОБРАЗОВАЊЕ		ВИСОКО ОБРАЗОВАЊЕ		19
18	СРЕДЊЕ ОБРАЗОВАЊЕ	13	СРЕДЊЕ ОБРАЗОВАЊЕ	12	СРЕДЊЕ ОБРАЗОВАЊЕ	4	18
17	Виши ниво	12				3	17
16	СРЕДЊЕ ОБРАЗОВАЊЕ	11				2	16
15	Нижи ниво	10				1	15
14	СРЕДЊЕ ОБРАЗОВАЊЕ	9				ОСНОВНО ОБРАЗОВАЊЕ Виши разреди	8
13	Нижи ниво	8	7	13			
12	СРЕДЊЕ ОБРАЗОВАЊЕ	7	6	12			
11	Оријентациони разреди	6	5	11			
10	СРЕДЊЕ ОБРАЗОВАЊЕ	5	ОСНОВНО ОБРАЗОВАЊЕ Нижи разреди	4	10		
9	ОСНОВНО ОБРАЗОВАЊЕ	4		3	9		
8	ОСНОВНО ОБРАЗОВАЊЕ	3		2	8		
7	ОСНОВНО ОБРАЗОВАЊЕ	2	1	7			
6	ОСНОВНО ОБРАЗОВАЊЕ	1	1	6			
5	ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		5
4	ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		4
3	ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		ПРЕДШКОЛСКО ОБРАЗОВАЊЕ		3

Слика 1 – Организационе структуре образовних система Немачке, Турске и Србије

Основна карактеристика образовног система Немачке је да његова структура варира од покрајине до покрајине. Наставници Железничке техничке школе су посетили Берлин, па се добијене информације и импресије односе на Покрајину Брандербург. Савезна Влада учествује углавном у законској регулативи система. У Турској је структура система униформна на целој територији државе и у ингеренцији

Владе. Структура Образовног система у Републици Србији је ујеначена на целој њеној територији, мада постоје разлике у оперативном планирању између Централне Србије и њених покрајина због вишенационалне популације.

Школовање је бесплатно у све три земље, осим ако су у питању приватне школе којих има у Немачкој, и приватни универзитети којих има у Србији. Осим формалног образовања у оквиру система, у Турској функционише и неформално образовање у облику јавних обука, шегртовања, обука за сертификате и сл. Обучавање као облик образовања постоји и у Србији, и реализује се и кроз образовни систем али и кроз приватне институције које су сертификоване за образовне активности.

Средње образовање је у Немачкој двостепено. Прва фаза започиње са два разреда оријентационе наставе, која је иста за све. Након тога, ученици започињу школовање у једном од следећих типова школа: занатске школе (*Hauptschule*), стручне школе (*Realschule*), гимназије (*Gymnasium*) и комбиноване школе (*Gesamtschule*). Занатске школе трају углавном три године, мада неке и четири. У другој фази, ученицима су на располагању следеће школе струковне школе (*Berufsschule*), стручне школе, (*Berufsfachschule*) више техничке школе (*Fachoberschule*) и разни облици припремне наставе за Универзитет, које су доступне у гимназијама и неким комбинованим школама. У Турској постоје следећи типови школа: гимназије, стручне школе, полицијске школе, војне школе, школе за обуку наставника, ликовне и верске школе. Средње и више образовање ученик завршава са 17 година, и тада или наставља високо образовање или излази на тржиште рада. Школски систем у Србији је сличнији Турском него Немачком. У Србији у средњешколском образовању постоје гимназије, стручне школе и разне уметничке и струковне школе (музичка, на пример).

Може се рећи да је оцењивање у ова три образовна система потпуно различито. У Турској је оцењивање у процентима. У средњем образовању, праг пролазности за стручне предмете је познавање бар 50% градива а за општеобразовне предмете може да буде и мањи од пола. У немачком образовном систему, оцене се додељују у распону од 1 до 6, где је 1 највиша а 6 најнижа оцена. Оцене 5 и 6 су непрелазне оцене. У најстаријим разредима гимназија, оцењује се помоћу поена, где свака оцена носи одређени број поена. Дозвољено је варирање оцена помоћу + и -. На универзитетском нивоу, оцене су мало другачије, иду од 1 до 5. Оцењивање у Србији иде од 1 до 5 у основном и средњем образовању, где је оцена 1 непрелазна а оцена 5 одлична. У високом образовању оцењивање иде од 6 до 10, где је десетка највиша оцена. Одлична оцена из средњег образовања је непрелазна на факултетима.

Наставници који су учествовали у овом пројекту мобилности су уочили још једну разлику, нарочито видљиву код српских и немачких школа, а односи се на инклузију. Србија је инклузију у свој образовни систем увела 2009. године, ратификовањем Конвенције Уједињених нација о Правима особа са посебним потребама. Инклузијом су обухваћени ученици који имају проблеме са савладавањем градива, из било којих разлога; често су тиме обухваћени ученици из осетљивих и маргинализованих групација и ученици проблематичног социо-економског стања. Немачка, иако замља Европске Уније и мада критикована због тога, у свом образовном систему је задржала специјалне школе за ученике са тешкоћама у учењу и са посебним физичким проблемима. Процедуре инклузије се у Немачкој углавном примењују за интеграцију великог броја избеглица.

По питању мотивисаности просветних радника, Немачка и Турска су сличне – имају врло мотивисане наставнике, мада из различитих разлога. Један од ученика немачке школе која је посећена, изјавио је да му је животни циљ да постане наставник, јер су наставници у Немачкој одлично плаћени. И у Турској би сви да буду предавачи, али не толико због плате, колико због угледа коју професија просветног радника има.

У Србији није у значајној мери примећен ни један од ова два облика мотивисања наставника.

Дуално образовање у Немачкој, Турској и Србији

Дуално образовање је модел наставе који се реализује кроз теоријску наставу и вежбе у школи, и кроз учење кроз рад код послодавца. Постоје, дакле, две структурне и функционалне компоненте образовања:

1. теоријска компонента: реализује се у средњој школи, у њеним учионицама, радионицама, лабораторијама; заснива се на наставном плану и програму; полазник има статус ученика;
2. практична компонента: реализује се кроз рад на реалном радном месту, радионици, лабораторији у компанији; заснива се на законској регулативи специфично за тај облик образовања; полазник има статус приправника;

Једна средња школа може да школује образовне профиле и кроз дуални модел образовања, и кроз класични, а може и да их реализује истовремено и паралелно, у зависности од интересовања ученика. Суштинска разлика у ова два модела је у начину реализације практичне компоненте и у законској регулативи која прати ту компоненту. Теоријска компонента се суштински не разликује. У Србији, и код класичних и код дуалних образовних профила, настава се регулише Законом о основама система образовања и васпитања, Законом о средњем образовању и васпитању, Законом о дуалном образовању, Законом о образовању одраслих, Законом о националном оквиру квалификација и подзаконским актима (одредбеама, правилницима и слично). Закон о дуалном образовању јасно истиче разлику у приступу практичном делу образовања. Код класичних профила, практичан део образовања је регулисан Правилником о реализацији практичне наставе и професионалне праксе, који, такав какав је, приморава школе на самосталне акције проналажења образовног партнера и запослених из предузећа који ће праксу реализовати. Код дуалног модела, Привредна комора Србије игра улогу посредника између школе и привреде, чија сарадња је дефинисана Законом о дуалном образовању и пратећим подзаконским актима. Привредна комора, такође, врши акредитацију компанија које су изразиле жељу да учествују у дуалном образовању и врши обуку њихових запослених који ће да учествују у образовању деце.

У Немачкој, Привредна комора такође проверава и региструје компаније, прати и контролише обучавање унутар компанија. Влада и социјални партнери преговарају и одобравају стандарде нових обука, уз подршку Савезног завода за стручно образовање и обучавање. Влада прилагођава општи наставни план новодефинисаним стандардима који се онда уграђују у Правилник о обуци (за практични део у компанији) и у План и програм (за теоријски део у школи). Правилник о обуци садржи звање за занимање, профил обуке, садржај, временски оквир, план обуке и испитне захтеве. План и програм рада у стручној школи обезбеђује неопходна професионална теоријска знања и проширује општа знања, а стандарди се дефинишу Оквирним наставним планом и програмом кроз циљ учења, садржаје и области учења. Тако дефинисани стандарди су важећи у целој земљи.

У Немачкој, дуални модел образовања је предвиђен за ученике друге фазе средњег образовања, односно за узрасте од 16 до 19 година живота. За ученика, процедура пријављивања је врло једноставна, али ученик сам тражи компанију у којој ће да се школује кроз рад. У Србији, и у овом случају Привредна комора се поставља као посредник. и школама обезбеђује списак компанија које су на располагању за обучавање. Од школе се захтева да формира Тим за каријерно вођење и саветовање, који је у обавези да помогне ученицима у избору компаније, али и компанијама да

изаберу ученике. Дуални модел је предвиђен за ученике узраста 15 до 19 година, што је у Србији узраст средњошколаца. У Турској, модел дуалног образовања је предвиђен само током последње године школовања, осим за изразито дефицитарна занимања, где учење кроз рад почиње раније.

У све три земље се дуални модел примењује тако што ученик у школи борави одређени број дана а остатак радне недеље у предузећу, на практичним обукама. У Турској је предвиђено да ученик проводи три дана недељно у предузећу а два дана у школи. У Србији број дана у предузећу варира од разреда и врсте образовног профила. За неке образовне профиле, практичан део почиње тек у другом разреду, са једним даном у предузећу, и постепено расте до четвртог разреда. Слично је и у Немачкој.

Школа у Србији је у обавези да из реда запослених именује координатора за дуално образовање. То је обично наставник практичне наставе; он у сарадњи са инструктором планира, прати, реализује и вреднује реализацију учења код послодавца. Инструктор је запосленик компаније који брине да се током учења реализују садржаји прописани планом и програмом учења кроз рад. Координатор и инструктор сарађују у процесу оцењивања. Компанија је обавезна да обезбеди довољан број лиценцираних инструктора. Инструктори стичу лиценцу кроз обуку коју реализује Привредна комора и полажући испит за инструктора. У Турској је принцип сличан као у Србији – инструктор је запосленик компаније који је стекао лиценцу кроз обуке и испите које организује Привредна комора. Обука за инструкторе се финансира из фондова ЕУ. Координатор је наставник стручних предмета који је у обавези да једном недељно обиђе сва места на којима се ученици обучавају кроз рад и да том приликом у сарадњи са инструктором забележи све што је битно за ученика – почевши од присуства, учешћа у раду до остваривања циљева практичне обуке. Немачке школе такође имају запосленог који је задужен за сарадњу са инструктором, али су, кроз разговоре са колегама, наставници стекли утисак да је тај облик сарадње мањкав, да се одвија спорадично и ретко (једном у полугодишту) и углавном се односи на оцењивање.

Још једна важна обавеза компаније је да ученику који у компанији учи кроз рад обезбеди сву заштитну опрему и средства за одређено радно место – ова компонента је иста за све три државе. Координатор и инструктор су одговорни да безбедност и здравље ученика током учења буду у складу са прописима, и то је заступљено у све три земље.

Школовање у дуалном систему подразумева да ученик-приправник прима одређену финансијску надокнаду за учење кроз рад. У Немачкој, у складу са њиховим уговорима, ученици добијају малу плату, обично око 300-900 евра месечно; исплате имају карактер студентског кредита или стипендије. У Србији, ученицима се исплаћује накнада за сваки сат учења кроз рад, и то бар 70% минималне цене рада. У Турској, ученик добија 30% просечног дохотка - средства обезбеђује држава уколико компанија има мање од 20 запослених, а веће компаније саме финансирају своје ученике. Осим финансијске подршке, компаније својим ученицима-приправницима обезбеђују и материјалну подршку (плаћен превоз, трошкове исхране и слично).

Српски модел дуалног образовања предвиђа склапање два уговора. Први је Уговор о дуалном образовању и склапа га школа са компанијом. Уговор садржи податке о компанији и школи, на који образовни профил се односи, обавезе предузећа и школе, број ученика, број расположивих лиценцираних инструктора, трајање уговора и слично. Уговор обично важи три или четири године, онолико колико траје образовни циклус у Србији. Други Уговор је Уговор о учењу кроз рад и закључују га послодавац и ученик. Осим података о ученику, родитељу или старатељу, послодавцу, школи и

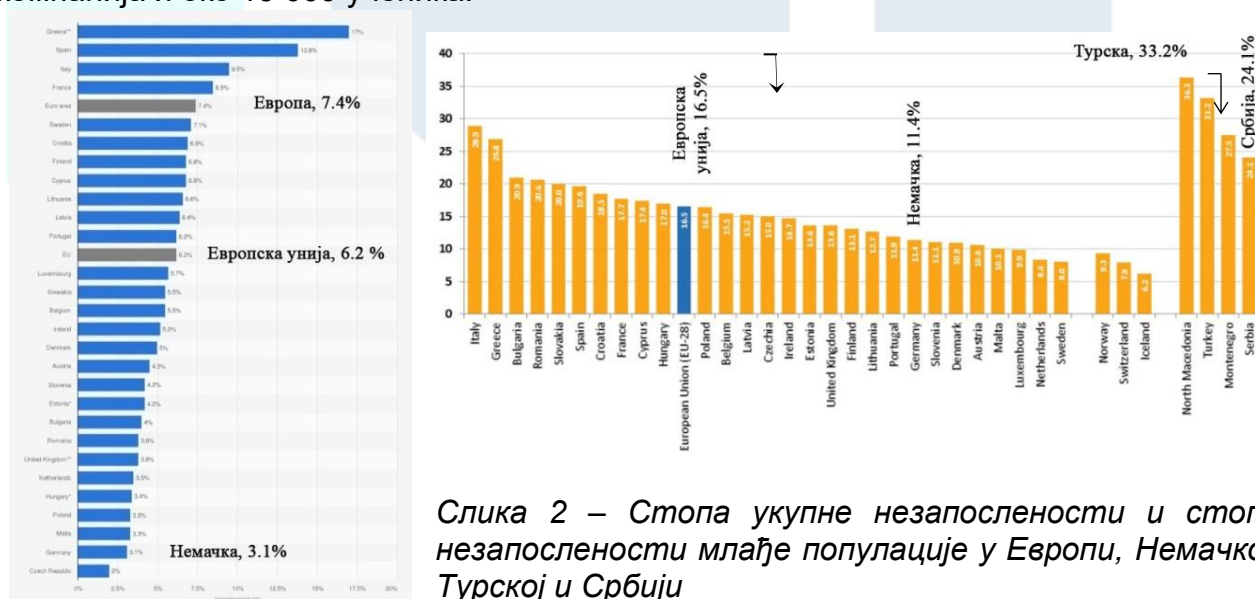
образовном профилу, мора да садржи и потврду да ученик испуњава здравствене услове за профил у коме се школује и друге обавезе ученика; обавезе послодавца које се истичу Уговором се односе на План и програм, финансијско и материјално обезбеђење ученика, План и програм реализације и трајање уговора. У Немачкој, када пронађе адекватну компанију, ученик са њом потписује Уговор о обучавању који садржи садржај обуке, распоред, трајање, новчану накнаду и бенефиције ученика-приправника. Сличан уговор се потписује и у Турској, али између компаније и родитеља, пошто су ученици у Турској млађи него у Немачкој и Србији.

Ефекти дуалног образовања

Дуално образовање се сматра економичним јер смањује трошкове које би држава издвојила за опремање учионица и радионица за практичну наставу. Као предност овог модела се види и у обезбеђењу квалификованих кадрова у складу са потребама тржишта рада; такође, и у раном контакту ученика са светом рада, што повећава шансе за развој предузетништва код младих и подстиче их да покрену сопствени бизнис.

У основи, сматра се да дуално образовање може ефикасно да смањи стопу незапослености у млађој популацији. У Србији та стопа је око 25% (стопа укупне незапослености се процењује на око 10%) а у Турској 33,2%. Немачко привредно окружење учествује у дуалном образовању са око 20% компанија (преко 400 000) и обухвата преко пола милиона ученика. Од тога, 74% се директно запошљава по завршетку школовања. Немци сматрају да је та чињеница заслужна за стопу незапослености од 3% (друга у Европи, иза Чешке) и стопу незапослене млађе популације која је око 11%.

Немачка је дуално образовање почела да уводи 1969. године, када је успостављена стандардизована регулатива. Закон о стручном образовању је 2002. године претрпео велике измене а 2020. нешто мање. Србија је донела Закон о дуалном образовању 2017. године, с тим што је 2019. Закон претрпео неке измене. Национални модел дуалног образовања Србије, иако се ослања на искуства других земаља (Швајцарске, Немачке и Аустрије) прилагођен је њеним потребама и карактеристикама, посебностима и капацитетима привреде и карактеристикама постојећих средњих стручних школа. Дуални модел у Србији је до сада имплементиран у 165 школа и у 65 образовних профила, а у њему учествује 850 компанија и око 13 000 ученика.



Слика 2 – Стопа укупне незапослености и стопа незапослености млађе популације у Европи, Немачкој, Турској и Србији

Закључак

У поређењу са Немачким моделом, дуални модел у Србији је новина, али га све више школа уводе у своју образовну праксу. За потребе школе, родитеља и ученика, обезбеђени су адекватни Водичи и разна литература, међутим, искуства из прве руке су више него добродошла, поготово ако је модел у примени 50 година, као што је случај са Немачком. Искуства која су наставници Железничке техничке школе поделили са колегама из Немачке и Турске су драгоцене. Дискутујући са колегама из своје школе, у процесу дисеминације, наставници обухваћени пројектом су дошли до неколико важних закључака који могу да се преиначе у смернице при имплементацији дуалног модела.

Немци слабост свог дуалног модела виде у мањкавој сарадњи школе и компаније која се своди на два сусрета годишње. Наставници су става да је у Турској та сарадња боље организована и боље регулисана. Координатори имају константан увид у напредовање ученика током учења кроз рад, јер су у обавези да посећују ученике у компанији, а ученици имају обавезу да воде дневнике свог боравка у предузећу. Железничка техничка школа у претходном периоду има добра искуства у организовању практичне наставе у железничким предузећима, а организациони модел јако личи на турски и по питању обавеза наставника, и по питању обавеза ученика. Сагледавајући један не тако добар пример и један пример праксе који им је врло препознатљив, наставници су ову димензију дуалног модела препознали као кључну за постизање позитивних ефеката дуалног модела.

Још једну важну димензију наставници су препознали у законској регулативи која прати дуални модел у Србији. Док је практична настава у класичним образовним профилима регулисана *Правилником о практичној настави*, у случају дуалног модела, обавезе свих учесника у дуалном образовању су регулисане *Законом о дуалном образовању*. У све три земље је та правно регулациона димензија видљива.

Кроз разговор са ученицима у обе земље, наставници су сазнали да су ученици углавном задовољни образовањем које стичу и начином на који га добијају. Учењем кроз рад, ученик ефикасније сагледава личне потенцијале, стиче самопоуздање да радне задатке и обавезе самостално обаља. Упознаје се са светом рада, климом у предузећу, формира тачну слику шта може да очекује у будућности. што му пружа ширу основу за неке будуће изборе у животу, што је, можда, и највећа предност дуалног образовања.



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5. DUAL EDUCATION IN GERMANY, TURKEY AND SERBIA - EXPERIENCES FROM THE MOBILITY PROJECT -

Summary: Teachers of the Railway Technical School had prepared and planned the Mobility Project, which was carried out with the support of European Union funds. Seven school teachers visited secondary vocational schools in Germany and Turkey. By observing the work of the school, talking with teachers and students, and visiting classes, the teachers gained an insight into the characteristics of dual education in Germany and Turkey. The knowledge gained through the implementation of the Project will help school teachers in the upcoming implementation of dual education for their educational profiles, which was the primary goal of the project.

Keywords: Educational system, secondary vocational school, work-based learning, dual education, instructor, coordinator.

Introduction

In order to facilitate and successfully overcome the challenges of the upcoming implementation of dual education, as part of the Mobility Project *New Knowledge for the New Rail Age*, trainings were organized in Germany and Turkey for the teachers of the Railway Technical School. The project was planned, organized and implemented by the School's *International Cooperation Team*. Seven school teachers, all teachers of professional subjects and practical training, and all electrical, mechanical and traffic engineers, participated in the Mobility Project.

The goals of the project were not only to gain insight into the functioning of dual education systems in Germany and Turkey and to recognize the organizational and practical aspects of their implementation, but also to observe various forms of adaptation of dual education and training to different educational environments. Likewise, and perhaps most importantly, gaining knowledge about models of cooperation between schools and companies and elucidating the key problems accompanying that cooperation, so that these problems could be prevented.

Practical aspects of implementation were planned to be observed through visits to schools. In order to foster educational skills, the teachers visited two schools in Berlin and one educational center in Bursa, Turkey. Teachers visited classes, talked with students and exchanged experiences with colleagues.

By using the opportunities provided by the EU for teachers, and through the activities planned by the Project, the competences of teachers needed for the implementation of dual education have been improved. However, the participation of students is also envisioned within the Erasmus+ program. Thus, a mobility project for students, in which they will be able to conduct professional practice abroad, has been approved to our school.

The authors' intention is to present the experiences gained within this project, to present the educational systems in these three countries in a comparative manner, but with an emphasis on secondary education and especially on the dual system within it, as well as to point out the perceived problems of the implementation of dual education. We are convinced that these experiences can help any school that is preparing to implement a dual system for the education of its students.

Educational systems of Germany, Turkey and Serbia

The educational systems in these three countries are, understandably, very different, regarding both the structure and organization. However, the contents available to students are appropriate for their age, and no matter what the schools are called and whatever organizational unit they belong to, every educational system is structured to follow the natural psychophysical and mental development of students.

Age	GERMANY	class	TURKEY	class	SERBIA	class	Age	
19	<i>HIGHER EDUCATION</i>		<i>HIGHER EDUCATION</i>		<i>HIGHER EDUCATION</i>		19	
18	SECONDARY EDUCATION	13	SECONDARY EDUCATION	12	SECONDARY EDUCATION	4	18	
17	EDUCATION	12				3	17	
16	<i>Second phase</i>	11				2	16	
15	SECONDARY EDUCATION	10				1	15	
14	EDUCATION	9				PRIMARY EDUCATION	8	8
13	<i>First phase</i>	8	7	13				
12	SECONDARY EDUCATION	7	6	12				
11	EDUCATION	6	SECONDARY EDUCATION	6	<i>Higher classes</i>	5	11	
10	<i>Orientation classes</i>	5				4	10	
9	PRIMARY EDUCATION	4	PRIMARY EDUCATION	4	PRIMARY EDUCATION	3	9	
8		3				3	2	8
7		2				2	1	7
6		1				1	PRESCHOOL EDUCATION	8
5	PRESCHOOL EDUCATION		PRESCHOOL EDUCATION		5			
4	PRESCHOOL EDUCATION		PRESCHOOL EDUCATION		4			
3	PRESCHOOL EDUCATION		PRESCHOOL EDUCATION		PRESCHOOL EDUCATION		3	

Figure 1 – Organizational structures of the educational systems of Germany, Turkey and Serbia

The basic characteristic of the education system in Germany is that its structure varies depending on the federal province a school is located in. The teachers of the Railway Technical School visited Berlin, so the information and impressions obtained refer to the Brandenburg Province. The Federal Government participates mainly in the legislation framework of the system. In Turkey, the structure of the system is uniform in the whole country and under the jurisdiction of the Government. The structure of the Education System in the Republic of Serbia is uniform throughout its territory, although there are differences in operational planning between Central Serbia and its provinces due to the multi-ethnic population structure.

Education is free in all three countries, except for private schools and private universities. In addition to formal education, in Turkey there is also informal education in the form of public trainings, apprenticeships, training for certificates, etc. Training as a form of education also exists in Serbia, and is implemented in schools, as well as in private institutions certified for educational training programs, under the jurisdiction of educational authorities (Ministry of Education).

Secondary education in Germany has two levels. The first phase begins with two classes of orientation stage, which are the same for everyone. After that, students start their education in one of the following types of schools: vocational schools (*Hauptschule, Realschule*), gymnasiums (*Gymnasium*) and combined schools (*Gesamtschule*). Vocational schools usually last three or four years. In the second phase, the following schools are available to students: vocational school (*Berufsschule, Berufsfachschule*), higher technical school (*Fachoberschule*) and various forms of preparation in schools for the University, which are available in gymnasiums and some combined schools.

There are the following types of schools in Turkey: high schools, vocational schools, police and military schools, teacher training schools, art and religious schools. Students exit secondary education at the age of 17, and then either continue higher education or enter the labor market. The school system in Serbia is more similar to Turkey than to Germany. Secondary education in Serbia includes gymnasiums, vocational schools, and various vocational and art schools (e.g. music school).

It can be said that in these three educational systems, the assessment is completely different. In Turkey, grading is in percentages. In secondary education, the minimum for passing in professional subjects is at least 50%, and for general education subjects it can be less than half. In the German education system, the grades awarded go from 1 to 6, where 1 is the highest and 6 the lowest. Grades 5 and 6 are for failing. In the highest grades of gymnasium, students are graded with points, where each grade carries a certain number of points. It is allowed to vary the grades with + and -. At the university level, grades go from 1 to 5. Grading in Serbia goes from 1 to 5 in primary and secondary education, where grade 1 is non-passable and grade 5 is excellent. In higher education, grading goes from 6 to 10, where ten is the highest grade. Fact that an excellent grade in secondary education is non-passable at colleges, is a never-ending source of jokes.

The teachers participating in the mobility project noticed another difference, related to inclusion, which is especially visible in Serbian and German schools. With the ratification of the *United Nations Convention on Special Needs Persons Rights*, inclusion is introduced in Serbian education system in 2009. Inclusion involves students struggling with learning, for any reason; students from sensitive and marginalized groups and students with low socio-economic status are often included. Germany, despite being the member of the European Union, and suffering criticism, has retained special schools in its educational system for students with learning disabilities and special physical problems. Inclusion procedures are mainly applied for the integration of a large number of refugees.

When it comes to the motivation of educators, Germany and Turkey are similar - they have highly motivated teachers, although for different reasons. One of the students in the German school said that his life goal was to become a teacher, as teachers in Germany are well paid. In Turkey everyone would like to teach, but not so much because of the salary; rather due to prestige an educator has. In Serbia, neither of these two motivating factors has yet been observed to a significant extent.

Dual education in Germany, Turkey and Serbia

Dual education is a teaching model that is implemented through theoretical teaching and exercises at school, and through work-based learning in the company. There are, therefore, two structural and functional components of education:

1. theoretical component takes place in school, in its classrooms, workshops, laboratories; it is based on the curriculum; the participant has status of a student;
2. practical component is implemented through work at a real workplace, workshop or laboratory in the company; it is based on legislation specific to that form of education; the student has the status of apprentice or trainee;

A secondary school can educate students both through the dual model of education and through the classical one. Schools can do it simultaneously, depending on the student's interests. The essential difference in these two models is how to implement the practical component, as well as in the legislation framework regarding the practical training process. The theoretical component is generally the same.

In Serbia, for both classical and dual educational profiles, theoretical teaching is regulated by the Law on Foundations of The Education System, Law on Secondary Education and Upbringing, Law on Dual Education, Law on Adult Education, and Law on National Framework for Qualifications of The Republic of Serbia, bylaws, rulebooks etc. The only difference is related to the practical part. With classic profiles, the practical part of education is regulated by the *Regulations on practical teaching and professional practice*, which, being as it is, imposes on schools the obligation to take independent actions in order to find partner companies and individual employees in these companies willing to mentor students on practical training. In the case of the dual model, the *Serbian Chamber of Commerce* plays the role of an intermediary between the school and the companies, and their cooperation is defined by the *Law on Dual Education* and accompanying bylaws and rulebooks. *The Chamber of Commerce* also accredits companies that have expressed intentions to participate in dual education, and conduct training of the employees who will participate in education.

In Germany, *the Chamber of Commerce* also monitors and registers companies and controls learning process in companies. The government and social partners negotiate and approve new training standards, with the support of the *Federal Institute for Vocational Education and Training*. The government adapts the *Framework Curriculum* to the newly defined standards, which are then incorporated into the *Training Regulations* (for the practical part in the company) and the *Curriculum and Timetable* (for the theoretical part at school). The *Training Regulations* contain the occupation title, training profile, content, time frame, training plan and examination requirements. *Curriculum* in the vocational school provides the professional theoretical knowledge. The standards are defined by the *Framework Curriculum* through learning goals, contents and learning areas. The standards are valid on federal level.

In Germany, the dual model of education is provided for students at the second stage of secondary education, i.e. for ages 16 to 19. The application procedure is very simple; however, the student is obliged to find a company for work-based learning by himself, without an intermediary. In Serbia, Chamber of Commerce once more acts as intermediary and provides schools with a list of companies available for training. The school is required to form a *Career Guidance and Counseling Team*, which is obliged to help students in choosing a company, but also the companies to choose students. The dual model is designed for students aged 15 to 19, which is the age of high school students in Serbia. In Turkey, the dual education is provided only during the last year of schooling, except for highly deficient occupations, where work-based learning begins earlier.

In all three countries the dual model is implemented with the student being at school for a certain number of days and the rest of the working week in practical training at the company. In Turkey a student spends three days a week in the company and two days in school. In Serbia, the number of days in the company varies by grade and type of educational profile. For some educational profiles, the practical part starts in the second grade, with one day in a company, and gradually increases until the fourth grade. It is similar in Germany.

A school in Serbia is obliged to appoint one of its employees as a coordinator for dual education. This is usually a teacher of practical subjects; in cooperation with the instructor, coordinator plans, monitors, implements and evaluates learning in the company. An instructor is a company employee ensuring that the contents prescribed by the plan of work-based learning are implemented. The coordinator and the instructor collaborate in the evaluation process. The company is obliged to provide a sufficient number of licensed instructors. Instructors acquire a license through training provided by the Chamber of Commerce and by passing an instructor exam. In Turkey, the principle is similar to Serbian - the instructor is an employee of the company who obtained a license through training and exams organized by the Chamber of Commerce. Training for instructors is financed from EU funds. The coordinator is a teacher of vocational subjects who is obliged to visit all the work places where students are trained once a week and, in cooperation with the instructor, monitors student attendance, engagement and achieving goals of work-based learning. German schools also have an employee who is in charge of cooperating with the instructor; in conversations with German colleagues, however, an impression was acquired of deficiency of this form of cooperation, taking place sporadically and rarely (once per semester) and mainly refer to assessment of students.

Another important obligation of the company is to provide all the protective equipment and means for a designated workplace to the student work-based learning - this aspect is the same in all three countries. The coordinator and the instructor are responsible for safety and health of the students during learning being in accordance with the regulations; this is present in all three countries.

Schooling in the dual system implies that the student-trainee receives a certain financial compensation for work-based learning. In Germany, according to their contracts, students receive a remuneration, usually around 300-900 euros per month; payments have the character of a student loan or scholarship. In Serbia, students are paid a fee for each hour of work-based learning, at least 70% of the minimum wage determined on national level. In Turkey, a student receives 30% of the average company income; funds are provided by the state if the company has less than 20 employees, while larger companies provide the funds for their students. In addition to financial support, companies also provide material support (paid transportation, food expenses, etc.) to their apprentices.

The Serbian model of dual education foresees the signing of two contracts. The first is the *Contract on Dual Education* and is signed between the school and the company. The contract contains information about the company and the school, which educational profile it refers to, the obligations of the company and the school, the number of students, the number of available licensed instructors, the duration of the contract, and the like. The contract is usually valid for three or four years, as long as the educational cycle lasts in Serbia. The second is the *Contract on Work-based Learning* and is signed by the company and the student. In addition to information about the student, parent (or guardian), employer, school and educational profile, it must also contain a confirmation that the student meets the health requirements for the profile in which he is studying and other obligations of the student; the obligations of the employer that are highlighted in the *Contract* refer to the Plan of training, financial and material security of students, and the duration of the contract. In Germany, after

finding a suitable company, the student signs a *Training Agreement* with it, which includes the content of the training, schedule, duration, remuneration and benefits of the student-trainee. A similar contract is signed in Turkey, but between the company and the parents, since students in Turkey are younger than in Germany and Serbia.

Effects of dual education

Dual education is considered economical because of reduction of costs that the state would allocate for equipping classrooms and workshops for practical training. The advantage of this model can be seen in the provision of qualified workers in accordance with the needs of the labor market; also, in the early contact of students with the working environment; it is considered to be an initiating factor for developing entrepreneurship among young people, thus encouraging them to start their own business.

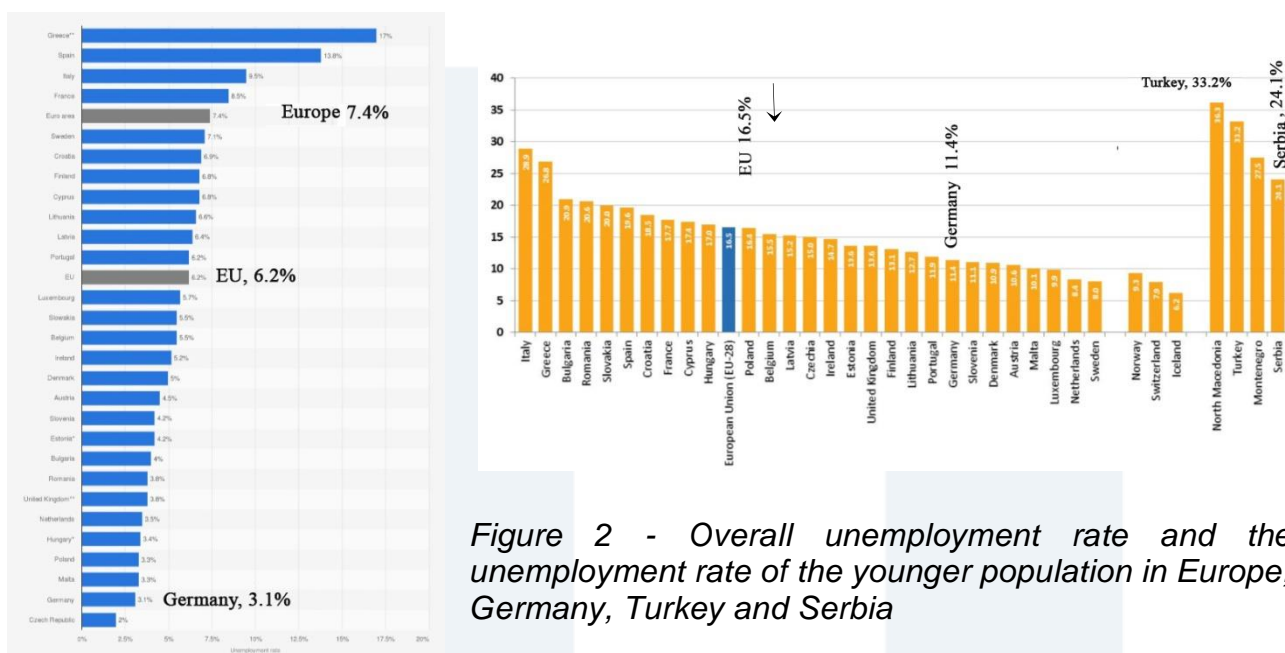


Figure 2 - Overall unemployment rate and the unemployment rate of the younger population in Europe, Germany, Turkey and Serbia

Basically, it is considered that dual education can effectively reduce the unemployment rate in the younger population. In Serbia, that rate is around 25% (the total unemployment rate is estimated at around 10%) and in Turkey it is 33.2%. The German business environment participates in dual education with about 20% of companies (over 400,000) and includes over half a million students. After completing their education, 74% students are directly employed. Germans believe that this fact is responsible for the unemployment rate of 3% (second in Europe, after the Czech Republic) and the unemployment rate of the younger population, which is around 11%.

Germany started the introduction of dual education in 1969, when standardized regulations were established. *The Law on Vocational Education* underwent major changes in 2002 and slightly less in 2020. Serbia passed the *Law on Dual Education* in 2017, with the fact that in 2019 the Law underwent some changes. The national model of dual education in Serbia, although relies on the experiences of other countries (Switzerland, Germany and Austria), is adapted to its needs and characteristics, the peculiarities and capacities of the economy and the characteristics of existing secondary vocational schools. The dual model in Serbia has been implemented in 165 schools and in 65 educational profiles so far, with participation of 850 companies and about 13,000 students.

Conclusion

Compared to the German model, the dual model in Serbia is a novelty, but more schools are introducing it into their educational practice. Adequate guides and extensive literature are provided for schools, parents and students. First-hand experiences, however, are more than welcome, especially if the model has been in use for 50 years, as is the case with Germany.

The experiences that the teachers of the Railway Technical School shared with their colleagues from Germany and Turkey are valuable. Discussing with colleagues from their school, in the process of dissemination, the teachers participated in the project reached several important conclusions that could be helpful for implementation of the dual model.

The German teachers identify the lack of cooperation between the school and the company, which is limited to two meetings a year, as the weakness of their dual model. The teachers are of the opinion that in Turkey this cooperation is better organized and better regulated. The coordinators have a constant insight into the students' progress during work-based learning, since they are obliged to visit the students in the company, and the students are obliged to keep diaries of their achievements in the company. So far the Railway Technical School has had good experience in organizing practical training in railway companies, and the organizational model is very similar to the Turkish one, both in terms of teacher's and student's obligations. Looking at one not-so-good example and one example of practice they are familiar with, the teachers acknowledge this dimension of the dual model as crucial for gaining positive effects of the dual model.

Another important dimension recognized by the teachers is in the legislation that follows the dual model in Serbia. While practical training in classic educational profiles is regulated by the *Regulations on practical teaching and professional practice*, the obligations of all participants in dual education are regulated by the *Law on Dual Education*. The legislation dimension is visible in all three countries.

Talking with students in both countries, teachers learned that students are generally satisfied with the education they receive and the way they receive it. By work-based learning, the student perceives his/her own potentials more effectively, gains confidence to handle work tasks and other obligations independently. He gets to know the world of work, the climate in the company and create an accurate picture of what he can expect when he gets a job. Moreover, it gives him/her a broader basis for some choices in the future, which is perhaps the biggest advantage of dual education.



JU SREDNJA STRUČNA
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6.STRUČNE EKSKURZIJE I NJIHOVO IZVOĐENJE

1. Uvod

Stručne ekskurzije čine kompleksan oblik putovanja koji podrazumijeva primjenu raznovrsnih nastavnih metoda: neposredno posmatranje geoprostora, radnih mjesta i postupaka rada na njima, istraživački razgovor, korišćenje različitih instrumenata, kartografski rad, grafičko prikazivanje, nastavni razgovor, izlaganje, obavljanje pojedinih radnji na radnom mjestu, objašnjavanje, opisivanje, referati učenika itd. Njihova didaktičko-metodička uloga u realizaciji obrazovno-vaspitnog procesa se ogleda u aktivizaciji logičkog mišljenja i razvijanju vizuelnog pamćenja kod učenika. Kroz realizaciji stručnih ekskurzija maksimalno se aktiviraju učeničke sposobnosti i mobilišu nastavnički kapaciteti. Kod učenika se razvija drugarstvo, solidarnost, organizovanost i tolerantnost, naučni pogled na svijet, podstiču se estetski i emocionalni doživljaji. Povremene ekskurzije i izleti neposredno doprinose razvoju organizma učenika, jačanju i stabilizaciji njihovog emocionalnog života. Ekskurziona aktivnosti doprinose da se nastavnici trajno usavršavaju i da bolje upoznaju svoje učenika što značajno podiže emocionalnu i radnu klimu u učionici po povratku sa stručnih ekskurzija.

2. Šta je stručna ekskurzija?

Stručna ekskurzija predstavlja kraće putovanje sa svrhom stručnog usavršavanja po određenom pitanju (ili više njih) iz određene oblasti. Realizacija stručne ekskurzije podrazumijeva detaljno osmišljavanje i samu organizaciju. U okviru stručne ekskurzije najčešće se uspostavljaju kontakti i posjećuju privredni subjekti, koji se bave oblašću, koja je tema predmeta (ili grupe predmeta) u okviru koga se organizuju stručne ekskurzije. Detaljno osmišljavanje i organizacija podrazumijeva, sagledavanje sledećih aspekata: pravni osnov na državnom i međunarodnom nivou, zastupljenost ovog vida nastave u Obrazovnom programu, Godišnji plan rada škole, plan rada aktiva, godišnji i operativni planovi nastavnika koji realizuju stručnu ekskurziju, plan rada odjeljske zajednice, roditeljski sastanci, kontakt sa privrednim subjektima na lokalnu i na nivou države a preko njih ili samostalno ostvarivanje kontakata sa subjektima na međunarodnom nivou.

U planiranju i organizaciji stručnih ekskurzija (bez obzira na broj dana) javljaju se administrativni i tehnički problemi koji nijesu nerešivi, ali mogu sam proces sprovođenja veoma usložniti. Veoma je važno da se pitanje organizacije stručnih ekskurzija ne formalizuje, već shvati kao ozbiljna potreba školovanja mladih ljudi. Pri tome se očekuje da svi subjekti koji učestvuju u realizaciji ove nastavne metode pokažu svoju odgovornost. Pri realizaciji stručnih ekskurzija neophodno je pridržavati se kodeksa ponašanja koji je definisan od strane privrednog subjekta koji se posećuje. U okviru stručne ekskurzije najčešće se posećuju privredni subjekti kod kojih je moguće provjeriti stečeno teoretsko znanje iz određenih predmeta, ili pak subjekti (ili događaji) koji imaju širi značaj za veći broj učenika različitih usmjerenja na obrazovnim programima iz oblasti saobraćaja.

Klasifikacija stručnih ekskurzija je mnogostruka.

Prema predmetu proučavanja stručne ekskurzije mogu biti:

- tematske – organizuju se radi obrade granskih sadržaja (radna mjesta i objekti posmatranja, klimatološke, geomorfološke, pedološke, demogeografske, urbanogeografske, privredno geografske i sl.) i
- regionalne – organizuju se radi kompleksnog posmatranja i proučavanja nekog predjela (bogatijeg su sadržaja, traže svestraniju pripremu, čvrstu organizaciju, trajanje angažovanosti učenika).

Prema didaktičkoj namjeni ekskurzije mogu biti organizovane:

- sa ciljem sticanja novih znanja,
- sa ciljem utvrđivanja stečenih znanja,
- sa ciljem primjene stečenih znanja u praksi.

Prema mjestu obavljanja ekskurzije se dijele na:

- lokalne – zavičajne, vezane za geografsku sredinu u kojoj se nalazi škola, radna mjesta za koja se školuju učenici i najbliža susjedna naselja

- zemaljske – mogu da se održavaju na početku ili na kraju školske godine u trajanju od oko sedam dana sa ciljem da se upoznaju partneri škole za čije se potrebe školuju naši učenici zanimljivi predjeli naše zemlje i
- međunarodne ekskurzije.

Prema vremenu trajanja ekskurzije mogu biti:

- u trajanju od 1 do 3 sata,
- poludnevne,
- jednodnevne,
- višednevne.

3. Dobro pripremljena i realizovana stručna ekskurzija

Priprema stručnih ekskurzija podrazumijeva nekoliko bitnih koraka koji se odnose na pripremu nastavnika, pripremu učenika, realizaciju ekskurzije i postekskurzijone aktivnosti. Pri stručnom planiranju ekskurzija (nastavnikova priprema) bitno je odrediti:

- pravac kretanja;
- izbor radnih mjesta i objekata posmatranja;
- izbor oblika i metoda rada (opisivanje, pripovijedanje, dijalog, samostalno izlaganje učenika, kombinovane metode itd.);
- primjena određenih nastavnih sredstava radi prezentacije onoga dijela stvarnosti koji se ne može vizuelno na terenu uočiti.

Nakon stvorenog plana putovanja, nastavnik pojedinačno predviđa šta će se običi svakog dana i pravi detaljnu satnicu aktivnosti u toku svakog radnog dana. Planiranje terenskog rada mora biti vrlo precizno, tako da učenici znaju šta će u svakom trenutku raditi. Vremenska artikulacija je veoma bitna stavka nastavničke pripreme koja mu omogućava da odredi tačno vrijeme trajanja radnih aktivnosti na svakom pojedinačnom radnom mjestu.

Stručnu ekskurziju ne treba shvatiti kao lakši nastavni rad koji pruža mogućnost odmora od nastave i učenja, niti je potrebno tretirati kao metodu koja se nalazi na margini nastavnog rada, kao svojevrsno izletničko putovanje radi odmora i rekreacije. Najbitnije je da na stručnoj ekskurziji postoji čvrstoća režima učeničkih zanimanja. Samo takav režim obezbjeđuje potrebnu disciplinu i bezbjednost svih učesnika na ekskurziji. Bez njega nije moguće u potpunosti realizovati postavljene zadatke stručne ekskurzije.

Po pripremi nastavnika pristupa se pripremi učenika za njihova zaduženja i izlaganje na ekskurziji. To podrazumijeva pripreme časove prije odlaska na ekskurziju sa jasno postavljenim zadacima i ciljevima koji se od učenika očekuju. Pri prezentaciji sadržaja ekskurzionih tura, treba se oslanjati na primjenu modifikovane ilustrativno-demonstrativne metode u geografskom prostoru. Njena primjena ima osnovu u usmenom izlaganju uz izbjegavanje čitanja referata. Potrebno je usmeno izlagati ono što je pripremljeno, dok pisani materijal može poslužiti kao eventualni podsjetnik za precizne (egzaktne) podatke, ili kao uputstvo za redosled izlaganja.

4. Svrha realizacije stručne ekskurzije

Svrha realizacije stručnih ekskurzija je efikasno potvrđivanje stečenih znanja u okviru teoretskog dijela nastavnog procesa kao i uspostavljanje čvrste veze teorije i prakse. Stručne ekskurzije imaju i svoju širu društvenu dimenziju koja se svakako ne smije zanemariti.

5. Prednosti i nedostaci

Učenici imaju mogućnost da se na licu mjesta upoznaju sa proizvodnim procesom koji je tema određenog predmeta čime se ostvaruje bolja veza sa stečenim teoretskim znanjem. Učenici stiču nova praktična iskustva, razmjenjuju svoja znanja sa učesnicima u proizvodnom

ciklusu, dobijaju predstavu o svojim obavezama nakon završetka škole, ostvaruju kontakt sa predstavnicima privrednog subjekta kao i učenicima drugih škola koje školuju učenike za ista ili slična zanimanja itd.

Nedostaci se ogledaju uglavnom u finansijskim i organizaciono-tehničkim aspektima realizacije. Srednje stručne škole najčešće ne poseduju unapred određene planove realizacije stručnih ekskurzija sa precizno definisanim zadacima, nosiocima i rokovima realizacije. Nije dobro organizovati stručne ekskurzije *ad hoc* bez definisanog sadržaja.

6. Značaj realizacije stručne ekskurzije

Učenici koji učestvuju u realizaciji stručnih ekskurzija imaju viši nivo sposobnosti povezivanja teorije i prakse, precizniju sliku proizvodnog procesa u realnim uslovima i mogućnost sagledavanja prednosti i nedostataka proizvodnje. Učenici su informisaniji o specifičnoj proizvodnji i nosiocima te proizvodnje u određenoj regiji. Stručne ekskurzije se organizuju isključivo kao grupna aktivnost koja je ujedno i najplodotvornija. Grupa za stručnu ekskurziju se formira najčešće na osnovu broja učenika u odjeljenju ili obrazovnom programu (posjeta proizvodnom subjektu), ili pak na osnovu zainteresovanosti učenika za specifičan vid stručne ekskurzije (posjeta sajmu automobila). Veličina grupe je uslovljena ciljem same ekskurzije i planiranog načina realizacije. U slučaju kada su stručne ekskurzije isključivo informativnog karaktera (uvid u određeni proizvodni proces, posjeta sajmovima i drugim strukovnim manifestacijama) grupa može biti veća (do 50 učenika). Ako je cilj ekskurzije detaljnije upoznavanje sa određenim proizvodnim procesom, gdje se očekuje aktivnije učešće učenika u pojedinim fazama (diskusija, razgovor sa nosiocima proizvodnog procesa), grupe bi trebalo da budu manje (25 do 30 učenika). Prevelike grupe otežavaju kontrolu i realizaciju ekskurzije i dovode u pitanje efikasnost njene stručne svrsishodnosti. Stručne ekskurzije su značajna nastavna metoda u strukturi predmeta koji podrazumevaju primjenu praktičnog znanja po određenim tematskim cjelinama. U okviru ovih predmeta stručne ekskurzije treba da zauzmu značajno mjesto u realizaciji nastavnog procesa i doprinesu boljem povezivanju teorije i prakse. Stručne ekskurzije su važne za osavremenjivanje nastavnih programa i diverzifikaciju nastavnog procesa. Učešće u realizaciji nastavnog procesa zavisi prvenstveno od karakteristika sadržaja predmeta ali i

drugih organizaciono-tehničkih mogućnosti. Zastupljenost u strukturi predmeta je do 20%.

U okviru ove metode najčešće ne postoji prostor za samostalni rad učenika, ali je veoma važno da svaki učenik bude aktivan učesnik tokom realizacije ekskurzije. Ocjenjivanje stručnih ekskurzija može biti od značaja za nastavno osoblje i učenike. Nastavnik može ocijeniti ponašanje i zainteresovanost učenika tokom realizacije ekskurzije, što može biti sastavni dio konačne ocjene u okviru određenog predmeta. Sa druge strane, veoma je korisno da učenici obave ocjenjivanje realizovane ekskurzije po unapred definisanom formularu i time ocijene kvalitet i svrsishodnost same ekskurzije, kao i značaj za unapređenje njihovih znanja. Ova ocjena može biti dobar pokazatelj nastavniku da li je ekskurzija dobro i kvalitetno osmišljena, ili treba raditi na njenom unapređenju (promjena vremena realizacije, veličine grupe, objekata koji se obilaze itd.). Veoma je korisno da učenici i nakon realizacije iznesu svoje mišljenje o stručnoj ekskurziji putem ocjenjivačkog lista i diskusije sa odgovornim nastavnikom. Na ovaj način nastavniku se pruža mogućnost da ocijeni aktivnost učenika tokom ekskurzije kao i nivo razumijevanja onoga što je viđeno. Stručne ekskurzije mogu biti jednodnevne i višednevne. Jednodnevne ekskurzije se realizuju najčešće posjetom objekata, proizvođača ili kompanija, koji se nalaze u blizini srednje škole i koje je moguće obići u toku jednog (radnog) dana. Pri realizaciji jednodневnih ekskurzija potrebno je skoncentrisati se na manji broj objekata sa specifičnom proizvodnjom. Organizacija i realizacija jednodневnih ekskurzija nije previše zahtjevana. Višednevne ekskurzije (do tri dana) imaju šire značenje i mogu se realizovati na širem području u okviru sopstvene države, ili pak mogu imati i međunarodni karakter, ako se obilaze specifični proizvodni subjekti koji se nalaze u nekoj drugoj državi. Kada se realizuju višednevne ekskurzije, potrebno je planirati obilazak što većeg broja različitih privrednih subjekata zbog efikasnosti same ekskurzije. Realizaciju višedневnih ekskurzija treba da vodi tim stručnih ljudi koordinisan od strane odgovornog nastavnika.

7. Značaj stručnih ekskurzija kao oblika vaspitno-obrazovnog rada

Čega se vi sećate iz škole? Šta je uticalo na to da budete ono što ste danas? Možda je to bio neki grupni projekat, nastavnik koji vas je inspirisao, ekskurzija ili izlet. Možda je to čak bilo nešto što ste radili sami, van škole, nakon što ste učili o određenoj temi. Sigurno je bilo nečeg u vašem životu što je izazvalo vašu strast ili probudilo radoznalost u vama!

Svaki učenik ulazi u učionicu sa drugačijim iskustvom. Znamo da učenici s većim iskustvom bolje rade i uče u školi. Da bi bili uspješni, učenici moraju da povežu ono o čemu su učili sa svojim iskustvom, odnosno sa svojim svakodnevnim okruženjem. Upravo su ekskurzije jedan od načina da se ovaj cilj postigne.

Mi kao nastavnici znamo da su ekskurzije važne, ali u čemu se tačno ogleda njihov značaj? Ekskurzije su oblik vaspitno-obrazovnog rada koji se izvodi van učionice. Didaktička vrijednost ekskurzije ogleda se u sledećem: radu na konkretnom radnom mjestu, direktnom posmatranju, produblivanju i povezivanju ranijeg znanja i podizanju nivoa opšte kulture. Obično se kaže: „Vrijediš onoliko koliko si vidio!”

Ovo je jedan od najboljih alata koje možemo koristiti da svakom učeniku pružimo iskustva iz stvarnog svijeta. Bilo da se radi o odlasku kod poslodavca u biblioteku, muzej, pozorište ili o obilasku historijskog lokaliteta, svako iskustvo u kojem učenik učestvuje doprinosi njegovom razumijevanju svijeta i sticanju funkcionalnog znanja. Učenici na taj način razvijaju

odgovornost prema budućem zanimanju patriotizam, solidarnost, humanizam, drugarstvo, požrtvovanost, kolektivni duh, životni optimizam i realno shvatanje života.

Kada učenici napuste učionicu i odu na ekskurziju, oni tada mogu da uoče vezu između onoga što su učili u školi i stvarnog svijeta. Počinju da shvataju da ono što nauče u učionici može da im pomogne da riješe probleme koje vide oko sebe i da ima direktan uticaj na to kakvi ljudi će postati. Učenici produbljuju, proširuju i obogaćuju svoja iskustva podstaknuti da se interesuju za nova saznanja, kako bi nastavni sadržaj povezali sa stvarnim svijetom i tako aktivno doprinijeli razvoju društva.

Naša država je bogata laboratorija za učenje. Učenici koji idu na ekskurzije postaju empatičniji i tolerantniji i razvijaju vještinu kritičkog mišljenja. Ekskurzije učenicima pružaju priliku da razmišljaju o različitim temama iz drugačije perspektive. Na ovaj način kod učenika se razvija sposobnost posmatranja, opažanja i uočavanja predmeta, objekata i pojava, sagledavanje i razumijevanje njihovih međusobnih veza i odnosa kako u prirodi tako i u društvu.

Učenje na ekskurzijama utiče i na rezultate u školi. Pored toga, ekskurzije su važne jer učenici mogu da se bave nastavnim sadržajima na različite načine. One utiču i na to da se učenici sa većom sigurnošću opredijele za životni poziv, da njeguju upornost i istrajnost, navike, odgovornost, tačnost i vrijednost u radu, ali i da razvijaju smisao za lijepo, ljubav prema struci, prirodi i njenim ljepotama, tekovinama materijalne i duhovne kulture i umjetničkom izražavanju, kao i da uoče ulogu čovjeka i njegov uticaj na životnu sredinu i mogućnost njene zaštite.

Većina učenika još od predškolskog uzrasta veliki dio dana provodi u zatvorenim prostorijama, bez kretanja. Glavne aktivnosti su im društvene mreže, gledanje TV-a, video-igre i slično. Svakako da to negativno djeluje kako na zdravlje djece tako i na njihov cjelokupan psihofizički razvoj.

Zato ekskurzije imaju svoje zdravstveno, pedagoško i šire društveno opravdanje, s obzirom na to da doprinose poboljšanju zdravlja i ukupnom psihofizičkom razvoju učenika. Napori društva treba da budu usmjereni na stvaranje optimalnih uslova za organizaciju ovog značajnog vida pedagoške djelatnosti škole i drugih obrazovnih ustanova.

Država u kojoj svako dijete živi je nevjerovatan resurs za proširivanje njegovih znanja. Putem interneta ili u učionici ne možemo sve ljude upoznati niti sva mesta posjetiti. Nažalost, neke ekskurzije se ne povezuju sa onim što se uči u školi, a opravdanja se najčešće nalaze u nedostatku vremena, finansija ili činjenici da gradivo nije moguće adekvatno povezati sa temom ekskurzije. Ekskurzije treba da budu u funkciji kvalitetnije nastave i da se povezuju sa proučavanjem nastavnog gradiva. Na taj način nastava se povezuje sa životom, svakodnevni pojmovi se dovode u vezu sa naučnim pojmovima, a učenici određene sadržaje izučavaju neposredno. Ovo iskustvo učenja putem ekskurzija može oživjeti lekcije i probuditi entuzijazam u učenicima. Kao nastavnicima dužnost nam je da im to i omogućimo, jer su oni pokretačka snaga budućnosti i obrazovanja.

8. Zaključak

Učenje kroz izvođenja stručnih ekskurzija je poseban stil učenja. Ovaj način učenja karakteriše kognitivno (iskustveno), situaciono i aktivno učenje. Stručna ekskurzija je tipičan primer za primjenu i preplitanje ovih vrsta učenja. Učenje na osnovu prethodnog iskustva i kroz sticanje novih iskustava ne samo da je karakteristično za đake nego i nastavnike. Na ekskurzijama i nastavnici iskustveno uče. Stručne ekskurzije pružaju najviše mogućnosti za približavanje poučavanja i učenja.

Budući da se oni koji se nalaze u prirodnoj fizičkoj i socijalnoj sredini ili okruženju koje omogućava iskustveno usvajanje znanja i vještina iz različitih oblasti i to kroz poseban vid socijalne i prirodne interakcije, učenje na ekskurzijama je u velikoj mjeri situaciono učenje. Predvidljive nove situacije, a pogotovo nepredvidljive i rizične situacije koje svako putovanje sa sobom neminovno nosi, značajan su faktor koji utiče na oblikovanje i specifičnost učenja na ekskurziji.

Stara kineska izreka kaže: „Reci mi – zaboraviću; pokaži mi – možda ću upamtiti; uključi me – razumjeću“. Međutim, nijesu sve aktivnosti na ekskurziji i svi obrazovni sadržaji prigodni za učenje, ali valja iskoristiti mogućnosti onih koje to jesu. Iznalaženje optimalnog nivoa u rasporedu dvije suprotnosti između pasivnog slušanja i pasivnog posmatranja do aktivne participacije, te između krajnje zavisnosti i pune autonomije u aktivnostima koje ekskurzija obuhvata, poseban je problem.

Empirijska istraživanja potvrđuju da su najefektnija, najviše se cijene i najviše pamte kasnije u životu, znanja i vještine stečene kroz aktivnosti na ekskurzijama koje podrazumijevaju aktivnu participaciju. Stručne ekskurzije koncipiraju se tako da nude niz aktivnosti u kojima mogu da učestvuju sami posjetioci u stvarnosti ili virtuelnoj simulaciji, na primer, princip rada pojedinih uređaja ili specifičnosti rada na određenim radnim mjestima. Utvrđeno je da takve aktivnosti podstiču visok nivo kreativnosti, razvoj vještina i sposobnost kritičkog mišljenja, sloboda reagovanja i eksperimentisanja u rešavanju problema uz preplitanje ranijeg i novostečenog iskustva. Pored toga, imaju i visoko motivaciono dejstvo za daljim obrazovanjem.

Na ekskurzijama se nastavni programi realizuju povezivanjem sa geoprostornom i socijalnom sredinom (teorije i prakse) što rezultuje time da se učenici razvijaju sveobuhvatno i svestrano. Krajnji ishod svake nastavne ekskurzije treba da bude zadovoljan učenik.

Pojam zadovoljnog učenika najbliži je pojmovima stvorenog, motivisanog, sigurnog, samouvjerenog, samopoštovanog, srećnog učenika. Ekskurzija je kvalitetno realizovana kada se sa nje vrati prilagođen učenik. Izuzev pedagoške zastarelosti i tvrdokornosti, nema jednog razloga da taj zahtev ne poštujemo i ne ispunjavamo.

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6. PROFESSIONAL EXCURSIONS AND THEIR PERFORMANCE

1. Introduction

Professional excursions are a complex form of travel that involves the application of various teaching methods: direct observation of geospaces, workplaces and work procedures on them, research interview, use of various instruments, cartographic work, graphic representation, teaching conversation, exposure, performing individual actions in the workplace, explaining, describing, student papers, etc. Their didactic-methodical role in the realization of the educational process is reflected in the activation of logical thinking and the development of visual memory in students. Through the realization of professional excursions, students' abilities are maximally activated and teaching capacities are mobilized. Students develop camaraderie, solidarity, organization and tolerance, a scientific view of the world, aesthetic and emotional experiences are encouraged. Occasional excursions and excursions directly contribute to the development of the student's organism, strengthening and stabilizing their emotional life. Excursion activities contribute to teachers' permanent improvement and to get to know their students better, which significantly raises the emotional and working climate in the classroom upon returning from professional excursions.

2. What is a professional excursion?

A professional excursion is a shorter trip with the purpose of professional development on a particular issue (or several) in a particular area. The realization of a professional excursion implies a detailed design and the organization itself. Within the professional excursion, contacts are most often established and visited by business entities, dealing with the field, which is the topic of the subject (or group of cases) within which professional excursions are organized. Detailed design and organization implies, considering the following aspects: legal basis at the national and international level, representation of this type of teaching in the Educational Program, Annual Work Plan of the School, Work Plan of Assets, Annual and Operational Plans of Teachers who implement professional excursions, work plan of the departmental community, parent meetings, contact with business entities at the local and state level and through them or independently establishing contacts with subjects at the local and state level international level.

In the planning and organization of professional excursions (regardless of the number of days) there are administrative and technical problems that are not unsolvable, but can complicate the implementation process itself. It is very important that the issue of the organization of professional excursions is not formalized, but taken as a serious need to educate young people. It is expected that all subjects involved in the implementation of this teaching method show their responsibility. In the implementation of professional excursions, it is necessary to adhere to the code of conduct that is defined by the business entity being visited. As part of the professional excursion, the most frequently visited are business subjects where it is possible to check the acquired theoretical knowledge in certain subjects, or subjects (or events) that have a wider importance for a larger number of students of different orientations in educational programs in the field of transport.

The classification of professional excursions is manifold.

According to the subject of study, professional excursions can be:

- thematic – are organized for the purpose of processing branch contents (workplaces and observation facilities, climatological, geomorphological, pedological, demogeographic, urban geographic, economic geographic, etc.) and
- regional – they are organized for the purpose of complex observation and study of an area (they are richer in content, require more versatile preparation, solid organization, duration of student engagement).

According to the didactic purpose, excursions can be organized:

- In order to gain new knowledge,
- in order to establish the acquired knowledge,
- with the aim of applying the acquired knowledge in practice.

According to the place of conduct, excursions are divided into:

- local – native, related to the geographical environment in which the school is located, workplaces for which students are educated and the nearest neighbouring settlements
- earthly – can be held at the beginning or end of the school year for about seven days with the aim of meeting the partners of the school for whose needs our students are educated interesting areas of our country and
- international excursions.

According to the duration of the excursion can be:

- for 1 to 3 hours,
- half-day,
- one-day,
- multi-day.

3. A well-prepared and well-implemented excursion

The preparation of professional excursions involves several important steps related to the preparation of teachers, preparation of students, realization of excursions and post-excursion activities. When planning excursions (teacher's preparation) it is important to determine:

- the direction of movement;
- selection of workplaces and objects of observation;
- choice of forms and methods of work (describing, storytelling, dialogue, independent exposure of students, combined methods, etc.);
- the application of certain teaching means to present that part of reality that cannot be visually perceived in the field.

After creating a travel plan, the teacher individually predicts what will be visited each day and makes a detailed schedule of activities during each working day. The planning of the fieldwork must be very precise, so that students know what they will do at all times. Time articulation is a very important item of teacher preparation that allows him to determine the exact duration of work activities in each individual workplace.

Professional excursion should not be understood as an easier teaching work that provides an opportunity to rest from teaching and learning, nor should it be treated as a method that is on the margins of teaching work, as a kind of excursion trip for rest and recreation. The most important thing is that on the professional excursion there is a firmness of the regime of student professions. Only such a regime ensures the necessary discipline and safety of all participants on the excursion. Without it, it is not possible to fully complete the set tasks of a professional excursion.

After the preparation of teachers, the preparation of students for their duties and presentation on the excursion is approached. This implies preparatory classes before going on an excursion with clearly defined tasks and goals that are expected of students. When presenting the content of excursion tours, one should rely on the application of a modified illustrative-demonstrative method in geographical space. Its application is based on oral

presentation while avoiding reading papers. It is necessary to present orally what has been prepared, while the written material can serve as a possible reminder for precise (exact) data, or as a guide for the order of presentation.

4. Purpose of the realization of a professional excursion

The purpose of the realization of professional excursions is to effectively confirm the acquired knowledge within the theoretical part of the teaching process as well as to establish a strong connection between theory and practice. Professional excursions also have their own broader social dimension, which should certainly not be ignored.

5. Advantages and disadvantages

Students have the opportunity to get acquainted on the spot with the production process that is the topic of a particular subject, which achieves a better connection with the acquired theoretical knowledge. Students gain new practical experiences, exchange their knowledge with participants in the production cycle, get an idea of their obligations after finishing school, make contact with representatives of the business entity as well as students of other schools that educate students for the same or similar professions, etc.

The shortcomings are reflected mainly in the financial and organizational-technical aspects of realization. Vocational secondary schools usually do not have predetermined plans for the realization of professional excursions with precisely defined tasks, carriers and deadlines for realization. It is not good to organize professional excursions *ad hoc* without defined content.

6. The importance of a short excursion

Students who participate in the realization of professional excursions have a higher level of ability to connect theory and practice, a more precise picture of the production process in real conditions and the ability to perceive the advantages and disadvantages of production. Students are more informed about the specific production and carriers of this production in a particular region. Professional excursions are organized exclusively as a group activity that is also the most fruitful. The group for professional excursions is usually formed on the basis of the number of students in the department or educational program (visits to the production entity), or on the basis of students' interest in a specific type of professional excursion (visit to the motor show). The size of the group is conditioned by the goal of the excursion itself and the planned way of realization. In the case when professional excursions are exclusively informative (insight into a certain production process, visits to fairs and other professional events), the group can be larger (up to 50 students). If the goal of the excursion is to get acquainted with a specific production process in more detail, where more active participation of students is expected in certain phases (discussion, conversation with the carriers of the production process), the groups should be smaller (25 to 30 students). Too large groups make it difficult to control and realize the excursion and question the effectiveness of its professional expediency. Professional excursions are an important teaching method in the structure of subjects that imply the application of practical knowledge

according to certain thematic units. Within these subjects, professional excursions should occupy an important place in the realization of the teaching process and contribute to a better connection between theory and practice. Professional excursions are important for the modernization of curricula and diversification of the teaching process. Participation in the implementation of the teaching process depends primarily on the characteristics of the content of the course, but also other organizational and technical possibilities. The representation in the structure of the subject is up to 20%.

Within this method, there is usually no space for independent work of students, but it is very important that each student be an active participant during the realization of the excursion. Grading professional excursions can be of importance to teaching staff and students. The teacher can assess the behavior and interest of students during the realization of the excursion, which can be an integral part of the final grade within a particular subject. On the other hand, it is very useful for students to evaluate the realized excursion according to a predefined form and thus assess the quality and expediency of the excursion itself, as well as the importance for improving their knowledge. This grade can be a good indicator to the teacher whether the excursion is good and of high quality design, or whether it needs to be worked on improving it (changing the time of realization, the size of the group, the facilities that are visited, etc.). It is very useful for students to express their opinion on the professional excursion even after the realization through the judging list and discussion with the responsible teacher. In this way, the teacher is given the opportunity to assess the student's activity during the excursion as well as the level of understanding of what was seen.

Professional excursions can be one-day and multi-day. One-day excursions are usually realized by visiting facilities, manufacturers or companies, which are located near the high school and which can be visited during one (working) day. In the realization of one-day excursions, it is necessary to concentrate on a smaller number of facilities with specific production. The organization and realization of one-day excursions is not too demanding. Multi-day excursions (up to three days) have a wider meaning and can be realized in a wider area within their own country, or they can also have an international character, if they are visited specific ally excerpts of entities located in another state. When multi-day excursions are realized, it is necessary to plan a tour of as many different business entities as possible due to the efficiency of the excursion itself. The realization of multi-day excursions should be led by a team of professional people coordinated by a responsible teacher.

7. The importance of professional excursions as a form of educational work

What do you remember from school? What made you who you are today? Maybe it was a group project, a teacher who inspired you, an excursion or a field trip. Maybe it was even something you did on your own, out of school, after learning about a particular topic. There must have been something in your life that sparked your passion or aroused curiosity in you!

Each student enters the classroom with a different experience. We know that students with more experience work and learn better in school. To be successful, students need to

connect what they have learned with their experience, that is, with their everyday environment. Excursions are one way to achieve this goal.

As teachers, we know that excursions are important, but what exactly is their significance? Excursions are a form of educational work performed outside the classroom. The didactic value of the excursion is reflected in the following: working in a concrete workplace, direct observation, deepening and linking earlier knowledge and raising the level of general culture. It's usually said, "You're worth as much as you've seen!".

This is one of the best tools we can use to provide each student with real-world experiences. Whether it's going to the employer's library, museum, theater, or a tour of a historical site, every experience in which the student participates contributes to his understanding of the world and the acquisition of functional knowledge. In this way, students develop responsibility towards the future profession patriotism, solidarity, humanism, camaraderie, sacrifice, collective spirit, life optimism and a realistic understanding of life.

When students leave the classroom and go on an excursion, they can then see the connection between what they were learning in school and the real world. They begin to realize that what they learn in the classroom can help them solve the problems they see around them and that it has a direct impact on what kind of people they become. Students deepen, expand and enrich their experiences encouraged to be interested in new knowledge, in order to connect the teaching content with the real world and thus actively contribute to the development of society.

Our country is a rich learning laboratory. Students who go on excursions become more empathetic and tolerant and develop critical thinking skills. Excursions give students the opportunity to think about different topics from a different perspective. In this way, students develop the ability to observe, perceive and perceive objects, objects and phenomena, perceive and understand their interrelationships and relationships both in nature and in society.

Learning on excursions also affects the results in school. In addition, excursions are important because students can deal with teaching content in different ways. They also influence students to opt for a life vocation with greater certainty, to cultivate persistence and perseverance, habits, responsibility, accuracy and value in work, but also to develop a sense of beauty, love for the profession, nature and its beauty, the achievements of material and spiritual culture and artistic expression, as well as to notice the role of man and his impact on the environment and the possibility of its protection.

Most students spend a large part of the day in closed rooms since preschool age, without moving. Their main activities are social networks, watching TV, video games and so on. Of course, this negatively affects both the health of children and their overall psychophysical development.

That is why excursions have their own health, pedagogical and broader social justification, given that they contribute to the improvement of health and the overall psychophysical development of students. The efforts of society should be aimed at creating optimal conditions for the organization of this significant aspect of pedagogical activity of the school and other educational institutions.

The state in which every child lives is an incredible resource for expanding his knowledge. Online or in the classroom, we can't meet all the people or visit all the places. Unfortunately, some excursions are not associated with what is taught in school, and justifications are most often found in the lack of time, finances or the fact that the material cannot be adequately linked to the topic of the excursion. Excursions should be in the function of better teaching and be associated with the study of teaching material. In this way, teaching is associated with life, everyday concepts are connected with scientific concepts, and students study certain content directly. This experience of learning through excursions

can revive lessons and awaken enthusiasm in students. As teachers, it is our duty to enable them to do so, because they are the driving force of the future and education.

9. Conclusion

Learning through professional excursions is a special style of learning. This way of learning is characterized by cognitive (experiential), situational and active learning. A professional excursion is a typical example of applying and interweaving these types of learning. Learning based on previous experience and through gaining new experiences is not only characteristic of students but also teachers. On excursions, teachers also learn experientially. Professional excursions provide the most opportunities for approaching teaching and learning.

Since those who are in a natural physical and social environment or environment that enables the experiential acquisition of knowledge and skills from different fields through a special form of social and natural interaction, learning on excursions is largely situational learning. Predictable new situations, and especially unpredictable and risky situations that every trip inevitably carries, are a significant factor that affects the design and specificity of learning on an excursion.

An old Chinese proverb says, "Tell me – I'll forget; show me – maybe I'll remember; Involve me – I will understand.". However, not all activities on the excursion and all educational content are suitable for learning, but the opportunities of those who are should be taken advantage of. Finding the optimal level in the arrangement of two opposites between passive listening and passive observation to active participation, and between extreme dependence and full autonomy in the activities that the excursion encompasses, is a particular problem. Empirical research confirms that they are the most effective, most valued and most remembered later in life, knowledge and skills acquired through activities on excursions that imply active participation. Professional excursions are designed to offer a series of activities in which visitors themselves can participate in reality or virtual simulation, for example, the principle of operation of individual devices or the specifics of working in certain workplaces. It was found that such activities encourage a high level of creativity, the development of skills and critical thinking ability, freedom of response and experimentation in problem solving with the interweaving of previous and newly acquired experience. In addition, they have a high motivational effect for further education.

On excursions, curricula are realized by connecting with the geospatial and social environment (theories and practices), which results in students developing comprehensively and versatilely. The final outcome of any teaching trip should be a satisfied student.

The notion of a satisfied student is closest to the notions of a created, motivated, safe, confident, self-respected, happy student. The trip is well realized when the adapted student returns from it. Apart from pedagogical obsolescence and stubbornness, there is no reason not to respect and fulfil this requirement.



J.U. SREDNJA ŠKOLA ZA
SAOBRAĆAJ I KOMUNIKACIJE
SARAJEVO

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7.ŠPEDICIJA U SAJAMSKIM POSLOVIMA

SAŽETAK

Razvoj proizvodnih snaga, proizvodnih i društvenih odnosa i odgovarajuća podjela rada doveli su do odvajanja trgovine od proizvodnje, a razvoj trgovine do njenog odvajanja od prometa, a razvoj trgovine i prometa, sa svim svojim tehničkotehnološkim, ekonomskopravnim i organizacijskim elementima doveo je do pojave posebnog specijaliziranog posrednika – špeditera, koji je kao organizator otpreme, dopreme i provoza robe našao svoje mjesto između vanjskotrgovinskih subjekata i međunarodnih prevoznika. Pod poslovima međunarodne špedicije podrazumijevaju privredne usluge vanjskotrgovinskog prometa odnosno poslovi: otpreme robe iz vlastite u strane države (izvozna špedicija), dopreme iz strani u vlastitu zemlju (uvozna špedicija) i provoza robe između stranih preko vlastite države (provozna ili tranzitna špedicija) koje obavljaju međunarodni špediteri, te obavljanje drugih propisanih ili uobičajenih specialnih (sporednih) poslova i radnjih u vezi s otpremom, dopremom i provoza robe do samih sajamskih štandova i nazad.

Ključne riječi: špedicija, špediter, sajamski poslovi, logističar, mehanizacija

1. UVOD

U ovom radu je obrađena uloga špedicije u sajamskim poslovima, tačnije u pretovaru, utovaru i istovaru sajamskih eksponata, transportu istih, i samoj organizaciji sajмова. Činjenica je da se na organizovanim sajmovima ne vrši samo prezentiranje i prodaja određenih proizvoda, već se na takvim sajmovima stvara i image tvrtke ili kompanije čiji su proizvodi izloženi. Od osobite je važnosti i sama organizacija sajma i štanda na kojemu su smješteni proizvodi, jer to odaje lice firme čiji su proizvodi tu. Također, te proizvode mora neko dopremiti i otpremiti do i od sajma, što obuhvata niz operacija i postupaka. Sve te proizvode koji se transportuju potrebno je propisno upakovati da ne bi došlo do njihova oštećenja. Upakovani proizvodi se prije prevoza moraju utovariti a poslije prevoza i istovariti na mjestu organizovanja sajma, i pri tome se koristi različita pretovarna mehanizacija. Sve te poslove na sebe preuzima špediter, koji na kraju obavljene usluge izdaje račun korisniku koji je dužan platiti cijenu obavljene usluge. Za špeditere je od osobite važnosti špediterski marketing.

2. ULOGA ŠPEDICIJE U SAJAMSKIM POSLOVIMA

Specifičnosti špediterskih sajamskih poslova mogu se sagledati kroz obradu ovih osnovnih tema¹:

1. osnovna obilježja sajamskih poslova,
2. tržišna politika (marketing) špediterskih organizacija,
3. mehanizacija ukrcaja, iskrcaja i prekrcaja tereta,
4. pakiranje i organiziranje otpreme sajamskih eksponata i
5. obračun špediterskih usluga.

2.1. OSNOVNA OBILJEŽJA SAJAMSKIH POSLOVA

Sajamski poslovi obuhvataju uglavnom izlaganje i prodaju određenih sajamskih eksponata na organizovanim sajmovima koji mogu biti opći i specijalizirani. U početku su to bili klasični sajmovi, koji su vremenom se izdiferencirali u savremene sajmove uzoraka, i to opće sajmove uzoraka i specijalizirane sajmove uzoraka. Na općim sajmovima uzoraka izlagači mogu izlagati različite vrste robe, dok na specijaliziranim sajmovima uzoraka izlagači mogu izlagati samo određene vrste robe kao npr. automobile, tekstil, vina itd.

Sajmovi mogu biti²:

- stalni održavaju se svake godine u određeno vrijeme i na određenom mjestu,
- povremeni (specijalizirani sajmovi koji se održavaju u najpovoljnije vrijeme i mjestu gdje je veliki interes za određenu vrstu robe).

Danšnji špediteri uz ponudu osnovnih špediterskih usluga nude i određene posebne usluge, a jedna od takvih usluga su upravo sajamski poslovi, odnosno organizacija sajмова i sve druge aktivnosti vezane za tu organizaciju. Kompletan niz izlagačkih usluga koje nude špediteri osigurava sjajnu prezentaciju. Bez obzira da li se vrši izlaganje umjetničkih djela ili velikih industrijskih mašina, ili klijent već ima štand na sajmu, klijenti mogu se osloniti na špeditera kad je u pitanju dostava eksponata, štandova i promotivnih materijala, na vrijeme i na svakom mjestu usvijetu.

¹ www.wikipedia.com

² www.webgradnja.hr

Korisnici sami mogu izabrati preferentni način transporta - cestovni, zračni ili pomorski – do sajma i sa sajma, a potom špediteru prepustiti svu dokumentaciju, carinjenje i formalnosti vezane za uvoz i izvoz kod međunarodnog transporta. Osobito vaznu ulogu u sajamskim poslovima igra sajamski prostor. Savremeni Sajamski prostor mora biti prema određenim pravilima uređen. Uređenje sajamskog prostora ne smije se više uzimati zdravo za gotovo, prošla su vremena kada je sajamski prostor imao isključivo izložbenu ulogu, statičnog štanda. Danas su izložbe na sajmovima sastavni dio promidžbene strategije tvrtke te s time u skladu moraju zadovoljiti temeljne estetske i ostale promidžbene kriterije. Sajmovi su značajni poslovni inkubatori i punktovi sklapanja novih suradnji, ali i održavanja postojećih, zato se prilikom odluke izlaganja na sajmu treba definirati cilj izlaganja.

Postoje tri osnovna cilja izlaganja³:

- razvoj imagea tvrtke
- predstavljanje proizvoda
- prodaja proizvoda ili usluga

Razvoj imagea tvrtke. Ukoliko izlagač na sajmu želi predstaviti image tvrtke, izlaganje će biti usmjereno prema njegovim baznim karakteristikama prepoznatljivosti. Uređenje sajamskog prostora pratit će kućna boja, slogan, zaštiti znak te dodatni promotivni sadržaj kojim će se predstaviti i razvijati image tvrtke tj. značajke njegovog imagea. U zadnje vrijeme je moderno sukladno eksternoj komunikaciji tvrtke uspostaviti neposredni kontakt sa korisnikom. Stoga mnoge tvrtke uređuju sajamski prostor “otvorenog tipa” gdje uspostavljaju neposrednu komunikaciju sa sudionicima.

Predstavljanje proizvoda. Uređenje sajamskog prostora za predstavljanje proizvoda ovisi zapravo o vrsti proizvoda. U svakom slučaju ako je to osnovni cilj, uređenje prostora mora odisati svim važnim obilježjima proizvoda. Vitrine ili izložbene police trebale bi sadržavati makete i uzorke proizvoda, boja i logo moraju dominirati prostorom, a ukoliko je moguće i to dozvoljavaju propisi organizatora sajma svakako bi bilo dobro urediti prostor u kojem će se moći isprobati, testirati ili konzumirati proizvod.

Prodaja proizvoda ili usluga. Ovo je najkomercijalniji vid izlaganja i zapravo ne zahtjeva neki poseban dizajn, najčešće se radi o usluzi ili proizvodu koji ima svoju potrošačku grupu i na izlagaču je da samo dobro obavijesti posjetitelja o postojanju svog izložbenog prostora. Ovakvi, prodajni prostori podrazumijevaju štand otvorenog tipa sa skladišnim prostorom.

2.2. POSTUPAK PRIMJENE I UREĐENJA SAJAMSKOG PROSTORA

Kada se odredio cilj nastupa na sajmu i samim time neki osnovni princip uređenja sajamskog prostora, potrebno je odrediti i naručiti temeljne tehničke odrednice štanda, sekundarne tehničke uvjete štanda, smještaj štanda te razmotriti dodatne usluge i potrebe koje zahtjeva izlaganje na sajmu kao i koje ustanove ili odjeli unutar organizacije sajma mogu pomoći pri realizaciji posebnih uvjeta izlaganja.

Faze realizacije i uređenja sajamskog prostora⁴:

1. Narudžba za promociju izlagača ili prijava izlagača – ova narudžba / prijava provodi se u pisanom obliku i sadržava detaljne uvjete i potrebe izlagača. Većina organizatora

³ www.webgradnja.hr

⁴ www.webgradnja.hr

sajmova narudžbe / prijave već ima standardizirane u obliku obrasca koji izlagač samo popuni sukladno svojim zahtjevima.

2. Prihvaćenje i razmatranje uvjeta izlaganja i organizatora – uvjeti izlaganja predočeni su izlagaču u pisanoj formi i oni su uvjet temeljne suradnje izlagača – organizatora. Prikazani su u obliku pravilnika kojeg se stranke pridržavaju obostrano prilikom realizacije posla.
3. Osnovne i sekundarne tehničke usluge – sukladno narudžbi koja već definira osnovne tehničke zahtjeve izlagača (oblik štanda i dimenzija štanda), ovim putem se definira cijena tih usluga.
4. Odabir materijala za izradu štanda – iako se oni također ubrajaju u tehničke uvjete izlagača, nisu primarno uvjet koji treba osigurati organizator sajma jer poneki izlagači konstruiraju i dizajniraju štandove od materijala koji nisu u standardnoj ponudi organizatora sajma. Temeljna ponuda organizatora podrazumijeva aluminijske, pleksi i iver profile.

2.3. SPECIFIČNI UVJETI IZLAGANJA

Ponekada specifičnost sajamskog posla upravo je u tome što dokumentacija i cjelokupan proces prati robu koja nema svoje tržišne vrijednosti tj. nije namijenjena daljnjoj distribuciji, nego ima reprezentativnu ulogu, za razliku od ostalih unosa robe na sajam gdje roba ima daljnju trgovačku vrijednost i namijenjena je daljnjoj distribuciji na tržištu kojem se plasira. Uslugu sajamskih poslova u većini slučajeva danas nude razni špediteri u okviru organizacije sajмова, stoga je potrebnu prilikom ugovaranja izlaganja s organizatorom dogovoriti i tu mogućnost kako sam izlagač ne bi gubio vrijeme na carinske i druge propise koji uređuju sajamske poslove.

U skladu s predstavljenom temom može se istaknuti da je sajamska promocija vrlo čest oblik promocije u svijetu, no većina izlagača ili potencijalnih izlagača ne zna kako i na koji način realizirati i urediti sajamski prostor i izložbu. Svjesni tih problema postanu tek u trenutku kada se uhvate u koštac sa samom organizacijom. Iako na oko jednostavan proces promocije, on je vrlo kompleksan pa je ponekad dobro, ukoliko tvrtka nema sektor koji se isključivo bavi promocijom, da uređenje i realizaciju sajamske promocije prepusti stručnjacima i agencijama koje se bave tim poslom. Za sve one koji smatraju da im je uređenje sajamskog prostora i realizacija sajamske promocije jedan novi izazov, neka prvo dobro razmotre svoje ciljeve i mogućnosti, a zatim neka krenu u realizaciju.



Sl.1. Sarajevski sajam

Sarajevski Sajam (sl.1.) danas organizuje preko 20 specijalizovanih sajмова na 27.000 metara kvadratnih izložbenog prostora. Svojim kvalitetom, sajamske manifestacije zauzimaju veliki značaj u privrednim dešavanjima ovog dijela Evrope.

3. TRŽIŠNA POLITIKA (MARKETING) ŠPEDITERSKIH ORGANIZACIJA

Špediterski marketing je skup planiranih, koordiniranih reguliranih i kontroliranih špediterskih aktivnosti kojima se u partnerskim odnosima s aktivnim sudionicima logističkih lanaca povezuju svi djelotvorni procesi savladavanja prostornih i vremenskih udaljenosti brzih, sigurnih i racionalnih transformacija materijala, dobara, (polu)proizvoda, repromaterijala, živih životinja(...) od sirovinke baze do potrošača, od pošiljatelja do primatelja, od prodavatelja do kupca, od skladišta do skladišta, "od vrata do vrata", uključujući i pripadajuće informacije, a da se pri tome maksimalno zadovolje potrebe i zahtjevi aktivnih sudionika u logističkim lancima⁵.

Špediteri kao logistički operatori trebaju svoje ponude usluga prilagoditi potražnji potencijalnih komitenata i time uključiti u logističke procese, odnosno u logističke lance.

4. MEHANIZACIJA UKRCAJA, ISKRCAJA I PREKRCAJA TERETA

Da bi se sajamski eksponati od proizvođača dopremili do sajmovi i nazad, te da bi se utovarali, istovarali na transportna sredstva, potrebno je koristiti određenu pretovarnu i transportnu mehanizaciju (sl.2, sl.3). Ta mehanizacija obuhvata: obična kolica, električna akumulatorska kolica, ručna i električna kolica za automatsko prenošenje i premještanje tereta, autodizalice za vodoravno i uspravno premještanje i dizanje tereta, dizalice.



Sl.2 Pretovarna mehanizacija

Ovisno o tome koja je vrsta transportiranih sajamskih eksponata u pitanju, mogu se koristiti i viljuskari, veće autodizalice te različite druge vrste pomoćnih pretovarnih sredstava.



⁵ www.wikipedia.com

Sl.3 Ručna pretovarna mehanizacija

5. PAKIRANJE I ORGANIZIRANJE OTPREME SAJAMSKIH EKSPONATA

Na sajmu se često izlaže roba koja je stigla direktno iz inozemstva ili carinskog skladista. Kada carinska roba prijeđe carinsku crtu, ulazna carinarnica pod carinskim nadzorom upućuje tu robu carinarnici nadležnoj za određeni sajam.

Sajamska roba koja stigne u mjesto gdje se održava sajam, prijavljuje se nadležnoj carinarnici na temelju propisanog obrasca. Na temelju odgovarajuće dokumentacije špediter podnosi carinarnici deklaraciju za sajamsku robu. Nakon obavljanja carinjenja robe špediter predaje dotičnu robu izlagaču. Na posebnom obrascu on mu potvrđuje primitak određenog eksponata. Nakon zatvaranja sajma, špediter treba u najkraćem vremenu obaviti brojne poslove oko organiziranja otpreme sajamskih eksponata. Mnoge eksponate potrebno je prije otpreme propisno pakirati. Špediter će ili sam obaviti pakiranje ili će to isto organizirati pomoću specijaliziranih službi za pakiranje.

Nakon zatvaranja sajma, špediter treba u najkraćem vremenu obaviti brojne poslove oko organiziranja otpreme sajamskih eksponata. Mnoge eksponate potrebno je prije otpreme propisno pakirati. Špediter će ili sam obaviti pakiranje ili će to isto organizirati pomoću specijaliziranih službi za pakiranje.

Nakon pakiranja eksponata obavlja se ponovni carinski pregled. Na taj se način razdužuje deklaracija za sajamsku robu. Špediter je, kao podnositelj deklaracije, dužan robu vratiti u inozemstvo, odnosno vratiti u konsignacijsko skladište. Kada je pakovanje i zaštita eksponata u pitanju, špediteri vrse tri vrste pakovanja⁶:

- Unutrasnje
- Vanjsko
- Pakovanje specijalnih stvari

5.1. Unutrašnje pakovanje

Kada je u pitanju unutrasnje pakovanje, preporučljivo je ostaviti najmanje 5 cm prostora između vanjske ambalaže i upakovanog proizvoda. Ovaj prostor treba popuniti nekom vrstom obloge, bilo da se radi o zgužvanim novinama ili starim komadima tkanine.

5.2. Vanjsko pakovanje

Prilikom transporta, pošiljka može biti izložena nepovoljnim uticajima usljed vremenskih uslova i turbulencija prilikom transporta, tako da je adekvatno pakovanje od ključnog značaja. Proizvodi koji se mogu koristiti za optimalno pakovanje pošiljki su⁷:

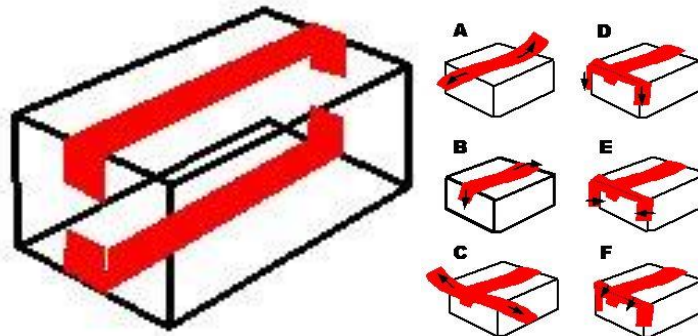
- vreće
- koverta
- kutije
- tube

⁶ www.dhl.com

⁷ www.dhl.com

- trake
- trake i film za umotavanje
- bandažiranje

Uvijek koristiti jake i čvrste trake – DHL spediter preporučuje polipropilensku ili vinilsku ljepljivu traku. Izbjegavajte korištenje celofanskih traka, koje jesu jeftinije ali su obično nedovoljno jake i pogodne samo za kancelarijsku upotrebu. Mogu se koristiti i druge vrste traka, kao što je papirna traka ojačana vlaknima. Ne preporučuje se umotavanje paketa užetom, jer uže može prorezati karton i oštetiti paket. Ukoliko koristite traku preporučljivo je zatvoriti kutiju sa šest komada trake, kako je prikazano na slikama Sl.4:



Sl. 4 Lijepljenje kutije sa šest komada trake

Ukoliko se odlučite za pojačanu papirnu traku, kutija se može zatvoriti sa samo dva sloja trake. Ne zaboravite da traka mora biti duža od ivica kutije za 80 mm ili 32 inča.

- Trake od poliestera manje se rastežu od polipropilenskih na visokim temperaturama, jače su i zadržavaju svoja svojstva u vlažnom stanju. Mogu zamijeniti čelik u mnogim primjenama zbog niže cijene.
- Metalne trake za bandažiranje su najbolje za veoma teške pošiljke, i ne rastežu se. Preporučuje se njihovo korištenje samo za drvene sanduke.

5.3. Pakovanje specijalnih stvari

Pojedini predmeti su osjetljiviji i podložniji oštećenjima od drugih, te može lako doći do oštećenja ako nisu adekvatno upakovani. Takvi predmeti koji zahtijevaju specijalno pakovanje su pr. Leci I dokumenti, knjige, praškasti proizvodi, tekućine, viskozne tekućine, mape i crteži, fotografske kopije, makaze i noževi, električna/elektronska oprema, sportski reketi, igračke i igre.

6. OBRAČUN ŠPEDITERSKIH USLUGA

Sajamski međunarodni špediteri imaju iste obaveze, prava i odgovornosti kao i špediteri koji obavljaju standardne špediterske poslove. Kada je riječ o obračunu špediterskih usluga, treba imati na umu nekoliko činjenica⁸:

1. špediter ima pravo na naknadu troškova i predujam,
2. špediter ima pravo zaloga,

⁸ www.wikipedia.com

3. špediter ima pravo zadržavanja,
4. špediter ima pravo na naknadu za svoje usluge.

Svoje usluge sajamski špediter obračunava na temelju **Tarife za špeditorske usluge na međunarodnim sajmovima, samostalnim i specijaliziranim izložbama i sličnim priredbama**. Špediteri shodno dogovoru i sklopljenom ugovoru imaju pravo tražiti naknadu za učinjene usluge, ostvarene troškove pri transportu, a isto tako i klijenti imaju pravo za naknadu ukoliko kojim slučajem dodje do oštećenja transportovanih sajamskih eksponata.

7. ZAKLJUČAK

U okviru ovog rada obradili smo ulogu i značaj špedicije i špeditorskih organizacija u organizovanju sajamskih poslova. činjenica je da svaku robu koja treba da bude izložena na sajmovima treba neko upakovati, natovariti i dovući do mjesta sajma, a po završetku sajma potrebno je istu robu vratiti u skladišta, tu ulogu na sebe uz određenu naknadu preuzimaju špediteri. Špediteri naročito pomažu i olakšavaju transport robe do i od sajmova kada su međunarodni sajmovi u pitanju jer je tada potrebno eksponate voziti u druge zemlje, i tada špediteri obavljaju niz carinskih poslova i postupaka. Po završetku obavljenih poslova, dolazi do izmirivanja dugova i naknada špediterima za obavljene usluge komitentima, a to je uglavnom unaprijed ugovoreno između dvije strane. Sajamski poslovi su samo jedna vrsta specijalnih špeditorskih poslova koje špediteri nude komitentima, a da bi opstali na tržištu moraju svoje usluge poboljšavati i usklađivati sa tržišnim zahtjevima.



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7. FORWARDING IN FAIR BUSINESS

ABSTRACT

The development of production forces, production and social relations and the appropriate division of labor led to the separation of trade from production, and the development of trade to its separation from traffic, and the development of trade and traffic, with all its technical-technological, economic-legal and organizational elements, led to the emergence of a special specialized intermediary - freight forwarder, who as an organizer of dispatch, delivery and transit of goods found his place between foreign trade entities and international carriers. Under international freight forwarding business, we mean business services of foreign trade traffic, i.e. business: shipment of goods from one's own country to a foreign country (export freight forwarding), delivery from a foreign country to one's own country (import freight forwarding) and transit of goods between foreign countries via a foreign country (in transit or transit freight forwarding) performed international freight forwarders, and performing other prescribed or usual special (side) jobs and actions related to shipping, delivery and transit of goods to the fair stands and back.

Keywords: *freight forwarding, freight forwarder, trade fair operations, logistician, mechanization*

1. INTRODUCTION

This paper deals with the role of forwarding in trade fair operations, more specifically in transshipment, loading and unloading of trade fair exhibits, their transport, and the organization of trade fairs itself. It is a fact that at organized fairs not only the presentation and sale of certain products is done, but also the image of the company or the company whose products are exhibited is created. The organization of the fair itself and the stand where the products are placed are particularly important, because it reveals the face of the company whose products are there. Also, someone has to deliver and ship those products to and from the fair, which includes a series of operations and procedures. All those products that are being transported must be properly packed so that they are not damaged. Packaged products must be loaded before transportation, and unloaded after transportation at the place where the fair is organized, and different handling machinery is used for this. All these tasks are taken over by the freight forwarder, who at the end of the service issues an invoice to the user who is obliged to pay the price of the service. For forwarders, forwarder marketing is of particular importance.

2. THE ROLE OF FORWARDING IN TRADE FAIR

The specifics of freight forwarding trade fairs can be seen through the processing of these basic topics⁹:

1. Basic features of fair business,
2. Market policy (marketing) of forwarding organizations,
3. Mechanization of loading, unloading and transshipment of cargo,
4. Packing and organizing the shipment of fair exhibits
5. Calculation of forwarding services.

2.1. Basic features of fair business

Fair business includes mainly the display and sale of certain fair exhibits at organized fairs, which can be general or specialized. At the beginning, these were classic fairs, which over time differentiated into modern sample fairs, namely general sample fairs and specialized sample fairs. At general sample fairs, exhibitors can exhibit different types of goods, while at specialized sample fairs, exhibitors can only exhibit certain types of goods, such as cars, textiles, wines, etc.

Fairs can be¹⁰:

- permanent are held every year at a certain time and in a certain place,
- occasional (specialized fairs that are held at the most convenient time and place where there is great interest in a certain type of product).

Today's freight forwarders, in addition to offering basic freight forwarding services, also offer certain special services, and one of these services is fair business, that is, the organization of fairs and all other activities related to that organization. A full range of exhibition services offered by freight forwarders ensures a great presentation. Regardless of whether works of

⁹www.webgradnja.hr

¹⁰ www.webgradnja.hr

art or large industrial machines are being exhibited, or the client already has a stand at the fair, clients can rely on the freight forwarder when it comes to the delivery of exhibits, stands and promotional materials, on time and anywhere in the world.

Users can choose their preferred mode of transport - road, air or sea - to and from the fair, and then leave all documentation, customs clearance and formalities related to import and export to the freight forwarder. The fair venue plays a particularly important role in fair business. The modern fair venue must be arranged according to certain rules. The arrangement of the fair venue must no longer be taken for granted, the times when the fair space had an exclusive exhibition role, a static stand, are gone. Today, exhibitions at trade fairs are an integral part of the company's advertising strategy, and accordingly they must meet basic aesthetic and other advertising criteria. Fairs are important business incubators and points for establishing new collaborations, but also for maintaining existing ones, so when deciding to exhibit at the fair, the goal of the exhibit should be defined.

There are three main objectives of the presentation¹¹:

- o development of the company's image
- o product presentation
- o sale of products or services

Development of the company's image. If the exhibitor at the fair wants to represent the image of the company, the presentation will be directed towards its basic characteristics of recognition. The arrangement of the fair venue will be accompanied by the color, slogan, trademark and additional promotional content that will present and develop the image of the company, i.e. features of its image. Recently, it is fashionable to establish direct contact with the user in accordance with the company's external communication. Therefore, many companies organize an "open-type" trade fair area where they establish direct communication with participants.

Product presentation. Arranging the fair space for product presentation actually depends on the type of product. In any case, if this is the main goal, the arrangement of the space must reflect all the important features of the product. Showcases or exhibition shelves should contain models and product samples, the color and logo must dominate the space, and if possible and the regulations of the fair organizer allow it, it would certainly be good to arrange a space where the product can be tried, tested or consumed.

Development of the company's image. If the exhibitor at the fair wants to present the image of the company, the presentation will be directed towards its basic characteristics of recognition. The arrangement of the fair space will be accompanied by the house color, slogan, trademark and additional promotional content that will present and develop the image of the company, i.e. features of his image. Recently, it is fashionable to establish direct contact with the user in accordance with the company's external communication. Therefore, many companies organize an "open-type" trade fair area where they establish direct communication with participants.

¹¹ www.webgradnja.hr

Selling products or services. This is the most commercial type of exhibition and does not really require a special design, it is usually a service or product that has its own consumer group and it is up to the exhibitor to inform the visitor about the existence of their exhibition space. Such sales premises include an open-type stand with storage space.

2.2. Procedure of application and arrangement of the fair space

Once the goal of the exhibition at the fair and therefore some basic principles of organizing the fair space has been determined, it is necessary to determine and order the basic technical parameters of the stand, the secondary technical conditions of the stand, the placement of the stand, and consider the additional services and needs required for exhibiting at the fair, as well as which institutions or departments within the organization of the fair can help with the implementation of special exhibition conditions.

Stages of realization and arrangement of the fair venue:¹²

1. Exhibitor promotion order or exhibitor application – this order / application is made in writing and contains detailed conditions and needs of the exhibitor. Most fair organizers already have standardized orders/applications as a form that the exhibitor simply fills in according to their requirements.
2. Acceptance and consideration of the conditions of the exhibition and the organizer - the conditions of the exhibition are presented to the exhibitor in written and they are a condition for the thorough cooperation of the exhibitor - organizer. They are presented in the form of a rulebook which the parties adhere to mutually during the implementation of the work.
3. Basic and secondary technical services - in accordance with the order that already defines the basic technical requirements of the exhibitor (stand shape and stand dimensions), the price of these services is hereby defined.
4. Selection of materials for the construction of the stand - although they are also included in the technical conditions of the exhibitor, they are not the primary condition that the fair organizer should ensure, because some exhibitors construct and design stands from materials that are not in the standard offer of the fair organizer. The basic offer of the organizer includes aluminum, plexiglass and chipboard profiles.

2.3. Specific conditions for exhibiting

Sometimes the specificity of trade fair work is precisely that the documentation and the entire process follows goods that do not have their own market value, i.e. it is not intended for further distribution, but has a representative role, unlike other entries of goods to the fair where the goods have further commercial value and are intended for further distribution in the market where they are placed. In most cases, the service of trade fairs is offered today by various freight forwarders within the organization of trade fairs, therefore it is necessary to agree on this possibility with the organizer when contracting the exhibition, so that the exhibitor does not waste time on customs and other regulations governing trade fairs.

In accordance with the presented topic, it can be pointed out that fair promotion is a very common form of promotion in the world, but most exhibitors or potential exhibitors do not know how and in what way to realize and arrange the fair venue and exhibition. They only become aware of these problems when they come to grips with the organization itself. Although the promotion process seems simple to the eye, it is very complex, so sometimes

¹² www.webgradnja.hr

it is good, if the company does not have a sector that exclusively deals with promotion, to leave the organization and realization of the fair promotion to experts and agencies that deal with that work. For all those who think that the arrangement of the fair space and the realization of the fair promotion is a new challenge for them, let them first carefully consider their goals and possibilities, and then let them start the implementation.



Fig.1 Sarajevo fair

Today, the Sarajevo Fair (Fig. 1) organizes over 20 specialized fairs on 27,000 square meters of exhibition space. Due to their quality, fair events are of great importance in the economic events of this part of Europe.

3. MARKET POLICY (MARKETING) OF FORWARDING ORGANIZATIONS

Freight forwarding marketing is a set of planned, coordinated, regulated and controlled freight forwarding activities which, in partnership with active participants in logistics chains, connect all effective processes of overcoming spatial and temporal distances for fast, safe and rational transformations of materials, goods, (semi)products, raw materials, live animals (...) from the raw material base to the consumer, from the sender to the recipient, from the seller to the buyer, from the warehouse to the warehouse, "door to door", including the associated information, while at the same time meeting the needs and requirements of possible active participants in logistics chains¹³.

Freight forwarders as logistics operators need to adapt their service offerings to the demand of potential clients and thus include them in logistics processes, i.e. in logistics chains.

4. MECHANIZATION OF CARGO LOADING, UNLOADING AND TRANSSHIPMENT

In order for the fair exhibits to be delivered from the manufacturers to the fairs and back, and to be loaded and unloaded on the means of transport, it is necessary to use certain handling and transport machinery (Fig. 2, Fig. 3). This machinery includes: ordinary carts, electric battery carts, manual and electric carts for automatic transfer and moving of loads, truck cranes for horizontal and vertical moving and lifting of loads, cranes.

¹³ www.wikipedia.com



Fig.2 Loading machinery

Depending on the type of transported fair exhibits, forklifts, larger truck cranes and various other types of auxiliary handling equipment can be used.



Fig.3 Manual loading machinery

5. PACKING AND ORGANIZING THE SHIPMENT OF FAIR EXHIBITS

Goods that have arrived directly from abroad or from a customs warehouse are often exhibited at fairs. When the customs goods cross the customs line, the customs office of entry under customs supervision refers the goods to the customs office responsible for the specific fair.

Fair goods that arrive at the venue where the fair is held are reported to the customs office in charge, based on the prescribed form. Based on the appropriate documentation, the freight forwarder submits a declaration for the fair goods to the customs office. After customs clearance of the goods, the freight forwarder hands over the goods in question to the exhibitor. He confirms the receipt of a specific exhibit on a special form.

After the closing of the fair, the freight forwarder needs to perform numerous tasks in the shortest possible time to organize the shipment of the fair exhibits. Many exhibits need to be properly packed before shipping. The freight forwarder will either do the packing himself or organize it with the help of specialized packing services.

After packing the exhibits, a new customs inspection is carried out. In this way, the declaration for fair goods is discharged. The freight forwarder, as the applicant of the declaration, is obliged to return the goods abroad, i.e. return them to the consignment warehouse. When it comes to packing and protecting exhibits, forwarders carry out three types of packing:

- o Internal
- o External

o Packing of special items

5.1. Inner packing

When it comes to the inner packaging, it is recommended to leave at least 5 cm of space between the outer packaging and the packaged product. This space should be filled with some kind of padding, whether it's crumpled up newspaper or old pieces of fabric.

5.2. Outer packaging

During transport, the shipment may be exposed to adverse effects due to weather conditions and turbulence during transport, so adequate packaging is of key importance. Products that can be used for optimal packaging of shipments are:

- bags
- envelopes
- boxes
- tubes
- tapes
- tapes and wrapping film
- bandaging

Always use strong and sturdy tapes – DHL forwarder recommends polypropylene or vinyl tape. Avoid using cellophane tapes, which are cheaper but usually not strong enough and suitable only for office use. Other types of tape can be used, such as fiber-reinforced paper tape. Wrapping the package with rope is not recommended, as the rope can cut through the cardboard and damage the package. If you use tape, it is recommended to close the box with six pieces of tape, as shown in the pictures Fig. 4:

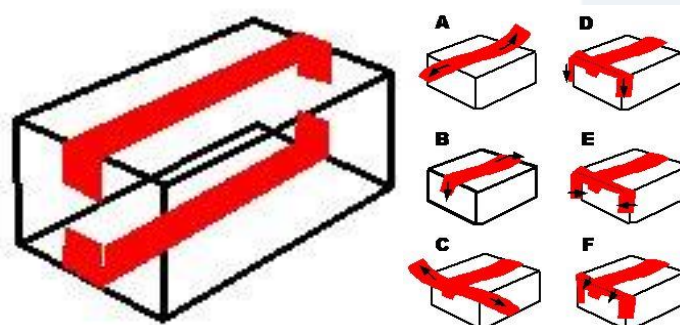


Fig. 4 Gluing the box with six pieces of tape

If you choose reinforced paper tape, the box can be closed with only two layers of tape. Remember that the strip must be longer than the edges of the box by 80 mm or 32 inches.

- Polyester tapes stretch less than polypropylene tapes at high temperatures, are stronger and retain their properties when wet. They can replace steel in many applications because of the lower cost.

- Metal banding straps are best for very heavy shipments, and do not stretch. It is recommended to use them only for wooden crates.

5.3. Packing special items

Some items are more sensitive and susceptible to damage than others, and damage can easily occur if they are not adequately packed. Such items require special packaging, ex

leaflets and documents, books, powder products, liquids, viscous liquids, maps and drawings, photographic copies, scissors and knives, electrical/electronic equipment, sports rackets, toys and games.

6. CALCULATION OF FORWARDING SERVICES

Fair international freight forwarders have the same obligations, rights and responsibilities as freight forwarders who perform standard freight forwarding operations. When it comes to the calculation of freight forwarding services, several facts should be kept in mind:

1. the freight forwarder has the right to reimbursement of expenses and an advance payment,
2. the freight forwarder has the right of lien,
3. the freight forwarder has the right of retention,
4. the freight forwarder has the right to compensation for his services.

The fair freight forwarder calculates its services on the basis of the Tariff for freight forwarding services at international fairs, independent and specialized exhibitions and similar events. In accordance with the agreement and concluded contract, the forwarders have the right to request compensation for the services rendered, costs incurred during transportation, and clients also have the right to compensation if by any chance the transported fair exhibits are damaged.

7. CONCLUSION

This paper deals with the role and importance of forwarding and forwarding organizations in organizing trade fairs. the fact is that every product that needs to be exhibited at fairs needs to be packed, loaded and brought to the fair venue by someone, and after the fair, the same goods must be returned to the warehouse, this role is taken over by freight forwarders for a certain fee. Freight forwarders especially help and facilitate the transport of goods to and from fairs when it comes to international fairs, because then it is necessary to transport exhibits to other countries, and then freight forwarders perform a series of customs duties and procedures. Upon completion of the work, the debts and fees to the forwarders for the services rendered to the client are settled, and this is generally agreed upon in advance between the two parties. Fair jobs are just one type of special freight forwarding jobs that freight forwarders offer to clients, and in order to survive on the market, they must improve their services and harmonize them with market requirements.



SUSTAIN4VET

STROKOVNI IZOBRAŽEVALNI
CENTER LJUBLJANA

Avtor: Haris Čordić, mag. inž.
prom.

8. TRAJNOSTNA MOBILNOST V POKLICNEM IN STROKOVNEM IZOBRAŽEVANJU

Povzetek

V članku je predstavljena študija primera, ki smo jo pripravili v okviru Erasmus+ KA2 projekta Sustain4VET. Podane so splošne informacije o študiji, celoten potek izvedbe ter rezultati izvedbe.

Ključne besede

Trajnost, mobilnost, onesnaževanje

1. UVOD

Pojem trajnostna mobilnost predstavlja znanje, s katerim lahko varno do sočloveka in okolja razvijamo potrebe posameznika, podjetij in družbe ter promoviramo pravičnost.

Z nami je sicer že kar nekaj časa, vendar se njegova raba in pomen povečujeta, kar dokazujejo tudi dokumenti nacionalnega pomena, kot je *Strategija razvoja prometa v Republiki Sloveniji*, ki obsega več kot 200 strani in navaja cilje do zelene prihodnosti in trajnostne mobilnosti v RS in pa tudi dokumenti evropskega pomena.

Evropska komisija navaja ključne cilje trajnostne mobilnosti v svojem dokumentu z imenom »Putting European transport on track for the future«:

1. Spodbujanje uporabe vozil, plovil in letal brez emisij, obnovljivih in nizkoogljčnih goriv ter povezane infrastrukture – na primer z namestitvijo 3 milijonov javnih polnilnih mest do leta 2030.
2. Ustvarjanje letališč in pristanišč brez emisij – na primer z novimi pobudami za spodbujanje trajnostnih letalskih in pomorskih goriv.
3. Narediti medmestno in mestno mobilnost zdravo in trajnostno – na primer s podvojitvijo železniškega prometa za visoke hitrosti in razvojem dodatne kolesarske infrastrukture v naslednjih 10 letih.
4. Okolju prijaznejši tovorni promet – na primer s podvojitvijo železniškega tovornega prometa do leta 2050.
5. Določanje cen ogljika in zagotavljanje boljših spodbud za uporabnike – na primer z izvajanjem obsežnega nabora ukrepov za zagotavljanje pravičnega in učinkovitega oblikovanja cen v celotnem prometu.

Smernice EU pa seveda vplivajo tudi na evropske projekte, ki jih imamo v šolstvu. Zato smo v okviru projekta Erasmus+ KA2 Sustain4VET v preteklih letih pripravili nekaj zelenih, trajnostnih študij primerov, ki jih lahko uporabljamo pri poučevanju v poklicnem in strokovnem izobraževanju.

V nadaljevanju bo predstavljena študija primera, katere cilj je predstaviti dijakom trajnostno mobilnost na zanimiv način, jih opolnomočiti na področju lastne mobilnosti in dojemanja okolice v kateri živijo z namenom optimizacije svojih življenjskih stroškov ter vpliva, ki ga imajo na okolje.

2. SPLOŠNE INFORMACIJE

Študija je namenjena za uporabo v poklicnih in strokovnih šolah, ki imajo program logistični tehnik ali podoben program na EQF stopnji 4. Lahko se uporabi tudi za druge poklicne (EQF 3) ali tehnične (EQF 4) smeri. Dijaki ne potrebujejo predznanja.

Kompetence, ki jih dijaki pridobijo:

- Razloži koncept ogljičnega odtisa,
- analizira različne vplive različnih panog prometa na okolje,
- analizira posledice, ki izhajajo iz vplivov različnih panog prometa na okolje,
- analizira celovito prometno strategijo občine,
- razume pomen trajnostnega prometnega načrtovanja in mestne logistike,
- analizira lastne potovalne navade in razume pomen različnih načinov delitve in kombiniranja prevoza za doseganje potovalnih ciljev (mestna logistika).

Potrebna orodja:

- Pametni telefoni z dostopom do interneta,
- Powerpoint prezentacija,
- papir in pisala,
- celostna prometna strategija izbrane občine. V Sloveniji je objava celostne prometne strategije za določeno časovno obdobje dolžnost občin, ki jo pogosto objavijo na lastni spletni strani.

3. IZVEDBA ŠTUDIJE

Študija primera spodbuja razvoj sposobnosti študentov za samostojno delo in raziskovanje na področju onesnaževanja okolja. Študenti bodo znali oceniti, katero prevozno sredstvo uporabiti za osebno trajnostno mobilnost. Dijaki bodo razvijali tudi kritično razmišljanje o trajnostnem prometnem načrtovanju občine, saj je večina dela na področju trajnostnega prometa (predvsem infrastrukture) v pristojnosti občine.

Odprta vprašanja za dijake:

- 1) Kako bi zmanjšali ogljični odtis prometa?
- 2) Kako vaša občina spodbuja trajnostni promet?
- 3) Kaj bi naredili/spremenili za spodbujanje trajnostnega prometa v vaši občini?
- 4) Kako vidite potovalne navade sodržavljanov?

Postopek izvedbe:

- Učitelj učencem predstavi splošne informacije o študiji primera in učnih izidih ter jih seznaniti s trajnostno mobilnostjo (Powerpoint prezentacija).
- Učitelj razdeli dijake v skupine po 4. Imeti morate vsaj 3 skupine (12 dijakov), da lahko primerjajo rezultate. Po možnosti razdelite študente po kraju bivanja (dijaki, ki skupaj živijo v isti občini). Učitelj vsaki skupini razdeli papir in pisala.
- Vsaka skupina mora s pomočjo mobilnih telefonov raziskati izraz »ogljčni odtis«, da pripravi koncept, kaj jim ta izraz pomeni in zakaj je pomemben. Za analizo koncepta lahko uporabijo različne spletne strani. Nekaj stavkov morajo oblikovati tudi na papirju.
- Vsaka skupina uporablja telefon za dostop do spletne strani Evropske agencije za okolje (povezava številka 1), da se seznanijo z različnimi vplivi različnih panog prometa na okolje in posledicami, ki izhajajo iz tega vpliva. Skupine zapišejo odstavek o vplivih in posledicah prometa na okolje.
- Vsaka skupina s pomočjo mobilnih telefonov poišče celovito prometno strategijo svoje občine (vsaka skupina naj ima drugo občino). Dijaki naj analizirajo lastno občino za boljšo uporabo pridobljenega znanja. Vsaka skupina naj napiše odstavek ključnih kazalnikov/načrtov trajnostne prometne strategije v svoji občini.
- Vsak posameznik z mobilnim telefonom dostopa do povezave številka 4 in izračuna emisije CO₂, ki nastanejo letno, če bi se vsak dan v službo vozil z avtomobilom. Sami naj si izberejo kraj bivanja in podjetje, v katerem bi radi delali ter uporabljajo trajnostno pot. Za izračun naj izberejo preproste avtomobile (npr. družinski avto, ki ga imajo). Vsak študent naj izračuna tudi stroške vsakodnevne uporabe avtomobila za delo. Ko dobijo potrebne podatke (ogljčni odtis, izračunani stroški goriva, registracije, pnevmatik, letnih servisov), naj primerjajo ogljčni odtis in stroške avtomobila z uporabo avtobusa in kolesa.
- Vsaka skupina odgovori na odprta vprašanja in napiše zaključek o možnostih trajnostnega prometa v svoji občini.
- Vsaka skupina predstavi svoje odgovore in zaključke drugim skupinam.

Povezave:

- <https://www.eea.europa.eu/themes/transport>
- <https://www.eea.europa.eu/signals/signals-2022/infographics>
- <https://ec.europa.eu/eurostat>
- <https://www.carbonfootprint.com/>



Slika 1: Izvedba študije, vir: lasten

4. ANALIZA REZULTATOV IN IZVEDBE

Za analizo rezultatov smo pripravili anketni vprašalnik, ki smo ga z dijaki delili s pomočjo QR kode. Dijaki so dostopali do pred in po-testa, da bi lahko tako ugotovili, koliko predznanja so imeli in koliko znanja so usvojili. Vprašanja so bila bazirana na podlagi postavljenih kompetenc. Dijaki so odgovarjali na vprašanja z ocenami (od 1-najmanj do 5-največ).

Ugotovili smo, da po izvedbi noben dijak ni navedel, da ne razume koncepta ogljičnega odtisa. 8 jih je dalo najvišje možne ocene (4 in 5). Dijaki so našli kar 25 različnih vplivov, ki jih ima promet na okolje. Noben dijak ni odgovoril, da ne razume vpliva, ki ga imajo določene vrste prometa na okolje. Večina je sicer izbrala srednjo vrednost (3). Na vprašanje, ali bi bili sposobni samostojno analizirati lastne potovalne navade in kombinirati različne vrste transporta z namenom optimizacije, je večina odgovorila, da verjamejo, da bi znali.

Seveda pa smo tudi učitelji analizirali lastno izvedbo in ugotovili, da je ključ dobre izvedbe odlična začetna motivacija. Pri sami postavitvi nalog smo opazili, da ni dobro, da so vse naloge na isti drsnici, saj dijaki hitijo, da čimprej končajo (tekmovalnost po skupinah).

Kot zaključek bi ocenil, da so študije primerov dijakom zelo zanimive, saj razbijajo monotonost frontalnega nastopanja in spodbujajo aktiven in bolj samostojen pristop k usvajanju znanja. Po svetu postajajo vse bolj priljubljen način poučevanja, še posebej študentov. Kot primer lahko izpostavim Poslovno šolo Harvard, ki je med vodilnimi na svetu po razvoju in uporabi študij primerov. V EU je v okviru ECSB (European Council for Small Business and Entrepreneurship) dostopna tudi knjižnica brezplačnih študij primerov v različnih jezikih, ki jih lahko vsakdo uporabi.



SUSTAIN4VET

TECHNICAL EDUCATION
CENTRE LJUBLJANA

Author: Haris Čordiĉ, mag. inž.
prom.

8.SUSTAINABLE MOBILITY IN VOCATIONAL AND TECHNICAL EDUCATION

Summary

The article presents a case study that we prepared as part of the Erasmus+ KA2 project Sustain4VET. General information about the study, the entire course of implementation and the results of the implementation are given.

Key words

Sustainable, mobility, pollution

1. INTRODUCTION

The concept of sustainable mobility allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations.

It has been with us for quite some time but its use and importance are increasing as evidenced by documents of national importance, such as the Strategy for the Development of Transport in the Republic of Slovenia, which covers more than 200 pages and states the goals for a green future and sustainable mobility in the Republic of Slovenia and also documents of European importance.

The European Commission lists the key objectives of sustainable mobility in its document entitled "Putting European transport on track for the future":

1. Promoting the use of zero-emission vehicles, vessels and aircraft, renewable and low-carbon fuels and related infrastructure – for example by installing 3 million public charging points by 2030.
2. Creating emission-free airports and ports – for example, through new initiatives to promote sustainable aviation and marine fuels.
3. Make intercity and urban mobility healthy and sustainable – for example by doubling high-speed rail traffic and developing additional cycling infrastructure over the next 10 years.
4. More environmentally friendly freight transport - for example by doubling rail freight transport by 2050.
5. Pricing carbon and providing better incentives for users – for example by implementing a comprehensive set of measures to ensure fair and efficient pricing across transport.

The EU guidelines also affect the European projects in education. Therefore, within the Erasmus+ KA2 Sustain4VET project, we have prepared some green, sustainable case studies over the past years that can be used in teaching in vocational and technical education.

In the following, a case study will be presented, the aim of which is to present students with sustainable mobility in an interesting way, to empower them in the field of their own mobility and perception of the environment in which they live in order to optimize their living costs and the impact they have on the environment

2. GENERAL INFORMATION

The study is intended for use in vocational and technical schools that have a logistics technician program or a similar program at EQF level 4. It can also be used for other vocational (EQF 3) or technical (EQF 4) courses. Students do not need prior knowledge.

Competences that students acquire:

- Explain the concept of carbon footprint.
- Analyse the impact of different traffic modes on the environment.
- Analyse the consequences arising from the impact of different traffic modes on the environment.
- Analyse comprehensive traffic strategy of the municipality.
- Understand the importance of sustainable transport planning and city logistics.
- Analyse their own travel habits and understand the importance of sharing and combining transport to achieve travel goals (city logistics).

Required tools:

- PowerPoint presentation.
- Mobile phones with access to the internet.
- Paper and pens.
- Comprehensive traffic strategy of each chosen municipality. In Slovenia it is required by law to publish a comprehensive traffic strategy for a period of time by each municipality. Available on webpage of municipality.

3. IMPLEMENTATION OF THE STUDY

The case study promotes the development of students' ability to work and research independently in the field of environmental pollution. Students will be able to estimate which means of transport to use for personal sustainable mobility. Students will apply critical thinking to the municipality's sustainable transport planning, since most of the work on sustainable transport (especially infrastructure) falls under the jurisdiction of the municipality.

Open questions for students:

1. How would you lower the carbon footprint of transport?
2. How does your municipality promote sustainable transport?
3. What would you do/change to promote sustainable transport in your municipality?

4. HOW DO YOU SEE TRAVEL HABITS OF YOUR FELLOW CITIZENS?

Tasks for students:

- The teacher presents students general info about the case study and learning outcomes and introduces them to sustainable mobility (ppt number 1).
- The teacher splits students into groups of 4. You should have at least 3 groups (12 students), so they can compare results. If possible students are split based on where they live (students who live in the same municipality). The teacher hands out paper and pens to each group.
- Each group uses their mobile phones to research the term »carbon footprint« to prepare a concept of what the term means to them and why it is important. They can use various web pages to analyse the concept. They should formulate a few sentences on the paper also.
- Each group uses the phone to access the webpage of the European Environment Agency (link number 1) to learn about the impact of different traffic modes on the environment and consequences arising from that impact. The groups write down a paragraph on the impact and consequences of traffic on the environment.
- Each groups use the phones to find a comprehensive traffic strategy of their municipality (each of the groups should have a different municipality). Students should analyse their own municipality for better use of gained knowledge. Each group should write a paragraph of key indicators/plans for sustainable traffic strategy in their municipality.
- Each individual uses their mobile phone to access link number 4 and calculate CO₂ emissions produced annually if they were to drive a car each day to work. They should choose their own place of living and a company they would like to work at and use the sustainable route. They should choose simple cars (e.g. a family car they own) for the calculation. Each student should also calculate the cost of using a car each day for work. After they get the necessary information (carbon footprint, calculated costs of fuel, registration, tires, annual services) they should compare the carbon footprint and cost of a car with a bus and bicycle.
- Each group answers open questions and writes a conclusion of their municipality's sustainable transport options.
- Each group presents their answers and conclusions to other groups.

Data usage and sources:

- <https://www.eea.europa.eu/themes/transport>
- <https://www.eea.europa.eu/signals/signals-2022/infographics>
- <https://ec.europa.eu/eurostat>
- <https://www.carbonfootprint.com/>



Photo 2: Implementation of the study, source: own

5. ANALYSIS OF RESULTS AND IMPLEMENTATION

To analyse the results we prepared a questionnaire which we shared with the students using a QR code. The students accessed the pre- and post-test in order to find out how much prior knowledge they had and how much knowledge they had acquired. The questions were based on competences. The students answered the questions with grades (from 1-least to 5-most).

We found that after the implementation no students indicated that they did not understand the concept of a carbon footprint. 8 of them gave the highest possible scores (4 and 5). The students listed as many as 25 different impacts of traffic on the environment. No student answered that they do not understand the impact that certain types of traffic have on the environment. The majority chose the middle value (3). When asked whether they would be able to independently analyze their own travel habits and combine different types of transport with the aim of optimization the majority answered that they believed they would know.

Teachers also analyzed their own performance and found that the key to a good performance is excellent initial motivation. When setting up the tasks we noticed that it is

XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

not good to have all the tasks on the same slide as the students rush to finish them as soon as possible (competition by groups).

As a conclusion I would assess that case studies are very interesting for students as they break the monotony of frontal presentation and encourage an active and more independent approach to acquiring knowledge. They are becoming an increasingly popular way of teaching, especially among students around the world. As an example I can highlight the Harvard Business School which is among the best in the world in the development and use of case studies. In the EU, the ECSB (European Council for Small Business and Entrepreneurship) also provides a library of free case studies in various languages that anyone can use.



OBRTNIČKA I TEHNIČKA
ŠKOLA OGULIN



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9. MJERENJE I ANALIZA STANJA ŽELJEZNIČKE INFRASTRUKTURE

SAŽETAK

MJERENJE I ANALIZA STANJA ŽELJEZNIČKE INFRASTRUKTURE

Povećanjem opsega željezničkog prometa, samim tim i povećanjem osovinskog opterećenja te uvođenje vlakova većih brzina dolazi do znatnog povećanja trošenja elemenata gornjeg ustroja kolosijeka. Iz tih razloga vrlo je važno obavljati sva potrebna mjerenja željezničke infrastrukture, a sve s ciljem povećanja sigurnosti željezničkog prometa.

Za provedbu svih važnijih mjerenja kolosiječne geometrije kao i za provedbu mjerenja na skretnicama postoje različiti mjerni uređaji koje generalno možemo svrstati u dvije osnovne skupine, a to su ručni mjerni uređaji i željeznička vozila posebne namjene (mjerna vozila).

Najbolja tehničko-tehnološka rješenja moguće je postići uporabom najsuvremenijih mjernih strojeva i uređaja kojima će se mjeriti i analizirati najvažniji parametri željezničke pruge – gornji i donji ustroj i kontaktna mreža.

U ovom radu dati ćemo osvrt na elemente gornjeg ustroja kolosijeka koji su najviše podložni trošenju i na uređaje koji se koriste za mjerenje i analizu dobivenih parametara.

Ključne riječi: željeznička infrastruktura, mjerenje stanja kolosijeka, geometrija kolosijeka, tračnice, M-24 Universal, EM-120

ŽELJEZNIČKA INFRASTRUKTURA - GORNJI USTROJ KOLOSIJEKA

Željeznička infrastruktura obuhvaća gornji i donji ustroj željezničke pruge, objekte na pruzi, kolodvorske kolosijeke, signalno-sigurnosne uređaje i postrojenja, elektro-energetske uređaje i postrojenja, telekomunikacijske uređaje i postrojenja, pružni prostor i zračni prostor.

Gornji ustroj kolosijeka pruge koristi se za kretanje željezničkih vozila, a osnovni elementi su kolosijek (kolosijek sačinjavaju tračnice, kolosiječni pragovi, zastor, spojni i pričvrсни pribor) i skretnice.

Gornji ustroj kolosijeka je od iznimnog značenja za kretanje željezničkih vozila pa je vrlo važno vršiti remont i održavanje kolosijeka, a sve u svrhu povećanja sigurnosti u odvijanju željezničkog prometa.

Tračnice

Osnovna namjena tračnica je izravno vođenje kotača željezničkih vozila. One preuzimaju opterećenje željezničkog vozila i dalje ga prenose na pragove za koje su čvrsto spojene kolosiječnim spojnim i pričvrsnim priborom.

Postoje tri vrste tračnica, a to su Vignolova tračnica ili tračnica sa širokom nogom (najčešće se koristi), te su još u uporabi žljebasta i dvoglava tračnica.

Tijekom kretanja željezničkih vozila trošenje tračnica može biti visinsko i bočno. Visinsko trošenje tračnica najviše je kod pruga koje se nalaze u pravcu, a kod kretanja vozila u krivinama osim visinskog trošenja tračnica dolazi do bočnog trošenja (slika 1).

Postoji nekoliko načina na koje se vrši pregled stanja tračnica i to:

- a. ispitivanje indukcijskim strujama - utvrđivanje dubine oštećenja površinskih pukotina na tračnicama
- b. ultrazvučno ispitivanje – utvrđivanje nepravilnosti u unutrašnjosti tračnice
- c. mjerenje poprečnog presjeka – mjerenje glave tračnice kojim se utvrđuje stanje tračnice
- d. mjerenje uzdužnih valova – prepoznavanje pogrešaka na glavi tračnice



Slika 1. Istrošena tračnica

Kolosiječni pragovi

Na kolosiječne pragove čvrsto su vezane tračnice na propisanom razmaku i to od 1435 mm. Širina kolosijeka predstavlja najmanji razmak između unutarnjih rubova tračnica mjereno na mjestu koje je 14 mm ispod gornjeg ruba glave tračnice. Pragovi se ugrađuju u kolosijek s poprečnim razmakom od 60-75 cm.

Pragovi imaju funkciju da što ravnomjernije prenesu opterećenja od tračnica na kolosiječni zastor, a gdje nema kolosiječnog zastora na konstrukciju objekta.

Pragovi mogu biti drveni, betonski i čelični, a kod nas se najčešće upotrebljavaju pragovi od bukovog i hrastovog drva. S obzirom da je drvo podložno truljenju uslijed utjecaja atmosferskih utjecaja vrlo je važno zaštititi pragove od procesa truljenja što se uglavnom vrši impregnacijom kreozotnim uljem. Na taj način se produljuje vijek trajanja. Kod pragova može doći i do pucanja odnosno pojave pukotina, a da bi se smanjila mogućnost nastanka većih pukotina pragovi se često na krajevima okivaju plosnatim čeličnim trakama (slika 2 i 3).



Slika2. Puknuti prag



Slika 3. Puknuti prag

Drveni pragovi se u novije vrijeme zamjenjuju betonskim pragovima čija je osnovna prednost u produljenom vijeku trajanja, dok je glavni nedostatak u tome što su podložni osjetljivosti na udarce.

Kolosiječni zastor

Zastor je element gornjeg ustroja kolosijeka čija je osnovna zadaća da ravnomjerno i elastično prenosi opterećenje vozila koje prima preko tračnica i pragova na trup pruge. Kolosiječni zastor mora biti izveden tako da sprečava uzdužno i poprečno pomicanje kolosijeka te osigurava pravilan položaj kolosijeka po smjeru i visini. Također kolosiječni zastor mora osigurati i laku i brzu odvodnju vode s kolosijeka uslijed utjecaja atmosferskih uvjeta.

Za kolosiječni zastor uglavnom se koristi kamen tucanik, a debljina zastora ispod praga trebala bi biti 30-45 cm.

Kolosiječni spojni i pričvrсни pribor

Osnovna namjena kolosiječnog spojnog i pričvrsnog pribora je ta da poveže tračnice međusobno, spriječi uzdužno i poprečno pomicanje tračnice i da pričvrsti tračnicu za podlogu na kojoj se nalazi. U kolosiječni pribor možemo ubrojiti kolosiječne čavle, vijke za pragove, podložne klinaste ploče, elastične čavle i elastične pritiskalice (slika 4).



Slika 4. Kolosiječni pribor

PREGLED ŽELJEZNIČKE PRUGE

Od velike važnosti je obavljati vizualni pregled pruge odnosno provjeravati stanje gornjeg i donjeg ustroja pruge, objekata i postrojenja koji se nalaze uz prugu. Potrebno je provjeriti sve dijelove željezničke: kolosiječne tračnice, veze na sastavu tračnica, pragove, stanje pričvrstnog pribora (vijaka), posebno se mora paziti da na pruzi nema odronjenog kamenja i na stanje kolosiječnog zastora. Ukoliko se zamijeti bilo kakvo oštećenje ili neispravnost potrebno je izvršiti sanaciju kako se ne bi došlo do smanjena sigurnosti u odvijanju prometa.

Pregled gornjeg ustroja pruge obuhvaća vizualni pregled, mjerenje i snimanje, a potrebno je provjeriti sve tehničke parametre željezničke pruge, od stanja tračnica, pragova, kolosiječnog zastora i ostalo.

Provjera stanja gornjeg ustroja željezničke pruge može se obavljati mjernim uređajima.

Mjerni uređaji mogu biti izvedeni kao:

- ručni mjerni uređaji
- željeznička vozila posebne namjene (mjerna vozila)

RUČNI MJERNI UREĐAJI

Ručni mjerni uređaji koriste se za provedbu svih važnijih mjerenja. Mjerni uređaji moraju biti izvedeni tako da se u što kraćem vremenu mogu ručno postaviti na kolosijek i isto tako nakon provedenog mjerenja skinuti s kolosijeka (slika 5 i slika 6). Također moraju biti izvedeni tako da se mogu lagano prenositi do mjesta primjene odnosno da budu izvedeni kao samoprevozivi.



Slika 5. Uređaj za mjerenje profila tračnice
uređaj(izvor:apps.unizg.hr)



Slika 6. Ručni mjerni uređaj

i geometrije kolosijeka(Građevinar 4/2014)

VOZILO ZA OBILAZAK PRUGE M24 UNIVERSAL

Vozilo za željezničke svrhe ruske proizvodnje "GAZ Volga" model "M24 Universal" koristi Sekcija ZOP-a (Sekcija za održavanje pruga) za redovni obilazak pruge te je prikazano na slici 7.To je klasična karavanska izvedba tvorničkog automobila, prilagođena za vožnju po tračnicama s dvije monoblok osovine, od toga jedna pogonska i to stražnja.

Umjesto starog 2.5 l motora sa 4 cilindra i 98 KS, zbog izrazito velike potrošnje, ugrađen je Mercedesov 4 cilindrični diesel motor iz serije 123. Okretanje se obavlja s dizalicom koja je učvršćena poprečno na sredini vozila. Vozilo ima 7 mjesta za sjedenje.



Slika 7. M24 Universal (zeljeznice.net)

TRAČNIČKO MJERNO VOZILO EM-120

Tračničko mjerne vozilo tehničko-mjernih karakteristika EM-120 izgradila je tvrtka Plasser&Theurer, a nalazi se u inventarnom parku Hrvatskih željeznica. Tračničko mjerne vozilo je šestosovinsko samohodno dizelsko motorno vozilo za posebne namjene u koje je ugrađena mjerna oprema za snimanje propisanih geometrijskih parametara kolosijeka te elektronička i računalna oprema za pohranu, prikaz i analizu snimljenih mjernih podataka.

Mjerne vozilo raspolaže s dva upravljačka mjesta i kolosijek je moguće mjeriti u oba vozna smjera. Uz svako upravljačko mjesto nalazi se posebna tipkovnica za ručno registriranje podataka važnih za obavljanje mjerenja (nailazak na skretnice, željezničko cestovni prijelaz, pružne građevine) i ispravak kilometarskoga položaja. Mjerenje se obavlja pomoću mjernih osovine postavljenih između osovinskih sklopova. Njihova stabilnost u kolosijeku ostvaruje se djelovanjem uspravnih i vodoravnih sila preko zračnoga sustava. U mjernom odjeljku

nalaze se mjerni stol i računalo. Mjerni stol sastoji se od uređaja za crtanje grafičkoga mjernog dijagrama i uređaja za ispis numeričkoga mjernog izvješća. Vozilo je opremljeno klima-uređajima koji održavaju stalnu temperaturu potrebnu za siguran rad računala i opreme.

Tračničkim mjernim vozilom tehničko-mjernih karakteristika EM-120 provjeravaju se sljedeći geometrijski parametri uporabnoga stanja kolosijeka:

- uzdužni profil vozni površina tračnica u kolosijeku (stabilnost kolosijeka),
- iskrivljenost ravnine kolosijeka,
- visinski odnos tračnica i nadvišenje vanjske tračnice kolosijeka u luku i
- smjer (zakrivljenost) tračnica u kolosijeku.

Slika 8. prikazuje tračničko mjerno vozilo EM-120.

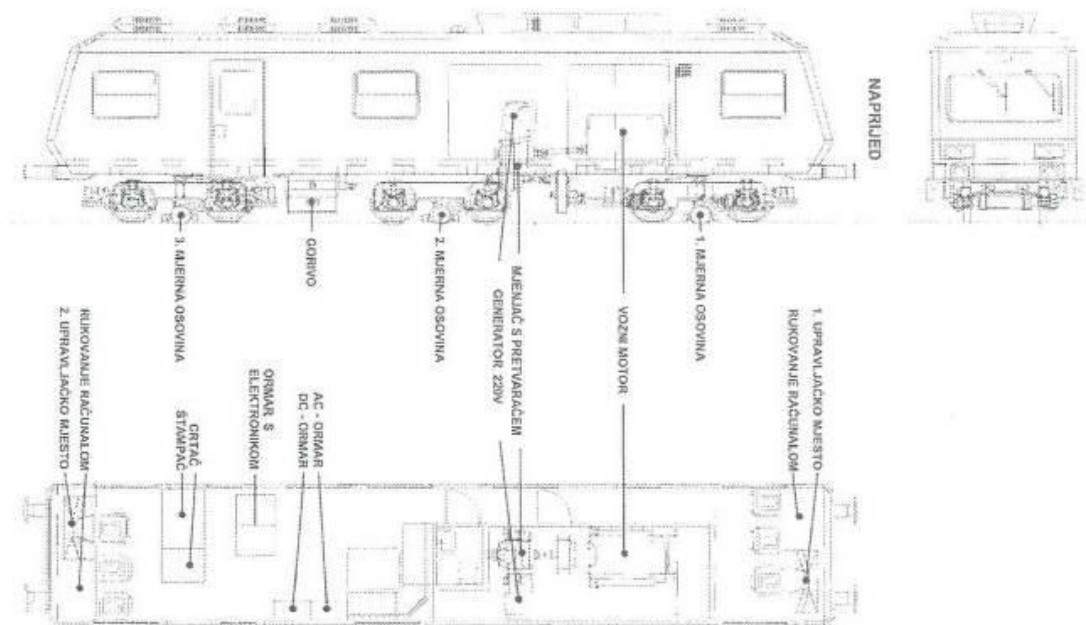


Slika 8. Tračničko mjerno vozilo EM-120

Tehničke karakteristike tračnickog mjernog vozila EM-120:

	Tračničko mjerno vozilo EM-120
ukupna masa	48,34 t
promjer vozni kotača	850 mm
promjer mjernih kotača	350,7 mm
snaga motora	368 kW
najveća mjerna brzina	120 km/h
najveća vozna brzina	120 km/h

Glavni dijelovi mjernog tračničkog vozila EM -120



GEOMETRIJSKI PARAMETRI UPORABNOGA STANJA KOLOSIJEKA I NAČIN MJERENJA

Tračničkim mjernim vozilom tehničko-mjernih karakteristika EM-120 provjeravaju se sljedeći geometrijski parametri uporabnoga stanja kolosijeka:

- uzdužni profil voznih površina tračnica u kolosijeku (stabilnost kolosijeka).
- iskrivljenost ravnine kolosijeka
- širina kolosijeka
- visinski odnos tračnica i nadvišenje vanjske tračnice kolosijeka u luku
- smjer (zakrivljenost) tračnica u kolosijeku

ANALIZA GEOMETRIJSKOGA UPORABNOG STANJA KOLOSIJEKA TRAČNIČKIM MJERNIM VOZILOM TEHNIČKO-MJERNIH KARAKTERISTIKA EM-120

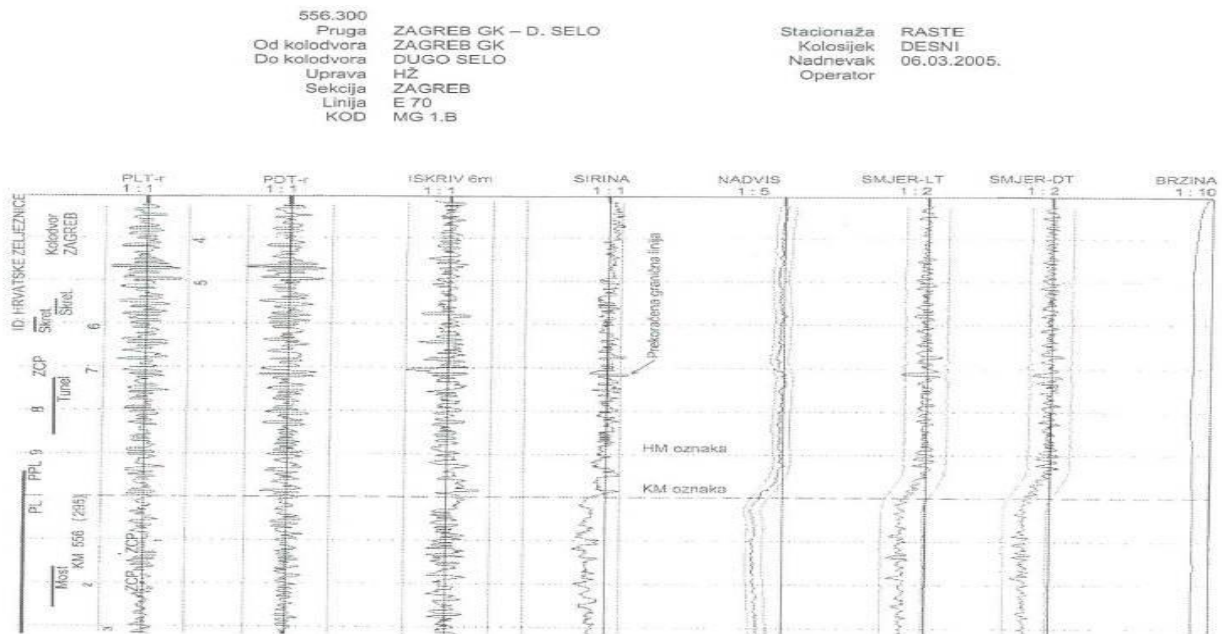
Tračničkim mjernim vozilom tehničko-mjernih karakteristika EM-120 obavlja se provjera i analiza geometrijskoga uporabnog stanja kolosijeka. Uporabno stanje pojedinih geometrijskih parametara kolosijeka provjerava se pomoću posebne namjenske mjerne opreme ugrađene u mjerno vozilo.

Rezultati provjere pohranjuju se i obrađuju u računalu i ispisuju u obliku mjernoga dijagrama (grafikona) i numeričkoga mjernog izvješća. (slika 9).

Mjerni dijagram jest grafički prikaz na kojemu se prikazuju sljedeći podatci i mjerne veličine na duljini pruge na kojoj je provjera obavljena :

- položaj lukova i prijelaznih lukova, skretnica, željezničko-cestovnih prijelaza, mostova, tunela i kolodvora.
- kilometarski položaj (stacioniranje) pruge
- uzdužni profil (stabilnost) lijeve tračnice u kolosijeku
- uzdužni profil (stabilnost) desne tračnice u kolosijeku iskrivljenost ravnine kolosijeka
- širina kolosijeka
- visinski odnos tračnica u kolosijeku (nadvišenje)
- smjer (zakrivljenost) lijeve tračnice u kolosijeku
- smjer (zakrivljenost) desne tračnice u kolosijeku mjerna brzina.

Zaglavlje mjernog dijagrama

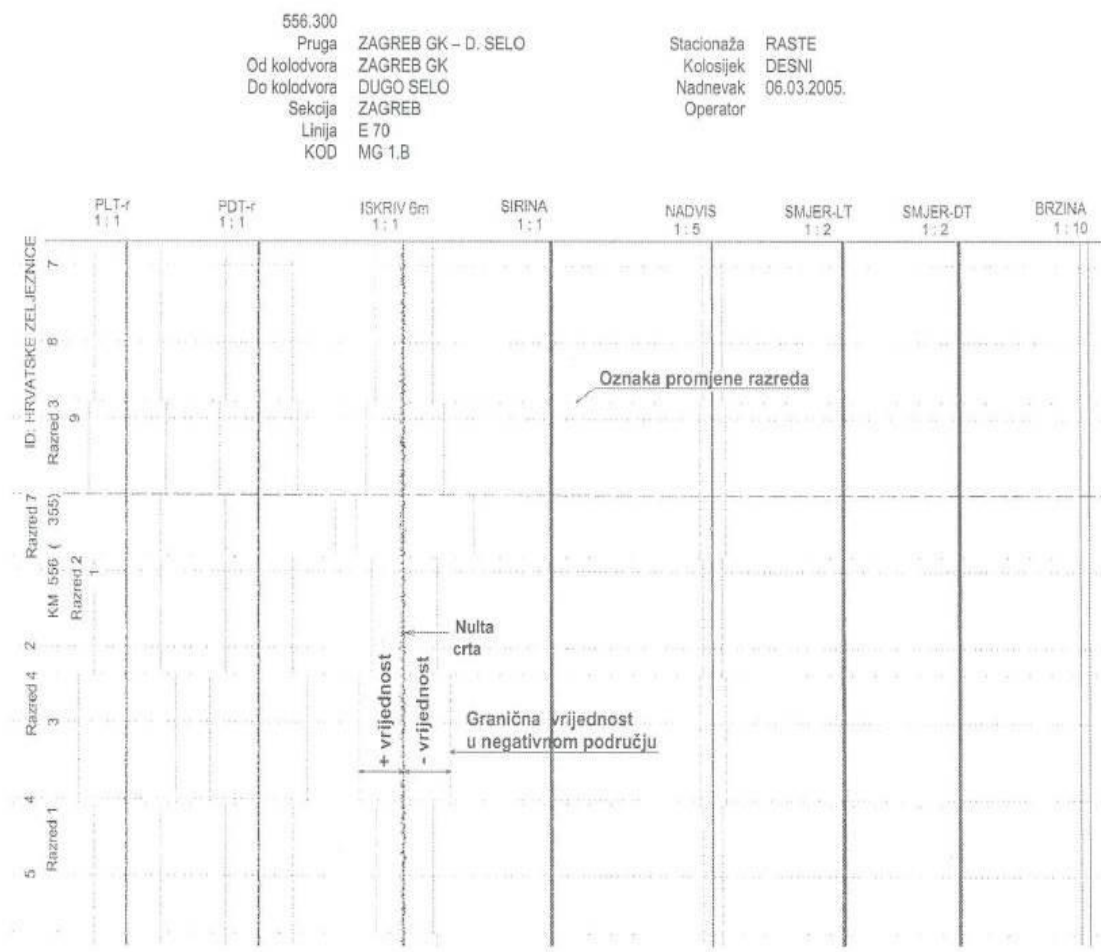


Slika 9. Mjerni dijagram

Mjerno vozilo ima dva upravljačka mjesta (1 . ili 2.) i mjerenje se može obavljati u oba vozna smjera. Položaj tračnica u kolosijeku i pravilan ispis položaja tračnice na mjernom dijagramu ovisi o položaju 1. ili 2. upravljačkoga mjesta u smjeru vožnje i postavlja se automatski u odnosu na kilometarski položaj (stacioniranje) u porastu ili u padu. Na dvokolosiječnim prugama položaj lijeve i desne tračnice uvijek se određuje u smjeru porasta kilometarskoga položaja.

Računalni program omogućuje unošenje promjena mjerodavnih dopuštenih graničnih vrijednosti geometrijskih parametara ovisno o kategoriji za provjeru i razreda brzina .(slika 10)

Prikaz promjena mjerodavnih dopuštenih graničnih vrijednosti



Slika 10. Mjerodavne granične vrijednosti

OBRTNIČKA I TEHNIČKA
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9. THE MEASUREMENT AND THE ANALYSIS OF RAILWAY INFRASTRUCTURE

SUMMARY

THE MEASUREMENT AND THE ANALYSIS OF RAILWAY INFRASTRUCTURE

The volume of the railway traffic, and the resulting axle weight as well as the introduction of faster trains increase leads to the substantial change in upper geometry of the track wear. Providing the need of the railway traffic safety, all those are the reasons why the necessary measurements of the railway infrastructure are required.

In order to do all the important measurements of the track geometry and measurements at the switch gears there exist different measuring devices which can generally be classified into two basic groups, that is, into manual measuring devices and the railway vehicles of the special purpose (measuring vehicles).

The best technical and technological solutions can be obtained by the use of the state-of-art measuring devices and instruments which can measure and analyse the most important parameters of the railway track – the upper and the lower structure and the contact network.

This paper will deal with the analysis of the upper architecture of the railway track elements which are subject to the most intensive wear and with the equipment used for the measurement and analysis of the obtained parameters.

Keywords: railway infrastructure, the measurements of the railway track condition, the architecture of the railway track, rails, M-24, Universal, EM-120

RAILWAY INFRASTRUCTURE – THE UPPER ARCHITECTURE OF THE RAILWAY TRACK

Railway infrastructure comprises upper and lower architecture of the railway, the objects situated by the railway, the railway station tracks, signaling and light equipment and facilities, electro-power equipment and plants, telecommunication equipment and facilities, railway area and air space.

The upper structure of the railway track is used for the movement of railway vehicles, and its main elements are the railway track (railway track is composed of rails, sleepers, ballast, connecting and fitting equipment) as well as switches.

The upper structure of the track is vital for the movement of the railway vehicle, so it is important to do repair and maintenance in order to increase railway traffic operation safety.

Rails

The basic use of rails is the direct running of the rail vehicle wheels. They overtake the load produced by the railway vehicle transmitting it onto the sleepers they are tightly connected to by the rail connecting and securing fittings.

There are three types of rails; Vignol's rail or the rail with a wide head (most commonly used), bridge rail and two-headed rail.

During the movement of the railway vehicles, the rails wear can be lateral or along their height. The height wear is the most intensive in the railways which run straight, while in those with a lot of bends the height wear is accompanied by lateral wear of the rails (figure 1.)

There are a few ways the inspection of the rail condition is performed:

- a. the inspection by the means of induction current – the determination of the depth in surface cracks on the rails,
- b. ultrasound inspection – the determination of irregularities inside the rail,
- c. the measurement of the cross-section – the measurement of the rail head which is used for the rail condition determination,

d. the measurement of the longitudinal waves – the identification of the rail head irregularities.



Figure 1. A worn-out rail.

Sleepers

Sleepers are firmly held by the tracks placed at a regular distance of 1435 mm. The width of the track represents the minimum distance between the inner edges of the rails measured at the place which is 14 mm below the upper edge of the rail head. The sleepers are mounted into tracks at the lateral distance of 60-75 cm.

The sleepers function is to transfer the track load onto the balast as effectively as possible, and in the track architecture where the ballast is not included, onto the object construction.

Sleepers can be wooden, concrete or steel, and in our country the most often used sleepers are those made of beech or oak wood. Considering the fact that wood is susceptible to rotting caused by the atmospheric conditions, the protection of sleepers is performed by the impregnation with creosote oil. In this way their lifespan can be prolonged. Sleepers can also crack, or better, cracks can appear on their surface. To prevent the occurrence of more substantial cracks, sleepers are often reinforced by flat steel fittings at their ends (Figures 2 and 3).



Figure 2. A cracked sleeper



Figure 3. A cracked sleeper

Wooden sleepers are recently being replaced by concrete ones which have the basic advantage of being more durable, while their main disadvantage is that they are not equally impact-resistant.

Ballast

Ballast is the element of the upper structure of the track and its basic role is to transfer the load of the vehicle it receives via the rails and sleepers onto the track body evenly and with elasticity. Track ballast must be constructed so that it can prevent longitudinal and horizontal movement of the track and, in this way, enable the track to have a regular position in its height and direction. Ballast should also ensure easy and quick drainage from the track during adverse weather conditions.

Ballast is usually made of stone chippings, and its thickness should be from 30 to 45 cm.

Track fitting and connecting means

The basic use of track fitting and connecting accessories is to connect the two rails, to prevent horizontal and longitudinal movement of the rails and fix them onto the understructure they are placed on. Track accessories include rail track nails, sleepers bolts, railway bearing wedge-shaped plates, elastic rail clips, and elastic compressive plates. (Figure 4).



Figure 4. Railway fittings

RAILWAY TRACK INSPECTION

The visual inspection of railway track, that is, the inspection of upper and lower structure of the track, infrastructure and facilities situated by the railway is of utmost importance. It is necessary to inspect all the parts of the railway track: rails, the connections at the rails joints, sleepers, the condition of the fittings (bolts), and particularly if there is any rock slides on the track, as well as what condition of the ballast is. If any damage or irregularity is noticed, it is necessary to do a repair in order to avoid a decreased traffic operation security.

The inspection of the upper structure of the track includes a visual inspection, measurements and recordings, and it is also necessary to check all the technical parameters of the railway track, from the rails, sleepers, ballast to all other parts.

The inspection of the upper structure can be done by measuring devices. Measuring devices can be listed into two categories:

- manual measuring devices
- railway vehicles of a special use (track survey cars)

MANUAL MEASURING DEVICES

Manual measuring devices are used for all the important measurements. Measuring devices should be constructed in a way which enables their manual installation onto the track as quickly as possible, and their fast removal after the performed measurements (Figure 5 and Figure 6) They should also be constructed in a way that enables their easy transport to the place of their application, that is, to be self-transporting.

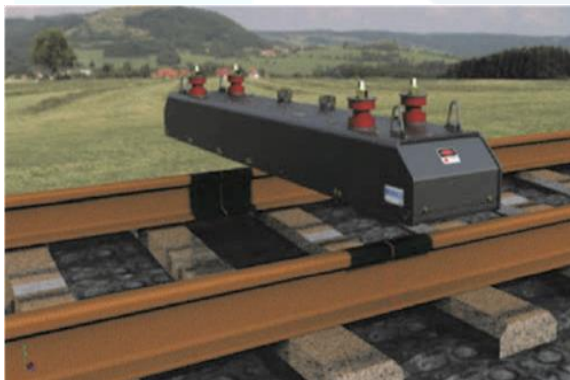


Figure 5.The instrument for track profile and the geometry of the track measurement (Građevinar 4/2014)

Figure 6.Manual measuring instrument (Source:apps.unizg.hr)

TRACK SURVEY CAR M24 UNIVERZAL

The track survey car made in Russia called "GAZ Volga", model "M24 Universal", shown in Figure 7, is used by the ZOP Section (The Section for railway maintenance) for the regular inspection of railway track. It is a classic caravan modification of a factory-made car, adapted for riding along the track with two monoblock axles, one of which, the rear one, is a driving axis. Instead of the old 2.5-litres, 4-cylindre, 98 HP engine it has much more economical Mercedes 4-cylindre engine of the series 123. Turning is performed by the crane fixed across, in the middle of the vehicle. The vehicle has 7 seats.



Figure 7. M24 Universal (zeljeznice.net)

EM-120 TRACK SURVEY CAR

The track survey car with technical measuring characteristics EM-120 was made by Plasser&Theurer company, and it constitutes the part of Croatian railway inventory. The track survey car is a self-propelled, six-axles, diesel motor car for special purposes which incorporates measuring instruments for recording regulated geometric parametres of the track and electronic and computing equipment for storing, display and the analysis of the recorded measuring data. Track survey car has two control panels so that it is possible to inspect the track in both riding directions. Each control pannel has a special keyboard for the manual entering of data which are important for measuring performance (approaching switches, railway-road crossing, railway buildings) and for correction of the kilometre position.

Measurements are performed by measuring axles mounted between axes assembly. Their stability inside the track is achieved by horizontal and vertical forces produced by the air system. In the measuring section there are a measuring desk and a computer. The measuring desk consists of the instrument used for the drawing of graphic measuring diagram and the instrument for the printout of the numerical measuring report. The vehicle is equipped by air-condition which maintains a constant temperature required for the safe functioning of the computer and other instruments.

Track survey car with the technical measuring characteristics EM-120 controls the following geometric parameters of the operational condition of the track:

- a longitudinal profile of the running surface of the rails inside the track (track stability),
- the twist of the track surface
- the elevation range of the rails and the height of the outer track in the curve and
- the direction (curvature) of the rails in the track

Figure 8. shows the track survey car EM-120



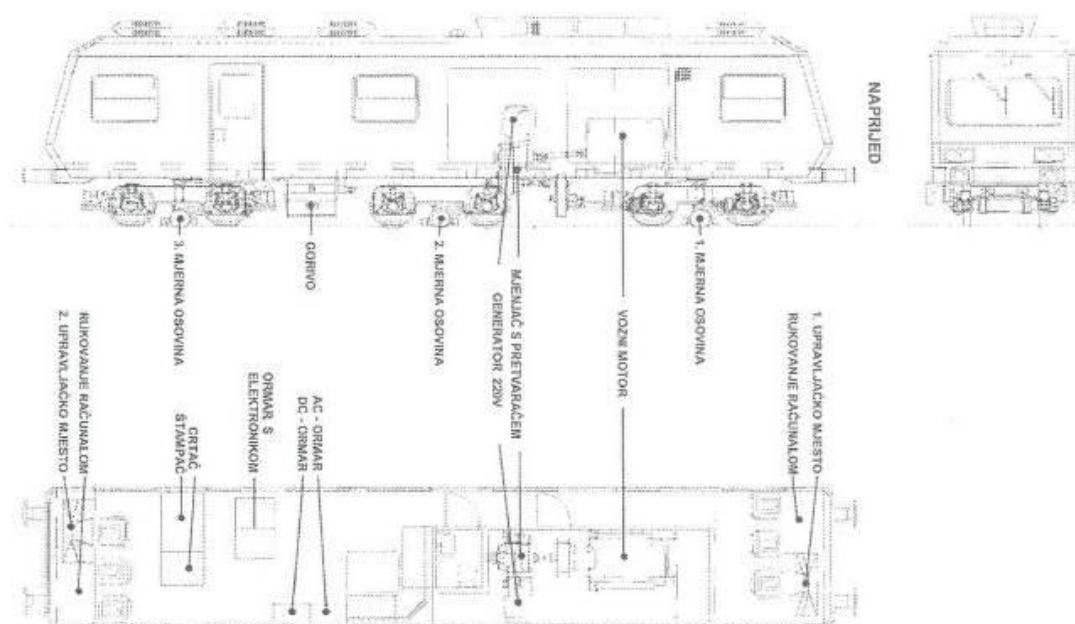
Figure 8. Track survey car EM-120

The technical characteristics of the Track survey car EM-120:

	Track survey car EM-120
Total mass	48,34 t
The diametre of the driving wheels	850 mm
The diametre of the measuring wheels	350,7 mm
Engine power	368 kW
The highest measuring speed	120 km/h

The highest driving speed	120 km/h
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The main parts of the Track survey car EM-120



Translation of the terms in the figure above (from upper right to bottom left): front, 1. measuring axis, driving engine, measuring instrument with the converter, generator 220V, 2. measuring axis, fuel, 3. measuring axis, computer operating, 2. control point, drawing device, printer, the cabinet with electronic equipment, AC-cabinet, DC-cabinet, 1. control point, computer operating

THE GEOMETRIC PARAMETRES OF THE USING CONDITION OF THE TRACK AND THE MODES OF ITS MEASURING

Track survey car with the mechanical measuring characteristics EM-120 checks the following geometric parametres or the using condition of the track:

- a longitudinal profile of the running surface of the rails inside the track (track stability)
- the twist of the track surface
- the width of the track
- the elevation range of the rails and the height of the outer track in the curve
- the direction (curvature) of the rails in the track

THE ANALYSIS OF THE GEOMETRIC USING CONDITION OF THE TRACK BY THE TRACK SURVEY CAR WITH THE TECHNICAL MEASURING CHARACTERISTICS EM-120

The track survey car with the technical measuring characteristics EM-120 is used for the inspection and analysis of geometric using condition of the track. The using condition of particular geometric parameters of the track is checked by a special measuring instruments incorporated into the surveying car.

The results of the inspection are stored and processed in the computer and printed out in the form of a measuring diagram (graph) and a numerical measuring report (Figure 9).

Measuring diagram is a graphic image which shows the following data and measuring units along the track where this inspection is done:

- the position of arcs and transitional arcs, switches, railway-road crossings, bridges, tunnels and railway stations.
- the kilometre position (stationing) of the railway
- the longitudinal profile (stability) of the left rail in the track
- the longitudinal profile (stability) of the right rail in the track
- the twist of the track surface
- track gauge
- the elevation range of the rails in the track (cant)

- the direction (twist) of the left rail in the track
- the direction (twist) of the right rail in the track smjer (zakrivljenost)
- measuring speed.

Measuring diagram header

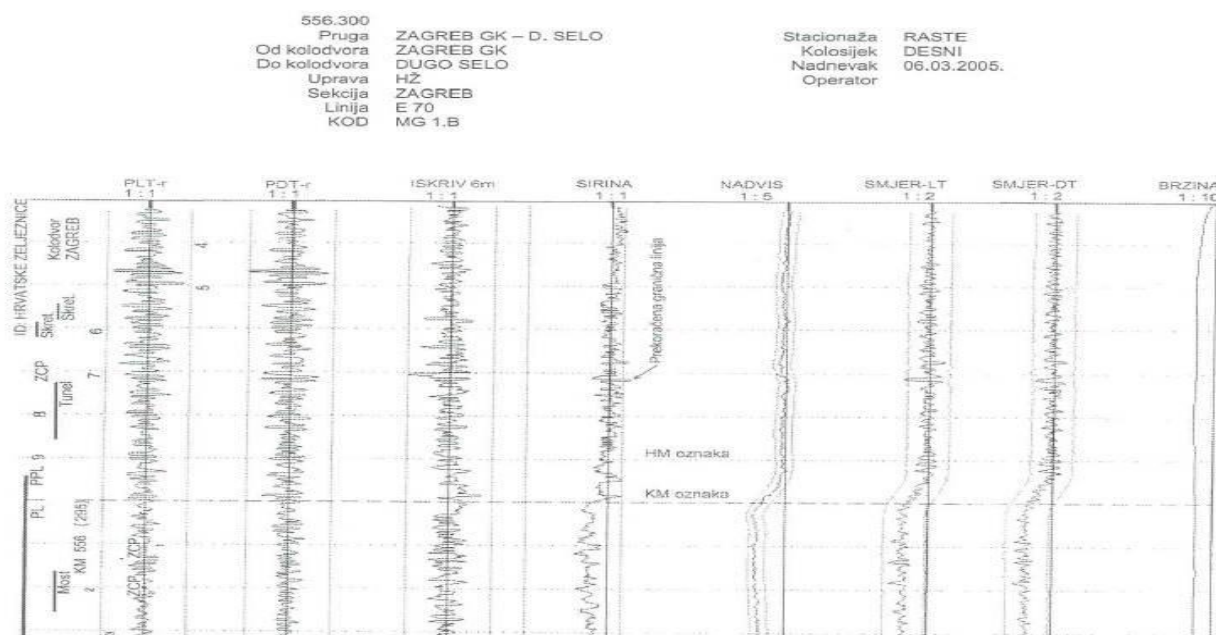


Figure 9. Measuring diagram

The track survey car has two command places (1. and 2.) and the measurements can be done in both directions. The position of the rails in the track and the proper print-out of the rails position in the measuring diagram depend on the position of the 1. and 2. command place in the running direction and it is set automatically in relation to the increasing or decreasing kilometre position (stationing). In two-track railways the position of left or right rail is always determined in the direction of the increased kilometre position.

The computer programme enables entering the changes of the current limit values of the geometruc parametres, depending on the category of the speed classes (Figure 10.)

The image of the changes in the current maximum limit values

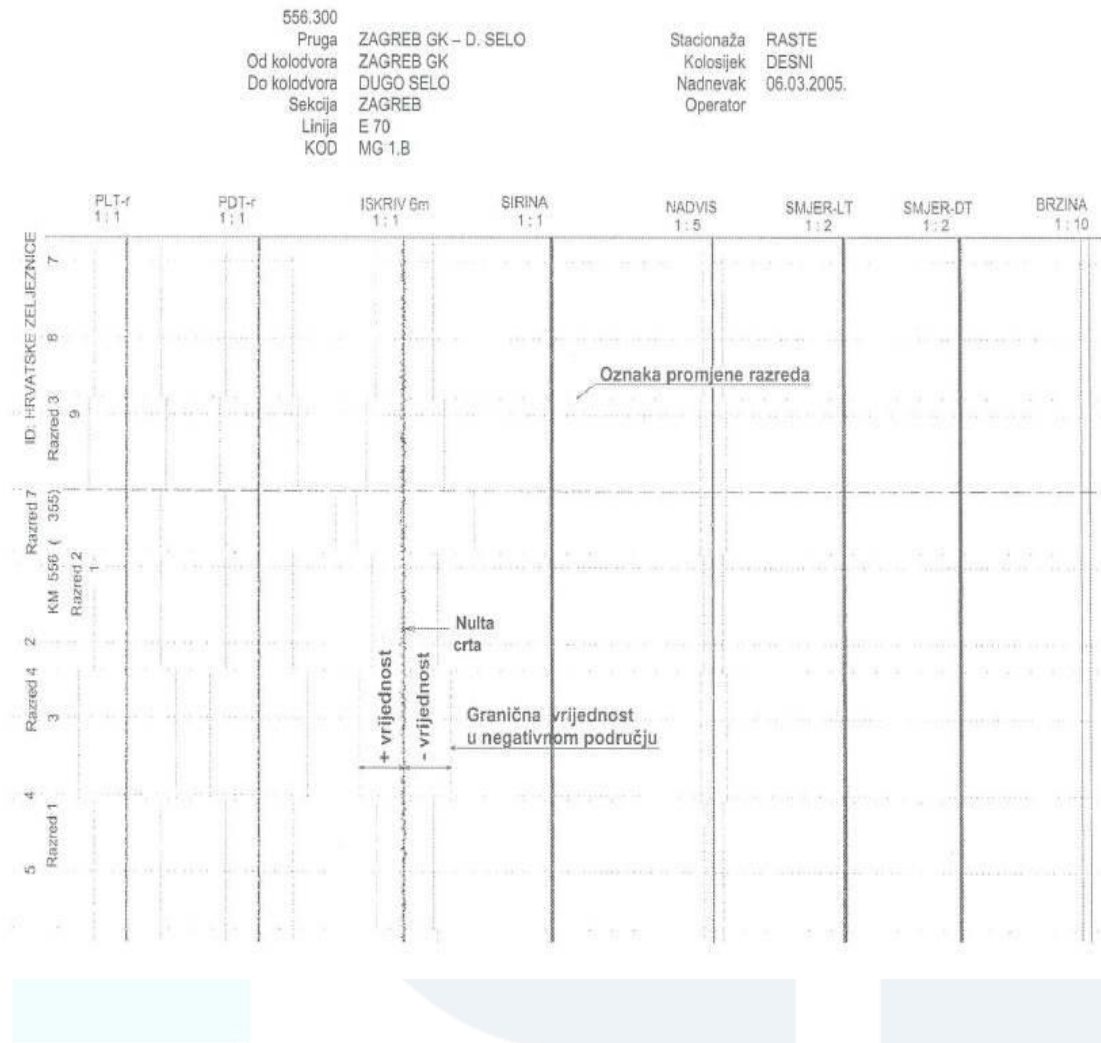


Figure 10. Current limit values



Avtor:

Rajko PALČAR
diplomirani inženir tehnologije
prometa

10.VOZNIKI TOVORNIH VOZIL IN PROMETNA VARNOST

POVZETEK

V EU vsako leto v prometnih nesrečah umre pri opravljanju svojega dela približno 800 voznikov tovornih vozil, kar poklic voznika uvršča med zelo nevarne poklice. Vsi zaposleni, vključno z vozniki tovornih vozil v cestnem tovornem prometu, imajo pravico do varnega in zdravega delovnega okolja. Poznavanje delovnega okolja, vzrokov in posledic prometnih nesreč je ključno za ozaveščanje voznikov o nevarnosti, ki so jim pri svojem delu izpostavljeni.

Prometne nesreče povzročajo ogromno gospodarsko škodo za celotno družbo, prav tako pa prevoznim podjetjem povzročajo dodatne stroške pri poslovanju. Prav tako imajo prometne nesreče z udeležbo tovornih vozil vpliv na negativen odnos družbe do transporta kot gospodarske dejavnosti, saj so posledice teh prometnih nesreč res tragične.

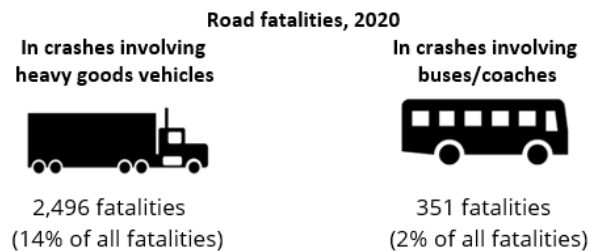
Vsi subjekti, ki so na kakršenkoli način vpeti v organizacijo prevoza tovora in potnikov si morajo prizadevati za zmanjšanje kakršnihkoli tveganj, ki imajo lahko negativne posledice na vozilo, voznika ali okolje. Pri načrtovanju ukrepov za zmanjšanje števila prometnih nesreč je pomembno poznavanje trenutnega stanja na področju prometne varnosti. Zaradi primerjave, sem v delo vključil tudi podatke in primerjave za voznike avtobusov, saj se veliko voznikov tovornih vozil odloči, da se vključijo tudi v organizirane oblike prevoza potnikov zaradi boljših pogojev dela.

Glavni vir podatkov pri pripravi prispevka je CARE (zbirka podatkov Skupnosti o nesrečah na cestah v Evropi).

KLJUČNE BESEDE: smrtne žrtve, prometne nesreče, poklicni vozniki, prometna varnost.

1. UDELEŽBA POKLICNIH VOZNIKOV V PROMETNIH NESREČAH V EU

Avtobusi in težka tovorna vozila se ne razlikujejo le glede na njihov »tovor« (prevoz potnikov oziroma tovora), ampak tudi glede na lokacijo, kjer se običajno vozijo, tj. težka tovorna vozila v mestnih območjih vozijo manj pogosto kot avtobusi. Obema vrstama vozil pa je skupno dejstvo, da so skupne mase vozil zelo velike, kar ima bistven vpliv na posledice prometnih nesreč v katere so vpletena. Pri dejstvih, ki bodo predstavljena v nadaljevanju se kot težko tovorno vozilo smatra tovorno vozilo nad 3.5 tone z zahtevano C in E kategorijo in avtobusi, ki imajo poleg voznika več kot 16 sedežev.



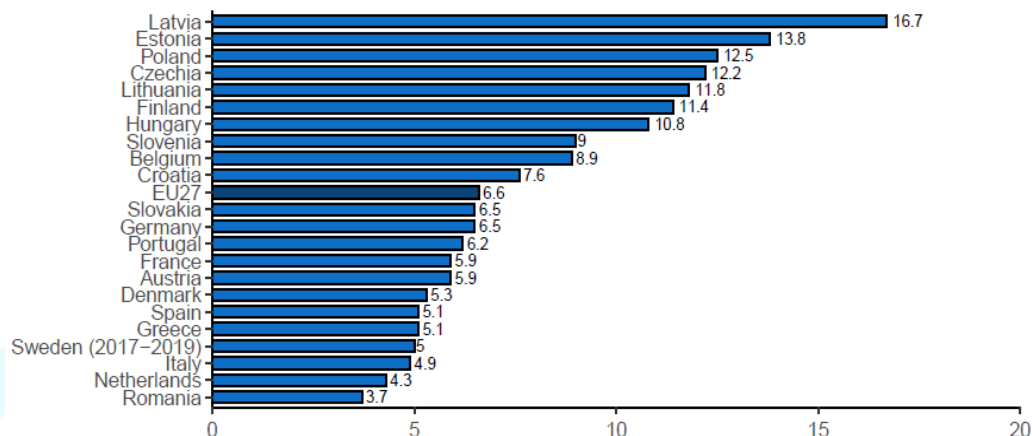
Slika 1: Prikaz števila žrtev prometnih nesreč z udeležbo težkih tovornih vozil in avtobusov

Od vseh smrtnih žrtev na cestah v EU leta 2020 jih je 14 % oz. 2.496 umrlo v nesreči z udeležbo težkega tovornega vozila in pa 351 žrtev oz. 2% v prometni nesreči z udeležbo avtobusa. Ta delež je med letoma 2011 in 2020 glede prometnih nesreč v katerih je bilo udeleženo težko tovorno vozilo ostal skoraj nespremenjen, vendar se je nekoliko zmanjšalo za nesreče v katere je bil vpleten avtobus.

Prikaz smrtnih žrtev v nesrečah težkih tovornih vozil ni bil enak v vseh državah članicah EU. Pri kazalniku »smrtnosti« sta dve baltski državi (tj. Latvija in Estonija) dosegli najslabši rezultat glede smrtnih žrtev, skupaj s Poljsko, Češko, Litvo in Finsko (ki je na splošno ena boljših in uspešnejših držav članic v smislu relativnega števila smrtnih žrtev v cestnem prometu). Kar se tiče smrtnih žrtev pri prometnih nesrečah z udeležbo avtobusov se je iskazalo, da so nekoliko manj uspešne države članice iz vzhodne Evrope, tako po umrljivosti med poklicnimi vozniki, kot po deležu v skupnem številu umrlih.

V nesrečah, v katerih so bila udeležena težka tovorna vozila je bilo samo 12 % smrtnih žrtev voznikov samih. Delež ranljivih udeležencev v prometu (tj. skupno število pešcev, kolesarjev in motornih dvokolesnikov) je bilo razmeroma nizko (29 % v nesrečah težkih tovornih vozil) v primerjavi s trki v prometnih nesrečah, v katerih je bil udeležen avtobus, in prometnih nesreč, v katerih je bil udeležen avtomobil, vendar je bil delež voznikov avtomobilov in tovornjakov pod 3,5 tone relativno visok. V prometnih nesrečah voznikov avtobusov je bilo 18 % smrtnih žrtev voznikov v avtobusih. Pri prevozu potnikov se pojavlja zelo veliko število prometnih nesreč z udeležbo pešcev, kar je posledica dejstva, da se vozila za prevoz potnikov gibljejo po urbanih območjih, kjer je prisotno večje število pešcev in ostalih ranljivih skupin.

Število smrtnih ųrtev na milijon prebivalcev v nesrečah teųkih tovornih vozil je največje v baltskih drųzavah (tj. Latvija in Estonija), Poljska, Češka, Litva in Finska.



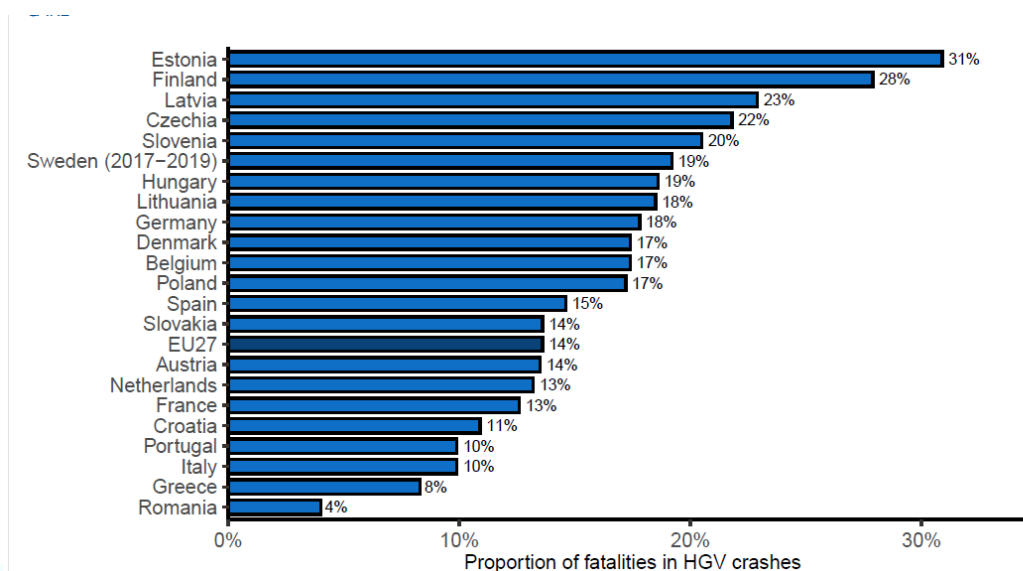
Slika 2: Število smrtnih ųrtev na milijon prebivalcev v nesrečah teųkih tovornih vozil po drųzavah v EU27 (2018–2020). Vir: CARE, EUROSTAT

Opombe:

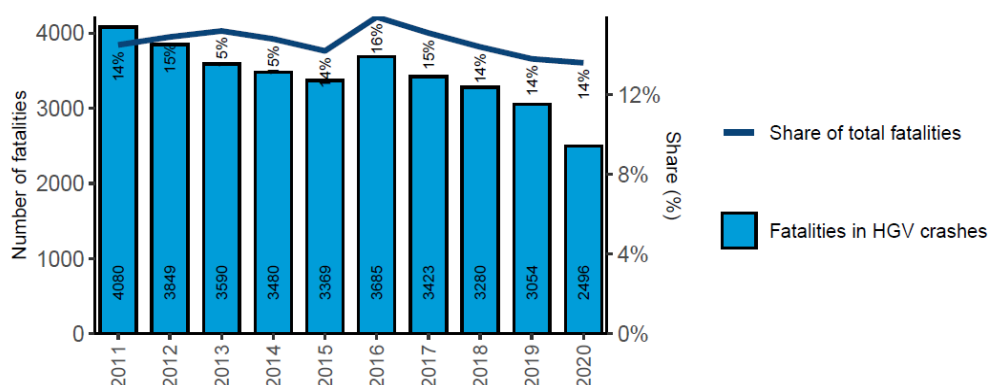
- Drųzave, ki niso vključene v številke, so Bolgarija, Ciper, Irska, Luksemburg in Malta, ker imajo te drųzave manjkajoče vrednosti v časovni vrsti 2010–2019 ali zaradi majhnih števil.
- Za Švedsko je uporabljeno časovno obdobje 2017–2019

Smrtnost v prometnih nesrečah teųkih tovornih vozil je pomemben kazalnik, vendar ne upošteva razlike v splošnem stanju prometne varnosti v različnih drųzavah. Z drugimi besedami, da je možno, da je smrtnost za posamezne tipe udeleųencev v prometu razmeroma visoka, ne odraųa pa prometne varnosti celotne drųzave. Zato je pomembno pogledati tudi deleų smrtnih ųrtev v prometnih nesrečah in nesrečah teųkih tovornih vozil v skupnem številu smrtnih ųrtev na cestah.

Tako kot pri stopnji smrtnosti je tudi deleų smrtnih ųrtev v nesrečah teųkih tovornih vozil enak najvišja na vzhodu in severu EU. Baltske drųzave so še vedno med najslabšimi glede prometne varnosti. Finska, ki se uvršča med najuspešnejše drųzave na področju varnosti v cestnem prometu, ima še posebej visok deleų smrtnih ųrtev, ki vključujejo prometne nesreče z udeleųbo teųkih tovornih vozil.



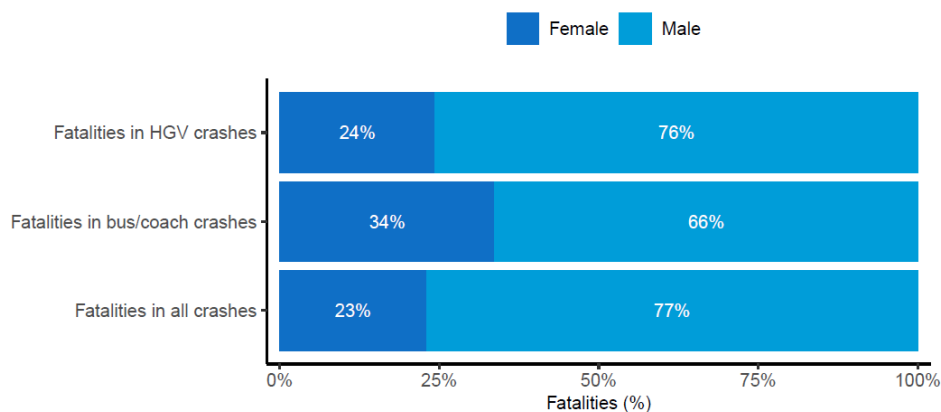
Slika 3: Letno število smrtnih žrtev v nesrečah težkih tovornih vozil in njihov delež v skupnem številu smrtnih žrtev v EU 27 po državah (2011-2020). Vir: CARE



Slika 4: Letno število smrtnih žrtev v nesrečah težkih tovornih vozil in njihov delež v skupnem številu smrtnih žrtev v EU 27 (2011-2020). Vir: CARE

2. SMRTNE ŽRTVE V PROMETNIH NESREČAH PO SPOLU

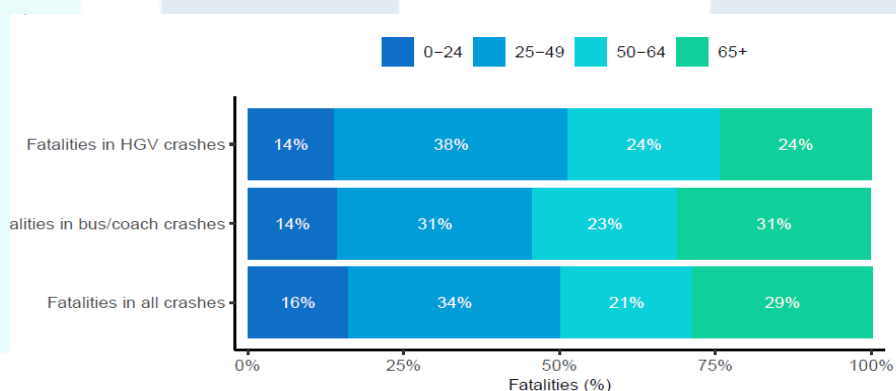
Kar 77 % vseh smrtnih žrtev prometnih nesreč v EU je moških. Bolj ali manj enak je delež moških (76%) pri smrtnih žrtvah v nesrečah težkih tovornih vozil, kjer so vozniki pretežno moški. V prometnih nesrečah pri prevozu potnikov je odstotek moških nekoliko nižji in znaša 66 %, kar je po eni strani mogoče pojasniti z enakomernejšo porazdelitvijo moških in žensk med potniki v avtobusih. Po drugi strani pa se avtobusi gibljejo večinoma po urbanih območjih, kjer predvsem trčijo v pešce, ki pa so prav tako enakomerno razporejeni po spolu.



Slika 5: Porazdelitev smrtnih ųrtev po spolu v nesrečah teųkih tovornih vozil, prometnih nesrečah avtobusov in vseh prometnih nesrečah v EU 27 (2018–2020). Vir: CARE

3. UMRLI V PROMETNIH NESREČAH GLEDE NA STAROST

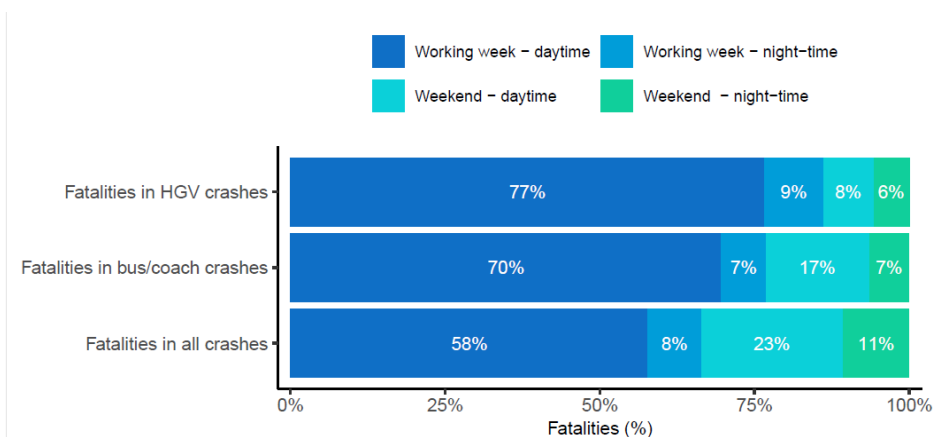
Porazdelitev števila smrtnih ųrtev v prometnih nesrečah in nesrečah teųkih tovornih vozil po razliĳnih starostnih kategorijah se bistveno ne razlikuje od starostne porazdelitve smrtnih ųrtev na splošno. Zaznati je razmeroma visoko število smrtnih ųrtev v starostnem obdobju srednjih let (25-64 leti) v nesrečah teųkih tovornih vozil, ki je 62 %, v primerjavi s 55 % vseh smrtnih ųrtev. To je mogoĳe vsaj delno razloųiti z dejstvom, da veliko voznikov teųkih tovornih vozil spada v to starostno kategorijo. V primerjavi s splošno starostno porazdelitvijo smrtnih ųrtev je deleų starejših od 65 let med smrtnimi ųrtvami v nesrečah teųkih tovornih vozil nekoliko niųji. To je povezano z dejstvom, da teųka tovorna vozila povzroĳijo veliko smrtnih ųrtev pri trkih z drugimi vozili na avtocestah in dejstvo, da so starejši udeleųenci manj zastopani na avtocestah, ker niso del delovno aktivnega prebivalstva.



Slika 6: Porazdelitev smrtnih ųrtev po starostni kategoriji v nesrečah teųkih tovornih vozil, prometnih nesrečah in vseh prometnih nesrečah v EU27 (2018–2020). Vir: CARE

4. DELOVNI TEDEN PROTI VIKENDU

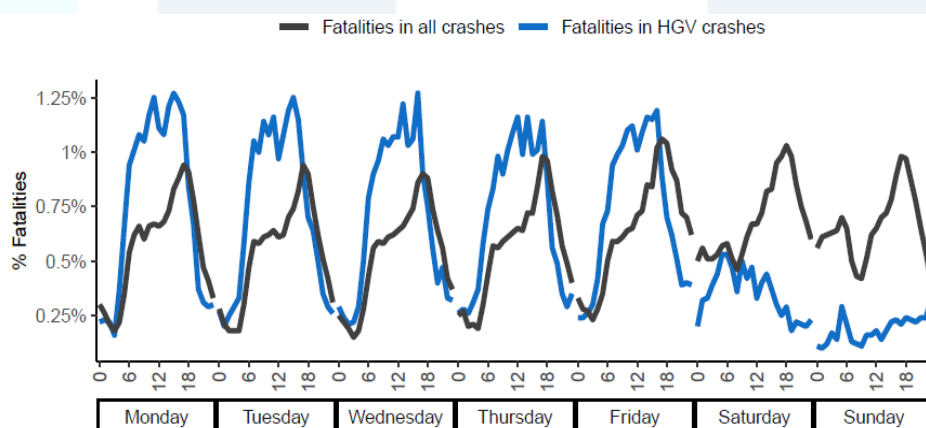
Delež smrtnih žrtev na cestah med delovnim tednom je v obdobju 2018–2020 znašal 66%. Delež smrtnih žrtev med delovnim tednom je višji pri prometnih nesrečah težkih tovornih vozil in avtobusov, kot za vse smrtne žrtve na cestah na splošno. Kar 86 % vseh smrtnih žrtev je nastalo v prometnih nesrečah težkih tovornih vozil in 77 % smrtnih žrtev v avtobusnih nesrečah v časovnem obdobju 2018–2020 med delovnim tednom.



Slika 7: Porazdelitev smrtnih žrtev glede na obdobje v tednu v nesrečah težkih tovornih vozil, prometnih nesrečah in vseh prometnih nesrečah v EU27 (2018-2020). Vir: CARE

5. DAN V TEDNU IN URA NASTANKA PROMETNE NESREČE

Porazdelitev smrtnih žrtev po urah v tednu je precej drugačna za smrtne žrtve v nesrečah težkih tovornih vozil, kot za vse smrtne žrtve na cestah skupaj. V primerjavi z vsemi smrtnimi žrtvami na cestah skupaj, smrtne žrtve, kot posledica prometnih nesreč težkih tovornih vozil nastanejo pogosteje med delovnimi dnevi med 7.00 in 18.00. Nasprotno pa so manj pogosto ponoči in med vikendi.

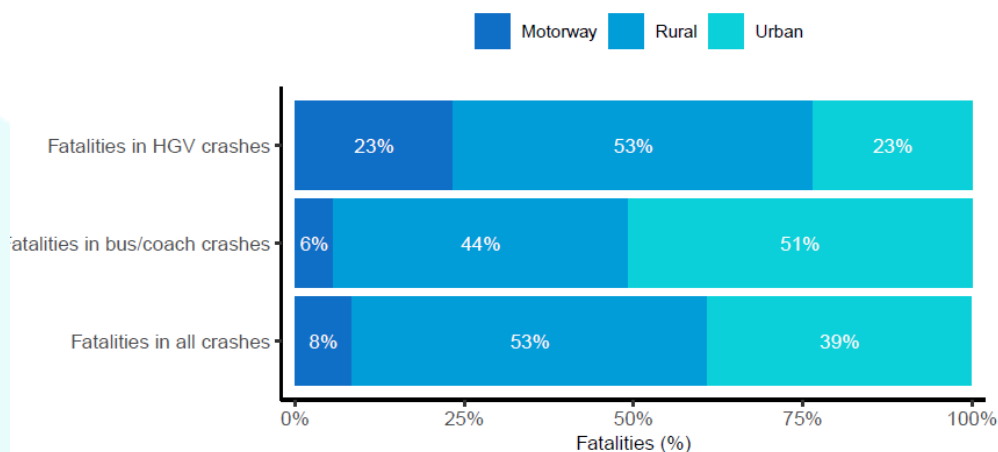


Slika 8: Porazdelitev smrtnih žrtev glede na dan v tednu in uro v nesrečah težkih tovornih vozil v EU27 (2016–2020). Vir: CARE

Zgornja slika prikazuje porazdelitev števila smrtnih žrtev v prometnih nesrečah na ure v tednu. Med delovnim tednom opazimo jutranji in večerni vrh smrtnih žrtev avtobusov. Ta dva vrha sta bolj izrazita kot pri smrtnih žrtvah težkih tovornih vozil in pri vseh smrtnih žrtvah skupaj. V primerjavi s težkimi tovornimi vozili je verjetneje, da bodo avtobusi vozili v mestnih območjih, kjer prevažajo potnike in lahko tudi trčijo z vozniki ostalih vozil. Kot pri trkih težkih tovornih vozil, vidimo relativno manj smrtnih žrtev ponoči in med vikendi.

6. VRSTA CESTE

Podeželske ceste predstavljajo površine 53 % vseh smrtnih žrtev v nesrečah težkih tovornih vozil, avtoceste 23 % in mestne ceste 23 %. Skoraj enak delež smrtnih žrtev je v prometnih nesrečah avtobusov v mestnem in prometu na cestah izven naselij (44 % oz. 51 % v 2018). Delež na avtocestah je razmeroma majhen, 6 % v Sloveniji za časovno obdobje 2018-2020.



Slika 9: Porazdelitev smrtnih žrtev glede na vrsto ceste v nesrečah težkih tovornih vozil, prometnih nesrečah in vseh prometnih nesrečah v EU27 (2018–2020). Vir: CARE

7. ZAKLJUČEK

Poklic voznika je deficitaren in zanimanja med mladimi za ta poklic praktično ni. Kot enega ključnih razlogov za to je dejstvo, da je cesta zelo agresivno delovno okolje, kjer so vozniki pri svojem delu izpostavljeni velikim nevarnostim, da se poškodujejo, zbolijo ali celo izgubijo življenje.

Izboljšanje varnosti v cestnem prometu je tako temelj za izboljšanje pogojev za delo voznikov. Tehnologija in varnostni sistemi, vgrajeni v sodobna tovorna vozila veliko pripomorejo k zmanjšanju poškodb ali smrti v prometu, ko je v nesrečo udeleženo tovorno vozilo ali avtobus. Vendar je za izboljšanje varnosti ključno znanje vseh deležnikov, ki na kakršenkoli način sodelujejo pri načrtovanju in izvedbi transportnih procesov.

Kot je razvidno iz predstavljenih dejstev se prometna varnost na območju EU izboljšuje. Na izboljšanje varnosti v cestnem prometu v predstavljenem obdobju je vplivala tudi svetovna pandemija COVID-19. Obseg prometa je med pandemijo močno upadel, kar je imelo za posledico manjše število prometnih nesreč in manjše število smrtnih žrtev.

V primerjavi z vsemi smrtnimi žrtvami po celotni EU so izstopale smrtne žrtve z udeležbo težkih tovornih vozil in avtobusov na naslednje načine:

- smrtni primeri so bili pogostejši podnevi in med delovnim tednom,
- smrtnih žrtev v prometnih nesrečah težkih tovornih vozil je bilo pogosteje na avtocestah, medtem, ko je bilo več smrtnih žrtev v nesrečah avtobusov pogosteje v urbanih okoljih.

Dolgoročni cilj je odpraviti vse vzroke hudih in smrtnih nesreč na evropskih cestah. Za doseg tega cilja je pomembno zavedanje, da smo vsi udeleženci v prometu odgovorni, ker s svojimi dejanji in zgledi v vsakdanjem življenju pomembno vplivamo na varnost v cestnem prometu.

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10. TRUCK DRIVERS AND TRAFFIC SAFETY

ABSTRACT

Every year in the EU, approximately 800 truck drivers die in traffic accidents while performing their work, which makes the driving profession one of the most dangerous professions. All employees, including truck drivers in road freight transport, have the right to a safe and healthy working environment. Knowledge of the work environment, the causes and consequences of traffic accidents is the key to making drivers aware of the dangers they are exposed to in their work.

Traffic accidents cause enormous economic damage to the entire society, and they also cause additional costs to transport companies in their operations. Traffic accidents involving trucks also have an impact on society's negative attitude towards transport as an economic activity, as the consequences of these traffic accidents are truly tragic.

All entities involved in any way in the organization of cargo and passenger transport must strive to reduce any risks that may have negative consequences for the vehicle, the driver or the environment. When planning measures to reduce the number of traffic accidents, it is important to know the current situation in the field of traffic safety. For the sake of comparison, I also included data and comparisons for bus drivers, as many truck drivers decide to join organized forms of passenger transport for better working conditions.

The main source of data for the preparation of the contribution is CARE (Community data collection on road accidents in Europe).

KEY WORDS: fatalities, traffic accidents, professional drivers, traffic safety

1. PARTICIPATION OF PROFESSIONAL DRIVERS IN TRAFFIC ACCIDENTS IN THE EU

Buses/coaches and heavy goods vehicles (HGV) differ not only with respect to their “cargo” (transport passengers and freight respectively) but also with respect to the location where they usually drive, i.e., heavy goods vehicles drive less often in urban areas than buses/coaches. Both types of vehicles, on the other hand, have in common that the consequences of a collision are often serious for the victim due to the mass of these vehicles.

In terms of the facts that will be presented below, a heavy truck is considered a truck over 3.5 tons with the required C and E category and buses that have more than 16 seats in addition to the driver.

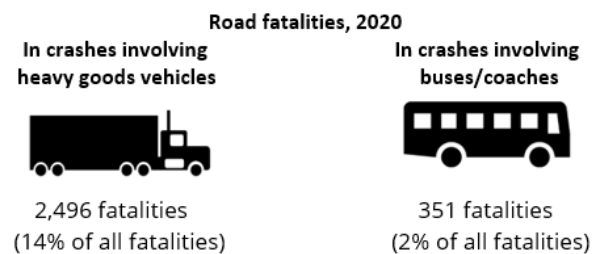


Figure1: Display of the number of victims of traffic accidents involving heavy goods vehicles and buses.

Of all road fatalities in the EU in 2020, 14% and 2% respectively died in a crash involving an HGV or a bus/coach. This proportion has remained virtually stable between 2011 and 2020 for crashes involving an HGV but has decreased slightly for crashes involving a bus/coach.

The pattern of fatalities in HGV crashes was not the same in all EU Member States. Based on the “mortality” indicator, two Baltic States (i.e., Latvia and Estonia) scored worst in terms of HGV fatalities, along with Poland, Czechia, Lithuania and Finland (which is generally one of the better performing Member States in terms of the relative number of road fatalities). As far as fatalities in bus/coach crashes were concerned, the problem generally appeared to be more important in Eastern Europe, both in terms of mortality and in terms of the share in the total number of fatalities.

In crashes involving heavy goods vehicles, only 12% of fatalities were the occupants of the HGV themselves. The proportion of vulnerable road users (i.e., the total number of pedestrians, cyclists and powered two-wheelers) was relatively low (29% in HGV crashes) compared to crashes involving a bus/coach and crashes involving a car, but the proportion of occupants of passenger cars and lorries under 3.5 tons was relatively high. In bus/coach crashes, 18% of the fatalities were the passengers in the buses/coaches themselves. Pedestrians were also overrepresented among those killed in such crashes.

The number of fatalities per million inhabitants in HGV crashes is highest in the Baltic States (i.e., Latvia and Estonia), Poland, Czechia, Lithuania and Finland.

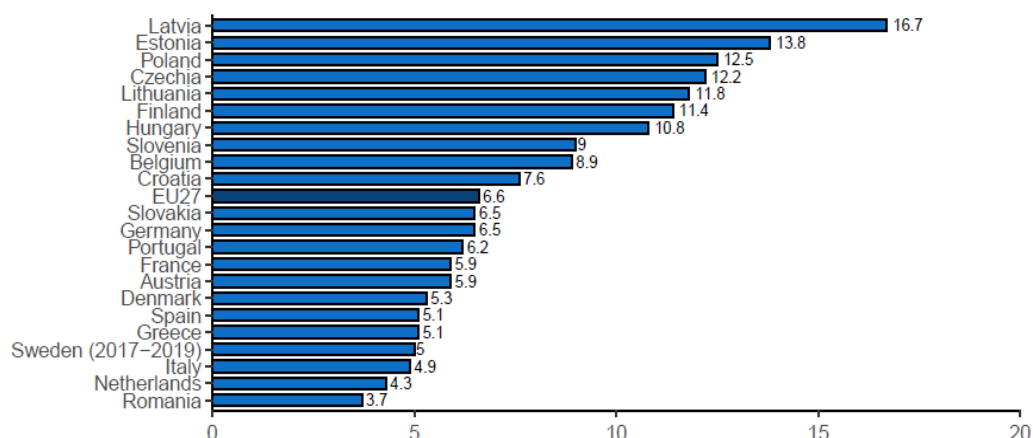


Figure 2. Fatalities per million inhabitants in HGV crashes per country in the EU27 (2018-2020). Source: CARE, EUROSTAT

Notes:

- Countries that are not included in the Figures are Bulgaria, Cyprus, Ireland, Luxembourg and Malta because these countries have missing values in the time series 2010-2019 or because of small numbers
- For Sweden, the time period 2017-2019 is used.

Mortality in bus/coach crashes and in HGV crashes is an important indicator but does not consider differences in the general state of road safety in different countries. In other words, it is possible that mortality for the types of vehicles investigated is so high because the total mortality for all vehicle types is high. Therefore, it is important to also look at the proportion or share of fatalities in bus/coach crashes and HGV crashes within the total number of road fatalities.

As with the mortality rate, the share of fatalities in HGV crashes is the highest in the east and north of the EU. The Baltic States are still among the worst-performing countries. Finland, which ranks among the best performing countries in road safety, has a particularly high share of fatalities involving HGVs.

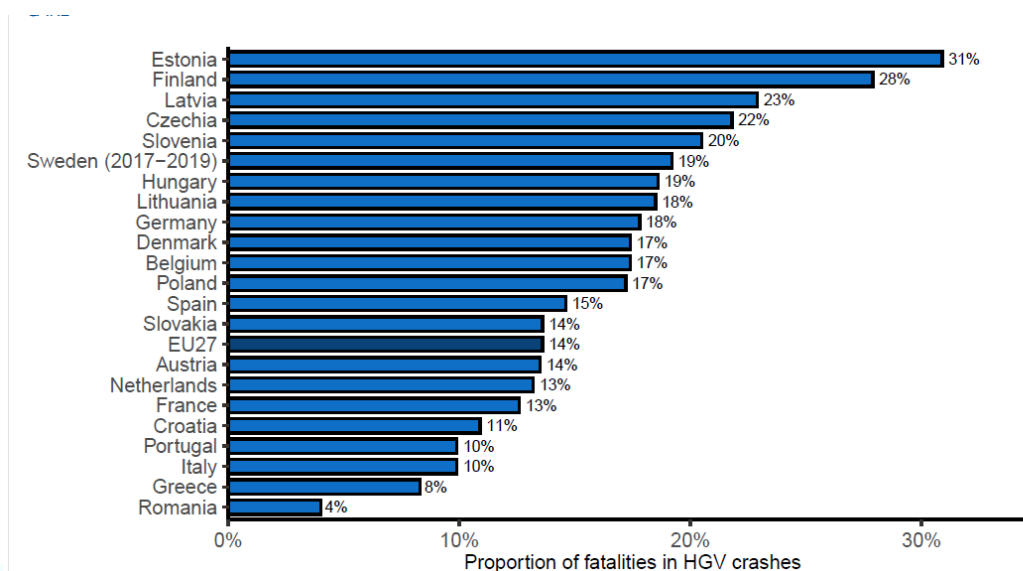


Figure 3. Share of fatalities in HGV crashes in the total number of fatalities, per country in the EU27 (2018-2020). Source: CARE

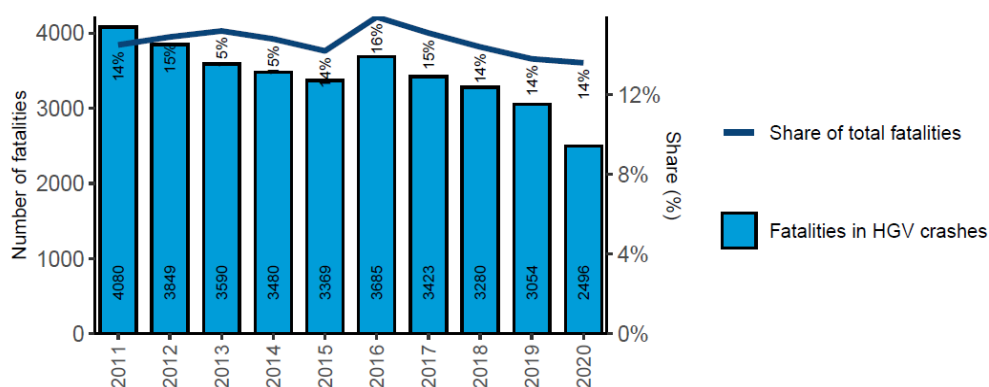


Figure 4. Annual number of fatalities in HGV crashes, and their share in the total number of fatalities in the EU27 (2011-2020). Source: CARE

2. FATALITIES IN TRAFFIC ACCIDENTS BY GENDER

77% of all road fatalities in the EU are male. More or less the same proportion of men (76%) is observed in the fatalities in crashes involving heavy goods vehicles. In bus and coach crashes, the percentage of men is slightly lower at 66%, which can be explained on the one hand by the more even distribution of men and women among the occupants of buses and coaches than among HGV occupants, who are mainly men. On the other hand, buses/coaches mainly collide with people outside their vehicles in urban areas; these are areas with a similar percentage of men and women on the streets.

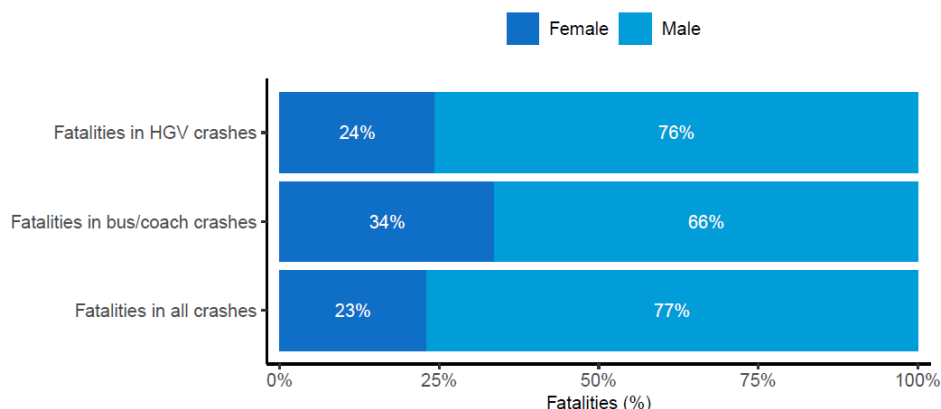


Figure 5. Distribution of fatalities by gender in HGV crashes, bus/coach crashes and all crashes in the EU27 (2018-2020). Source: CARE

3. FATALITIES IN TRAFFIC ACCIDENTS BY AGE

The distribution of the number of fatalities in bus/coach crashes and HGV crashes across different age categories does not differ strongly from the age distribution of road fatalities generally. We observe a relatively high number of middle-aged fatalities in HGV crashes. 62% are between 25 and 64 years old, compared to 55% of all fatalities. This can be explained, at least in part, by the fact that many HGV drivers belong to this age category. Compared to the general age distribution of fatalities, the proportion of people over 65 among fatalities in HGV crashes is slightly lower. This is related to the fact that heavy goods vehicles cause many fatalities in collisions with other vehicles on motorways, and the fact that senior citizens are underrepresented on motorways because they are not part of the working population.

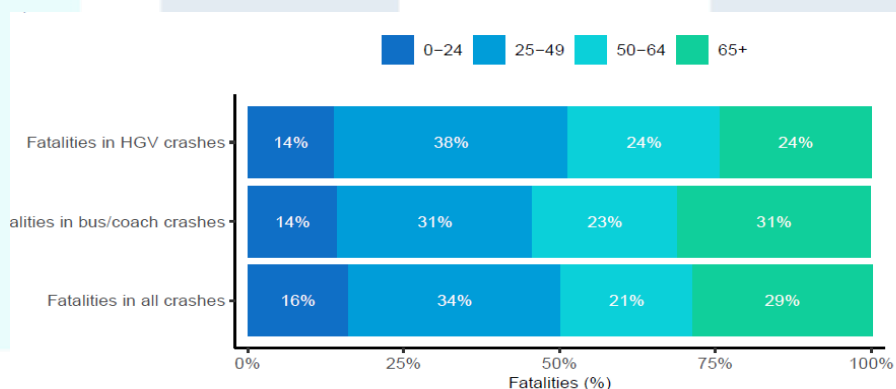


Figure 6. Distribution of fatalities by age category in HGV crashes, bus/coach crashes and all crashes in the EU27 (2018-2020). Source: CARE

4. WORKING WEEK VERSUS WEEKEND

The proportion of road fatalities that occur during the working week is 67% in the time period 2018-2020. The proportion of fatalities during the working week is higher for HGV crashes and for bus/- coach crashes than for all road fatalities in general. 86% of all fatalities in HGV crashes and 77% of fatalities in bus/coach crashes in the time period 2018-2020 occurred during the working week.

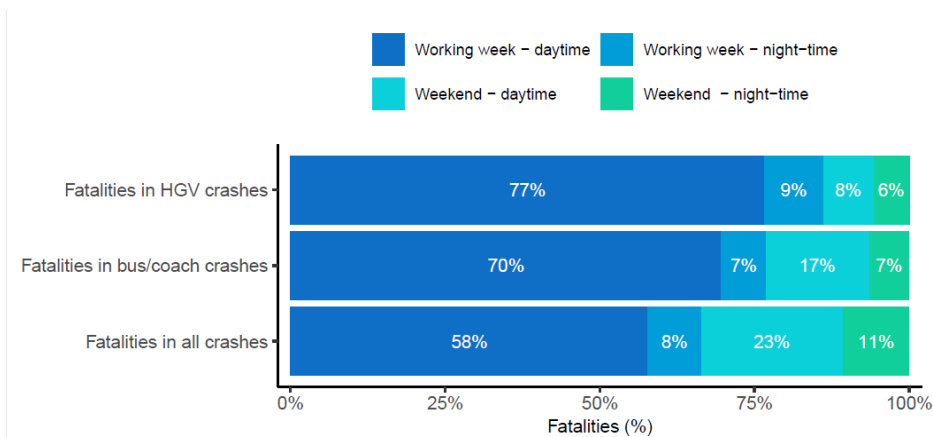


Figure 7. Distribution of fatalities by period of the week in HGV crashes, bus/coach crashes and all crashes in the EU27 (2018-2020). Source: CARE

5. DAY OF THE WEEK AND HOUR

The distribution of fatalities over the hours of a week is quite different for fatalities in HGV crashes than for all road fatalities combined. Compared to all road fatalities combined, HGV fatalities occur more often during working days between 7AM and 6PM. By contrast, they are less frequent at night and on weekends.

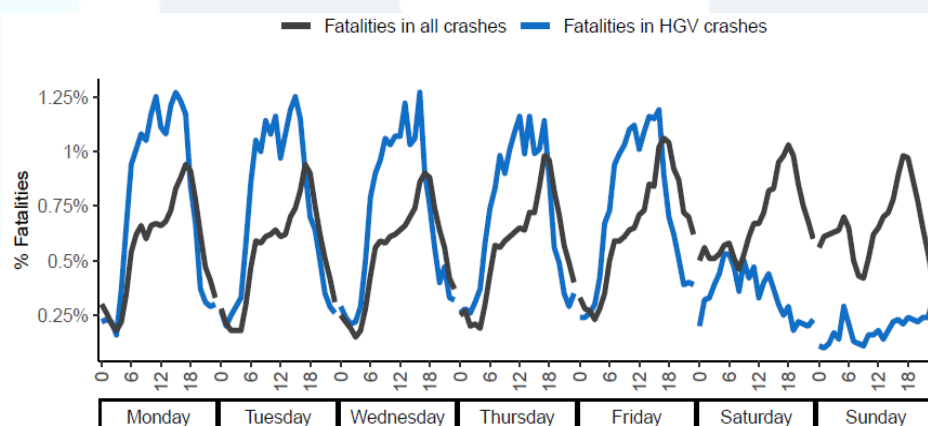


Figure 8. Distribution of fatalities by day of the week and hour in HGV crashes in the EU27 (2016-2020). Source: CARE

The Figure below shows the distribution of the number of fatalities in bus/coach crashes over the hours of the week. During the working week we see a morning peak and an evening

peak in bus/coach fatalities. These two peaks are more pronounced than for HGV fatalities and for all fatalities combined. Compared to heavy goods vehicles, buses are more likely to drive in urban areas where they both transport commuters and can also collide with commuters. As with HGV crashes, we see relatively fewer fatalities at night and on the weekends.

6. ROAD TYPE

Rural roads account for 53% of all fatalities in HGV crashes, motorways for 23% and urban roads also for 23%. There is an almost equal proportion of fatalities in bus/coach crashes on urban and rural roads (resp. 44% and 51% in 2018). The share on motorways is relatively small, at 6% in the time period 2018-2020.

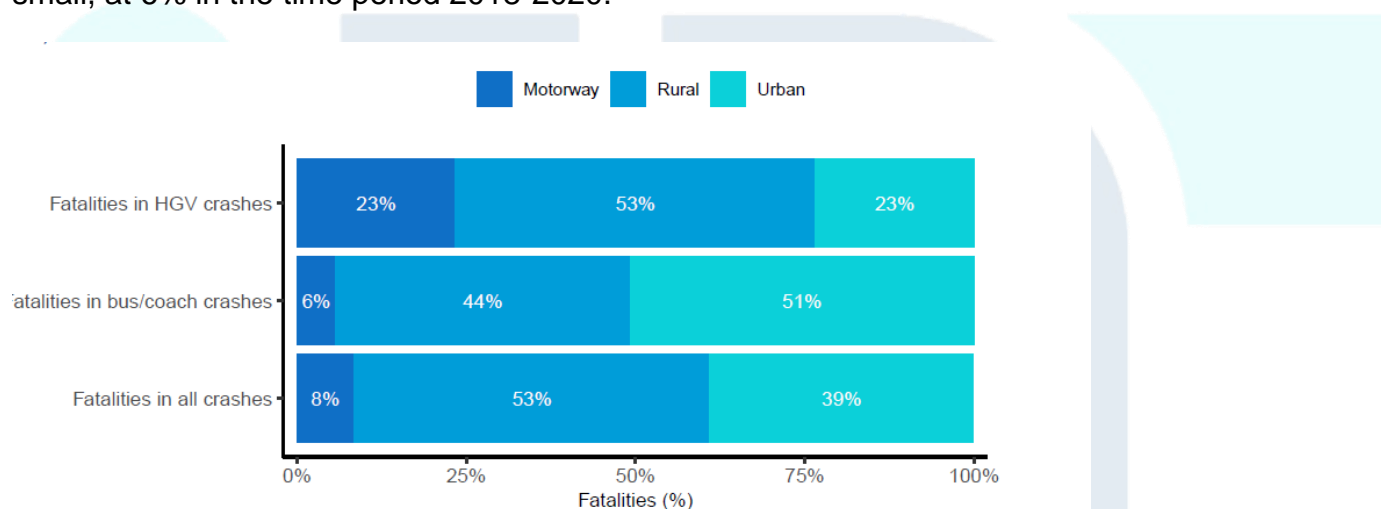


Figure 9. Distribution of fatalities by road type in HGV crashes, bus/coach crashes and all crashes in the EU27 (2018-2020). Source: CARE

7. CONCLUSION

The profession of driver is in short supply and there is practically no interest in this profession among young people. One of the key reasons for this is the fact that the road is a very aggressive working environment where drivers are exposed to great risks of injury, illness or even loss of life in their work.

Improving road safety is thus the basis for improving drivers' working conditions. The technology and safety systems built into modern trucks go a long way toward reducing traffic injuries or deaths when a truck or bus is involved in an accident. However, the key to improving safety is the knowledge of all stakeholders who participate in any way in the planning and implementation of transport processes.

As can be seen from the presented facts, traffic safety in the EU area is improving. The global COVID-19 pandemic also had an impact on the improvement of road traffic safety in the present period. Traffic volume fell sharply during the pandemic, resulting in fewer traffic accidents and fewer fatalities.

Compared to all fatalities across the EU, fatalities involving heavy goods vehicles and buses stood out in the following ways:

- deaths were more frequent during the day and during the working week,
- fatalities in traffic accidents involving heavy goods vehicles were more frequent on highways, while fatalities in bus accidents were more frequent in urban environments.

The long-term goal is to eliminate all causes of serious and fatal accidents on European roads. In order to achieve this goal, it is important to realize that all road users are responsible, because our actions and examples in our daily lives have a significant impact on road safety.



SAOBRAĆAJNO-TEHNIČKA
ŠKOLA, ZEMUN

Avtor:

Tanja Arsić, dipl. inž saobraćaja

11. BEZBEDNOSNI PLANOV I KAO PREVENTIVA U TRANSPORTU OPASNOG TERETA

Apstrakt:

Prevoznici i pošiljaoci, kao i drugi učesnici u transportu opasne robe sa visokom potencijalnom opasnošću, moraju usvojiti, sprovesti i primeniti bezbednosne planove. To je obavezna preventivna mera u transportu opasne robe sa visokom potencijalnom opasnošću posebno kod transporta radioaktivnih materija. Svaki bezbednosni plan mora imati određene elemente predviđene Evropskim sporazumom o međunarodnom drumskom transportu opasne robe – ADR-om.

Prevoznik, pošiljalac i primalac treba da međusobno sarađuju, kao i sa nadležnim organima radi razmene informacija koje se odnose na ugrožavanje bezbednosti, preduzimanje odgovarajućih bezbednosnih mera i reakcija na događaje koji se tiču bezbednosti, tako da je pravilna izrada ovih planova od velikog značaja za bezbednost ljudi i zaštitu životne sredine.

Ključne reči: bezbednosni plan, zaštita životne sredine, bezbednost učesnika u transportu opasne robe

1. UVOD

Opasne materije su one materije koje svojim svojstvima ili hemijskim reakcijama mogu ugroziti život i zdravlje ljudi, životnu sredinu i/ili materijalna sredstva. Sa aspekta značaja za zaštitu životne sredine, ljudi i opasnosti, a na osnovu preporuka Ujedinjenih Nacija, donešeni su propisi za transport opasnog tereta u svim vidovima saobraćaja. To je doprinelo uređenosti u ovoj oblasti kada je reč o bezbednosti transporta, obavezama i dužnostima prevoznika, pošiljaoca, primaoca i drugih učesnika u transportu.

Transport opasne robe u organizacionom i tehničko-tehnološkom smislu predstavlja stalnu opasnost za sve koji na posredan ili neposredan način dolaze u kontakt sa ovom vrstom robe. Zbog mogućih negativnih delovanja opasnih materija, njihov transport mora biti organizovan po određenim pravilima kako bi rizik od nezgoda bio minimalan, odnosno da posledice akcidenata budu svedene na najmanju moguću meru.

Svi učesnici u transportu opasnog tereta, u zavisnosti od svojih odgovornosti, moraju voditi računa o zahtevima bezbednosti. Jedan od tih zahteva je i bezbednosni plan koji je definisan je Evropskim sporazumom o drumskom transportu opasnog tereta – ADR-om. U ovom slučaju, pod pojmom bezbednost podrazumevaju se mere predostrožnosti, koje se moraju preduzeti da bi se sprečila krađa ili zloupotreba opasnog tereta, koji bi mogao da ugrozi lica, imovinu ili životnu sredinu.

Predviđeno je da prevoznici i pošiljaoci, kao i drugi učesnici koji učestvuju u transportu tereta sa visokom potencijalnom opasnošću moraju usvojiti, sprovesti i primeniti bezbednosne planove. Obaveza izrade i sprovođenja bezbednosnog plana učesnika u transportu opasnog tereta sa visokom potencijalnom opasnošću propisana je zakonom.

Tereti sa visokom potencijalnom opasnošću su oni kod kojih postoji mogućnost zloupotrebe u terorističke svrhe i koji mogu da dovedu do ozbiljnih posledica kao što su masovni gubici života ljudi ili velika ekonomska razaranja.

Bezbednosni rizik, opasnost od izazivanja požara, eksplozije, krađe autocisterne i slično, prisutan je tokom punjenja, prevoza, prijema i istakanja opasnih materija. Iz tih razloga je jako važno da bezbednosni plan bude dobar. Njegova vrednost se ogleda u stručnosti bezbednosnog savetnika koji ga definiše i u spremnosti preduzeća da ga u potpunosti primeni, kako zbog svoje tako i zbog bezbednosti ostalih učesnika u saobraćaju.

2. OPASAN TERET SA VISOKOM POTENCIJALNOM OPASNOŠĆU

Spisak opasnog tereta za visokom potencijalnom opasnošću po klasama ili podklasama ukoliko ih ima, dat je u tabeli 1. U koloni 1 su prikazane klase opasnih materija gde su: klasa 1 - eksplozivne materije i predmeti sa eksplozivnim materijama, klasa 2 – gasovi, klasa 3 - zapaljive tečne materije, klasa 4.1 - eksplozivne čvrste materije umanjene osetljivosti, klasa 4.2 - samozapaljive materije, klasa 4.3 - materije koje u dodiru sa vodom razvijaju zapaljive gasove, klasa 5.1 - oksidirajuće materije, klasa 6.1 - otrovne materije, klasa 6.2 - zarazne materije, klasa 7 - radioaktivne materije i klasa 8 - nagrizajuće materije. Može se primetiti da su pojedine klase opasnih materija isključene iz spiska tereta sa visokom potencijalnom opasnošću. Tako na primer kod klase 3, u materije sa visokom potencijalnom opasnošću spadaju zapaljive tečnosti ambalažne grupe I i II, dok su izuzete zapaljive tečnosti ambalažne grupe III. Ambalažne grupe imaju sledeće značenje: materije koje poseduju velike opasnosti pakuju se u ambalažnu grupu I, materije srednje opasnosti u ambalažnu grupu II i materije male opasnosti u ambalažnu grupu III. Sada je jasnije zašto su iz spiska tereta sa visokom potencijalnom opasnošću izuzete opasne materije klase 3 ambalažne grupe III. Slična je situacija i kod nekih drugih klasa opasnih materija, gde se u spisku tereta

navode samo materije ambalažne grupe I, kao što je slučaj kod podklase 4.2, 4.3, 5.1, 6.1 i 8.

Tabela 1: Spisak tereta sa visokom potencijalnom opasnošću (ADR, 2021)

Klasa	Podklasa	Materija ili predmet	Količina		
			Cisterna (litar)	rasuti teret (kg)	komad za otpremu (kg)
1	1.1	eksplozivi	(a)	(a)	0
	1.2	eksplozivi	(a)	(a)	0
	1.3	eksplozivi grupe kompatibilnosti C	(a)	(a)	0
	1.5	eksplozivi	0	(a)	0
2		zapaljivi gasovi (klasifikacionih kôdova koji sadrže samo slovo F)	3000	(a)	(b)
		otrovni gasovi (klasifikacionih kôdova, koji sadrže slova T, TF, TC, TO, TFC ili TOC) sa izuzetkom pakovanja gasa pod pritiskom	0	(a)	0
3		zapaljive tečnosti ambalažne grupe I ili II	3000	(a)	(b)
		desenzitivisani eksplozivi	(a)	(a)	0
4.1		desenzitivisani eksplozivi	(a)	(a)	0
4.2		materije ambalažne grupe I	3000	(a)	(b)
4.3		materije ambalažne grupe I	3000	(a)	(b)
5.1		oksidirajuće tečnosti ambalažne grupe I	3000	(a)	(b)
		perlorati, amonijumnitrat i đubrivo na bazi amonijumnitrata	3000	3000	(b)
6.1		otrovne materije ambalažne grupe I	0	(a)	0
6.2		zarazne materije kategorije A (UN -brojevi 2814 i 2900)	(a)	0	0
7		radioaktivne materije	3000 A ₁ (u posebnom obliku) ili 3000 A ₂ u komadima za otpremu tipa B(U)-, B(M)- ili C-		
8		nagrizajuće materije ambalažne grupe I	3000	(a)	(b)

(a) *ne primenjuje se*

(b) *u zavisnosti od količine ne važe propisi za materije sa visokom potencijalnom opasnošću*

Vrednost navedena u četvrtoj koloni tabele 1 koja se odnosi na cisterne važi samo ako je dozvoljen transport u cisternama prema koloni 10 ili 12 tabele A poglavlja 3.2 ADR-a. Za materije koje nisu dozvoljene za transport u cisternama, podatak u ovoj koloni se ne primenjuje.

Vrednost u četvrtoj koloni koja se odnosi na rasuti teret važi samo ako je dozvoljen transport u rasutom stanju prema koloni 10 ili 17 tabele A poglavlja 3.2 ADR-a. Podatak u ovoj koloni se ne primenjuje za materije koje nisu dozvoljene za transport u rasutom stanju.

Sledeći korak je utvrditi da li količina datog opasnog terete prelazi propisane granice. Da bi se utvrdilo da li opasan teret ima visoku potencijalnu opasnost, prvo se mora poznavati način otpreme robe: da li je to otprema materije u cisterni u tečnom stanju, kao rasuti teret ili je reč o komadu za otpremu.

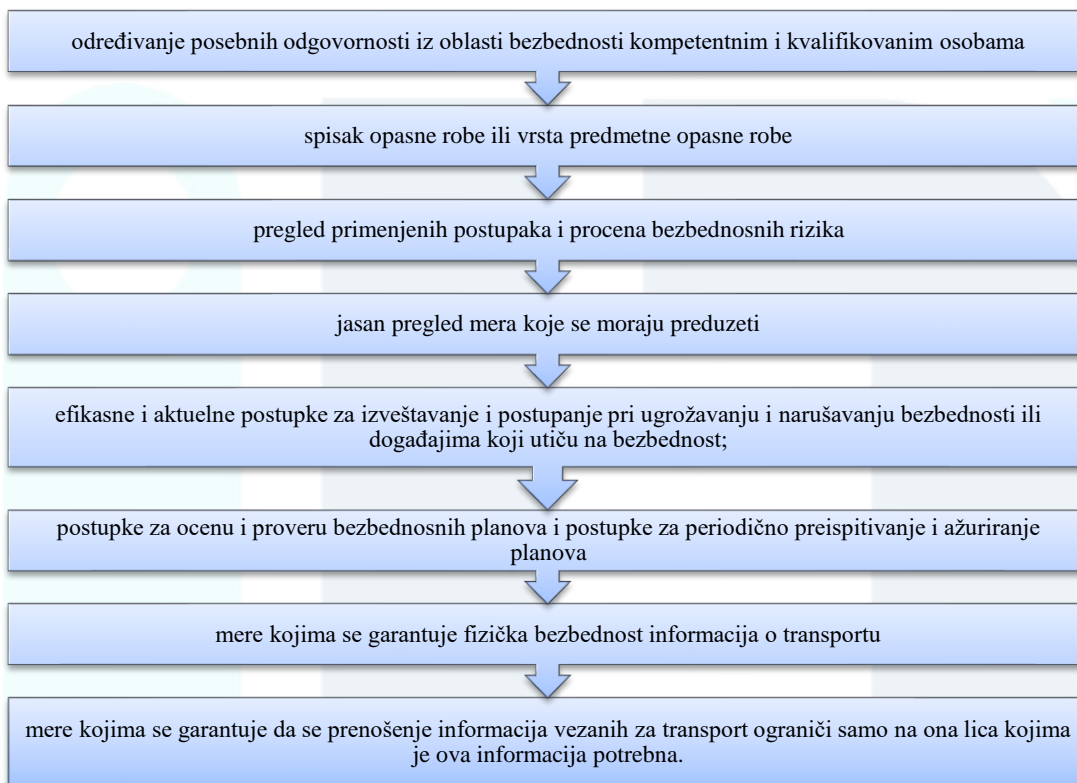
Na primer eksplozivi koji se uglavnom otpremaju kao komadni teret (osim podklase 1.5) imaju granicu 0 zbog svoje, opšte poznato, visoke potencijalne opasnosti. To znači da u slučaju transporta bilo koje količine opasne materije klase 1, postoji obaveza izrade bezbednosnog plana.

Sledeći primer su zapaljive tečne materije ambalažne grupe I ili II koje se uglavnom otpremaju cisternama. Iz tabele se vidi da je granična vrednost 3000 l i za svaku količinu preko ove, neophodna je izrada bezbednosnog plana.

Za opasnu robu klase 7, radioaktivne materije sa visokom potencijalnom opasnošću su one sa aktivnošću istom ili većom od granične vrednosti za transportnu bezbednost od 3.000 A2 po komadu.

3. IZRADA BEZBEDNOSNOG PLANA

Kad se utvrdi da opasan teret prelazi granične vrednosti iz spiska opasnog tereta sa visokom potencijalnom opasnošću, pristupa se izradi bezbednosnog plana. U nastavku rada je na slici 1 po koracima predstavljen i nakon toga detaljno objašnjen postupak izrade jednog takvog plana.



Slika 1. Postupak izrade bezbednosnog plana

1) Prvi korak u izradi je **određivanje posebnih odgovornosti** iz oblasti bezbednosti kompetentnim i kvalifikovanim licima sa odgovarajućim ovlašćenjima. Najčešće se to rešava imenovanjem Savetnika za bezbednostu transportu opasnog tereta.

2) Sledeći korak je **utvrđivanje spiska opasnih tereta ili vrste predmetnih opasnih tereta**. Vršiti se pregled opasnih materija kojima se manipuliše u transportnom lancu i klasifikuje se prema tabeli 1 koja je već prethodno objašnjena.

3) Treći korak je **pregled primenjenih postupaka i procena bezbednosnih rizika**, uključujući sva neophodna zadržavanja u transportu, zadržavanje tereta u vozilima, cisternama ili kontejnerima pre, za vreme i nakon transporta i privremeno skladištenje opasnog tereta, radi promene vida saobraćaja ili prevoznog sredstva (pretovar).

Definiše se najduže vreme stajanja vozila na parkingu i da li su vozila prazna, što znači da ne postoji visoka potencijalna opasnost. Jedino zaustavljanje vozila koje prevozi teret sa visokom potencijalnom opasnošću, odgovorno lice odobrava vozaču na pumpama kako bi se sipalo gorivo ili na parkingu namenjenom za vozila sa opasnim teretom. U inostranstvu

vozila se parkiraju na ADR parkinge kako bi pravili pauze u skladu sa propisima iz oblasti bezbednosti saobraćaja na putevima. U Republici Srbiji ne postoje parkinzi namenjeni ADR vozilima.

Ukoliko ne postoji ADR parking, a vozač mora da parkira vozilo, onda se parkiranje vrši na parkingu koji se nalazi van naseljenog mesta i gde postoji lice koje čuva parking ili video nadzor. U tom slučaju vozač obaveštava lice koje čuva parking o opasnom teretu koji prevozi i parkira se na određenoj udaljenosti od ostalih vozila. Oko vozila se postavljaju saobraćajni čunjevi kao upozorenje da je parkirano vozilo natovareno opasnim teretom.

4) **Jasan pregled mera** koje se moraju preduzeti u svrhu smanjenja bezbednosnih rizika saglasno odgovornostima i obavezama učesnika uključujući:

- Obuku svih koji učestvuju u transportnom lancu

Savetnik na osnovu godišnjeg plana vrši permanentno obuku zaposlenih za poslove manipulacije opasnim teretom (Ožegović i dr, 2016). Takođe, vozači koji imaju važeće sertifikate za transport opasnog tereta se periodično proveravaju u smislu osnovnog nivoa znanja koji bi trebalo da imaju u svakom trenutku. Vodi se evidencija o zaposlenima sa podacima o obimu obučenosti u zavisnosti od vida transporta.

- Bezbednosnu politiku

Na primer mere pri povećanoj opasnosti, kontrola pri zapošljavanju lica (utvrđuje se koje bi specifikacije i pojedinosti pri zapošljavanju trebao navesti svaki potencijalni radnik) ili premeštanju lica na drugo radno mesto.

- Opremu i sredstva koja se moraju koristiti za smanjenje bezbednosnih rizika

Svi učesnici u transportu opasne robe treba da su obučeni iz oblasti zdravlja, bezbednosti, životne sredine i protivpožarne zaštite, što znači da prisustvuju redovnim treninzima iz datih oblasti, kao i da su prošli odgovarajuću proveru znanja.

5) Efikasne i aktuelne postupke za izveštavanje i postupanje pri ugrožavanju i narušavanju bezbednosti ili događajima koji utiču na bezbednost. Regulisano je kroz jasno definisane postupke obaveštavanja, izrade dokumenta (izveštaja) o akcidentu, kao i mere za sprečavanje istih. Izrađuje se jedinstvena forma u kojoj se dostavljaju informacije o vanrednim događajima u transportu opasnog tereta, bez obzira na težinu posledica i vid transporta i manipulacije.

6) **Postupci za ocenu i proveru bezbednosnih planova i postupci za periodično preispitivanje i ažuriranje planova.** Rade se kroz Akcione planove sa definisanim obavezama i sprovodi ih Savetnik za bezbednost u transportu opasnog tereta, periodično na svakih 12 meseci.

7) Mere kojima se garantuje fizička bezbednost informacija o transportu, koje su sadržane u bezbednosnim planovima. Svi zaposleni imaju ovu obavezu potpisivanjem Ugovora o radu i dokumenta o poverljivosti podataka.

8) Mere kojima se garantuje, da se prenošenje informacija, vezanih za transport koje su sadržane u bezbednosnim planovima, ograniči samo na ona lica kojima je ova informacija potrebna. Ove mere ne smeju da isključe potrebne informacije koje su opisane na drugim mestima u ADR-u.

4. ZAKLJUČAK

Izrada bezbednosnog plana kroz jasno navedene korake je od velikog značaja za bezbednost svih učesnika u transportu opasnog tereta i zaštitu životnu sredinu. Efikasna primena plana u praksi je bitna, a tome u velikoj meri doprinosi znanje, iskustvo, umeće i obaveštenost Savetnika za bezbednost koji ga i pravi. Rad Savetnika ogleda se u praćenju propisa, donošenju strateških odluka, obučavanju radnika, saniranju posledica i praćenju transporta.

Dobar Bezbednosni plan pozitivno utiče na funkcionalno poslovanje preduzeća, na smanjenje rizika zagađenja, trovanja, požara, rasipanja, prosipanja i sličnih negativnih pojava. Takođe, ako se ovim planom utvrde tačne nadležnosti i obaveze svih zaposlenih u transportnom preduzeću, a naročito vozača, broj saobraćajnih nezgoda i njihove posledice bi se smanjile. Zato prevoznik, pošiljalac i primalac treba da sarađuju međusobno, kao i sa nadležnim organima radi razmene informacija koje se odnose na ugrožavanje bezbednosti, preduzimanje odgovarajućih bezbednosnih mera i odgovora (reakcije) na događaje koji se tiču bezbednosti.



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11. SAFETY PLANS AS A PREVENTION IN THE TRANSPORT OF DANGEROUS GOODS

Abstract: Carriers and senders as well as other participants in the transport of dangerous goods with high potential danger must adopt, implement and apply safety plans. This is a mandatory preventive measure in the transport of dangerous goods with high potential danger, especially for the transport of radioactive materials with high potential danger. Each security plan must have certain elements foreseen by the European Agreement concerning the International Carriage of Dangerous Goods by Road - ADR.

The carrier, the sender and the recipient should cooperate with each other and with competent authorities as well, in order to exchange information related to the threat to safety, to take appropriate safety measures and to respond to security related events. The proper development of these plans is of great importance for the safety of people as well as for the environment.

Key words: safety plan, environmental protection, safety of participants in the transport of dangerous goods

1. INTRODUCTION

Hazardous substances are substances that, due to their properties or chemical reactions, can endanger the life and health of people, the environment and/or material resources. From the aspect of importance for protection of the environment, people and dangers, and based on the recommendations of the United Nations, the regulations for the transport of dangerous goods in all modes of transport were adopted. That contributed arrangements in this area when it comes to transport safety, obligations and duties, carriers, senders, receivers and other participants in transport.

The transport of dangerous goods in the organizational and technical-technological sense is permanent danger for all who come into contact with this type of goods in an indirect or direct way. Due to the possible negative effects of dangerous substances, their transport must be organized according to certain rules so that the risk of accidents is minimal, or that the consequences of accidents are minimized.

All participants in the transport of dangerous goods, depending on their responsibilities, must take into account security requirements. One of those requirements is the security plan that has been defined as the European Agreement on the Road Transport of Dangerous Goods - ADR. In this case, the term security means precautionary measures, which must be taken to prevent the theft or misuse of dangerous cargo, which could endanger persons, property or the environment.

It is envisaged that carriers and consignors, as well as other participants in transport cargoes with high potential danger must be adopted, implemented and applied security plans. Obligation to create and implement a security plan for participants in transport of dangerous cargo with high potential danger is prescribed by law.

Cargoes with a high potential danger are those where there is a possibility of misuse for terrorist purposes and which can lead to serious consequences such as mass casualty or great economic destruction.

Security risk, risk of fire, explosion, theft of a tanker truck are present during loading, transportation, reception and discharge of hazardous materials. For those reasons it is very important that the security plan is good. Its value is reflected in its expertise of the security advisor who defines it and in the company's readiness to fully implement it, both for your own sake and for the safety of other road users.

2. DANGEROUS CARGO WITH HIGH POTENTIAL DANGER

List of dangerous goods by high potential hazard by class or subclass if there are any, is given in table 1. Column 1 shows the classes of dangerous substances where: class 1 - explosive substances and objects with explosive substances, class 2 - gases, class 3 - flammable liquids, class 4.1 - explosive solids of reduced sensitivity, class 4.2 - self-igniting substances, class 4.3 - substances that, in contact with water, become flammable gases, class 5.1 - oxidizing substances, class 6.1 - poisonous substances, class 6.2 – infectious substances, class 7 - radioactive substances and class 8 - corrosive substances. It can be noted that certain classes of hazardous materials are excluded from the list of cargo with high potential danger. So, for example, in class 3, in substances with high potential danger include flammable liquids of packaging groups I and II, while flammable liquids of packaging are excluded group III. Packaging groups have the following meaning: substances that have great dangers are packed in packaging group I, substances of medium danger in packaging group II and lower hazard substances in packaging group III. Now it is clearer why dangerous substances of class 3 of packaging group III are excluded from the list of cargo

with high potential danger. The similar situation is with some other classes of dangerous goods, where they are only listed in the cargo list of substances of packing group I, as is the case with subclasses 4.2, 4.3, 5.1, 6.1 and 8.

Table 1: List of cargoes with high potential danger (ADR, 2021)

Class	Subclass	Matter or object	Quantity		
			Tanker (liter)	scattered cargo (kg)	a piece for shipping (kg)
1	1.1	Explosives	(a)	(a)	0
	1.2	Explosives	(a)	(a)	0
	1.3	explosives of compatibility group C	(a)	(a)	0
	1.5	Explosives	0	(a)	0
2		flammable gases (of classification codes which contain only the letter F)	3000	(a)	(b)
		poisonous gases (classification codes, which contain the letters T, TF, TC, TO, TFC or TOC) with the exception of pressurized gas packaging	0	(a)	0
3		flammable liquids of packaging group I or II	3000	(a)	(b)
		desensitized explosives	(a)	(a)	0
4.1		desenzitivisani eksplozivi	(a)	(a)	0
4.2		substances of packaging group I	3000	(a)	(b)
4.3		substances of packaging group I	3000	(a)	(b)
5.1		oxidizing liquids of packaging group I	3000	(a)	(b)
		perchlorate, ammonium nitrate and fertilizer based ammonium nitrate	3000	3000	(b)
6.1		toxic substances of packaging group I	0	(a)	0
6.2		infectious substances of category A (UN numbers 2814 and 2900)	(a)	0	0
7		radioactive substances	3000 A 1 (in a special form) or 3000 A 2 pieces for delivery type B(U)-, B(M)- or C-		
8		corrosive substances of packaging group I	3000	(a)	(b)

(a) *does* *not* *apply*

(b) *depending on the amount, the regulations for substances with high potential danger do not apply*

The value given in the fourth column of Table 1 relating to tanks is valid only if permitted transport in tanks according to column 10 or 12 of table A of chapter 3.2 of ADR. For substances that are not allowed for transport in tanks, the information in this column does not apply.

The value in the fourth column relating to bulk cargo is valid only if transport is permitted in bulk according to column 10 or 17 of table A of chapter 3.2 of ADR. The data in this column does not apply to substances that are not allowed for transport in bulk. The next step is to determine whether the quantity of a given dangerous cargo exceeds the prescribed limits. In order to determine whether a dangerous cargo has a high potential danger, shipping method must be known first: is it carriage of substances in a tank in liquid state, as bulk cargo or is it a word about the shipping piece.

For example, explosives which are generally shipped as bulk cargo (except subclass 1.5) have a limit of 0 because of their, well-known, high potential danger. This means that in case of transport of any quantity of hazardous substance of class 1, there is an obligation to produce security plan.

The next example is flammable liquids of packaging group I or II, which are generally shipped by tankers. The table shows that the limit value is 3000 l for each quantity beyond this, it is necessary to create a security plan.

For Class 7 of dangerous goods, radioactive substances with a high potential hazard are those with an activity equal to or greater than the limit value for transport safety of 3,000 A2 per piece.

3. DEVELOPMENT OF A SECURITY PLAN

When it is determined that dangerous cargo exceeds the limit values from the list of dangerous cargo with high potential danger, we should develop an effective security plan. In the continuation of the work, it is in the picture 1 step-by-step presentation and after that the procedure of making that one is explained in detail.

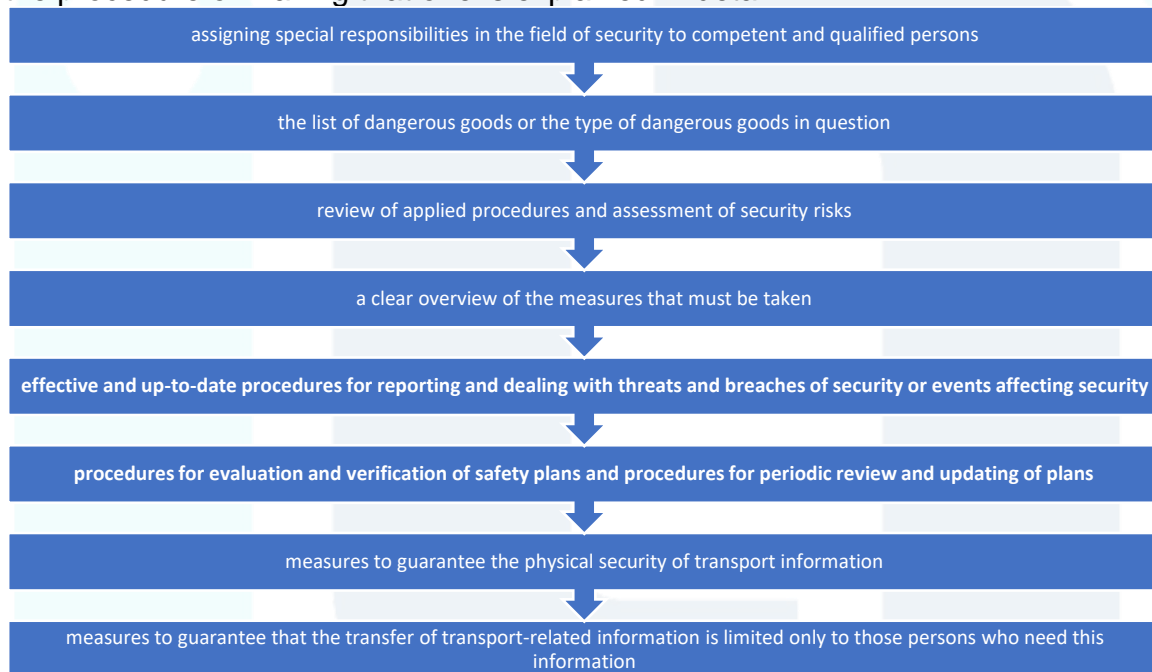


Figure 1. The process of creating a security plan

- 1) The first step in the process is the **determination of special responsibilities** in the field of security competent and qualified persons with appropriate authorizations. Most often it is solved by appointing the Advisor for the safety of the transport of dangerous goods.
- 2) The next step is to **determine the list of dangerous goods or the type of dangerous goods in question**. An inspection of hazardous materials that are handled in the transport chain is carried out and classified according to table 1, which has already been explained previously.
- 3) The third step is the **review of applied procedures and the assessment of security risks**, including all necessary detentions in transport, detention of cargo in vehicles, tanks or containers, before, during and after transportation and temporary storage dangerous cargo, for the purpose of changing the type of traffic or means of transport (transshipment).

It defines the longest time the vehicle is parked in the parking lot and whether the vehicles are empty, which means there is no high potential danger. Stopping of a vehicle carrying cargo with high potential danger is possible only by the approval of a responsible person to the driver at the pumps in order to fill up fuel or in a parking lot intended for vehicles with dangerous goods. Abroad vehicles are parked in ADR parking lots in order to take breaks in accordance with the regulations of the area road safety. In the Republic of Serbia, there are no parking lots intended for ADR vehicles.

If there is no ADR parking, and the driver has to park the vehicle, then parking is done at a parking lot located outside a populated place and where there is a person guarding the parking lot or a video supervision. In that case, the driver informs the person guarding the parking lot about the dangerous cargo transported and parked at a certain distance from other vehicles. Traffic cones are placed around the vehicle as a warning that the parked vehicle is loaded with dangerous goods.

4) **A clear overview of the measures** that must be taken to reduce security risks according to the responsibilities and obligations of the participants including:

- Training of everyone involved in the transport chain

Based on the annual plan, the advisor conducts permanent training of employees for jobs manipulation of dangerous cargo (Ožegović et al., 2016). Also, drivers who have valid certificates for the transport of dangerous goods are periodically checked in terms of basic level of knowledge they should have at all times. Records of employees with data on the scope of training depending on the type of transport are kept.

- Security policy

For example, measures in case of increased danger, control during the employment of persons (it is determined what specifications and particulars should every prospect provide when hiring worker) or transferring a person to another workplace.

- Equipment and means that must be used to reduce security risks

All participants in the transport of dangerous goods should be trained in the field of health, safety, environment and fire protection, which means that they attend regular training in the given fields, as well as having passed the appropriate knowledge test.

5) **Effective and current procedures for reporting and dealing with threats and security breaches or security-affecting events.** It is regulated through clearly defined procedures for informing, creating a document (report) about the accident, as well as measures to prevent them. A unique form is being created in which information about extraordinary events in the transport of dangerous cargo is submitted, regardless of the severity of the consequences and the type transport and manipulation.

6) **Procedures for evaluation and verification of security plans and procedures for periodic reviewing and updating plans.** They are done through Action Plans with defined obligations and are carried out by the Advisor for Safety in the Transportation of Dangerous Goods, periodically on every 12 months.

7) **Measures that guarantee the physical security of transport information, which are contained in security plans.** All employees have this obligation by signing employment contract and data confidentiality document.

8) **Measures that guarantee the transfer of information related to transport that are contained in the security plans**, and are allowed only to those persons who need this information. These measures must not exclude the necessary information that is described elsewhere in ADR.

4. CONCLUSION

Creating a security plan through clearly stated steps is of great importance for security of all participants in the transport of dangerous goods and environmental protection. Effective implementation of the plan in practice is important, and knowledge, experience, skill and awareness of the security advisor who makes it, contribute to this to a large extent. The work of the Advisor is reflected in the monitoring of regulations, making strategic decisions, training workers, remediating consequences and monitoring transport. A good Security Plan has a positive effect on the functional operation of the company, on reducing the risk of pollution, poisoning, fire, wastage, spillage and similar negatives occurrence. Also, if this plan determines the exact responsibilities and obligations of all employees in transport company, especially the driver, the number of traffic accidents and their consequences would have decreased. That is why the carrier, the sender and the recipient should cooperate with each other, as well as with competent authorities for the purpose of exchanging information related to security threats, undertaking appropriate security measures and response (reaction) to events concerning security.



Srednja šola za storitvene dejavnosti in logistiko

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12. CROSS DOCKING V DOBAVNI VERIGI

Povzetek

Z razvojem logistike kot takšne so se razvili različni podsistemi logističnih procesov. V prispevku izhajamo iz razumevanja treh pojmov/procesov: logistika, oskrbovalna veriga in menedžment oskrbovalne verige. Podjetja, kot deležniki v oskrbovalni verigi morajo nenehno posodablјati tehnično-tehnološke procese. Biti morajo inovativna in spremlјati razvoj logističnih procesov. Eden od procesov/modelov, ki ga lahko izvajajo podjetja za pridobitev konkurenčne prednosti, je cross-docking (slo. pretočna točka). V prispevku bomo natančneje raziskali vlogo in pomen tega logističnega procesa.

Ključne besede: logistična veriga, cross-docking, skladišče.

1 Uvod

Logistika je široko področje, ki se ukvarja s planiranjem, izvajanjem in nadzorom učinkovitega pretoka blaga, storitev in informacij od izvora do končnega uporabnika. Cilj logistike je zagotoviti pravilno količino izdelkov ali storitev, na pravem mestu, ob pravem času in z minimalnimi stroški. Opredelimo štiri pojme: logistika, oskrbovalna veriga, menedžment oskrbovalne verige in partnerstvo v logistični dobavni verigi.

Obstajajo trije jezikovni izvori pojma logistike. Kot prvo izhaja pojem logistike iz grške besede »logisticos«. Pod tem pojmom so razumeli preračunljivo logično mišljenje. Nadalje obstaja povezava s francosko besedo »loger«, kar je bilo razumljeno kot »pripravljanje in oskrba bivališč«. Ta pojem se je uporabljal že v 12. stoletju, in sicer na vojaškem področju. Vojaška logistika zajema transport, nastanitev in oskrbo čet, kakor tudi transport, skladiščenje in vzdrževanje vojaškega tovora. V Nemčiji se je pojem »logieren« v smislu nastanitve začel uporabljati okrog leta 1600. V 18. stoletju je švicarski general v francoski in ruski armadi Antoine-Henri Baron de Jomini (1779–1869) uporabil pojem logistike kot uporabno vedo za planiranje in vodenje premikov čet, gradnjo in utrditev skladišč za zagotavljanje preskrbe (Binner 2002, 29). Konec 19. stoletja so začeli izraz »logistika« uporabljati tudi v vojaški literaturi v Združenih državah Amerike (Zelenika in Pupavac 2008, 15).

Oskrbovalna veriga oz. dobavna veriga ([angleško supply chain](#)), je sistem, ki združuje dobavitelja, nabavo, proizvajalca, [distribucijske kanale](#) in kupca. Pokriva tok blaga od dobavitelja preko proizvodnje in distribucijskih kanalov do kupca oziroma končnega uporabnika. Z drugimi besedami je mreža zvez in distribucijskih možnosti, ki opravljajo funkcije nabave materialov, njihovega preoblikovanja v [vmesne](#) in končne proizvode, ter distribucijo končnih proizvodov kupcem. Kompleksnost verige pa se lahko razlikuje med različnimi panogami in podjetji.

Menedžment oskrbovalne verige je procesno usmerjen razvoj, oblikovanje in usmerjanje vseh dejavnosti, ki se začnejo z nakupom surovin in končajo s prodajo izdelka potrošniku. Vključuje celovito upravljanje kakovosti in drugo.

Shema št. 1: Menedžment oskrbovalne verige



Vir: AINA STEPHEN, B. Sc. (Hons), PGD, MBA, *Chief Regulatory Officer* (CRO), NAFDAC, Nigeria. Oskrbovalne verige v znanosti in praksi. 2014.

Za kakovostno logistično dobavno verigo je pomembno partnerstvo med deležniki v logistični dobavni verigi. Po Bezjaku¹⁴omogoča doseganje naslednjih kriterijev:

- zniževanje prevoznih stroškov,
- izboljšanje upravljanja logistične mreže,
- zmanjševanje števila škodnih dogodkov,
- zmanjševanje fiksnih stroškov,
- zmanjševanje skladiščnih stroškov,
- zmanjšanje stroškov zalog in
- zmanjšanje administrativnih stroškov.

2 Skladiščni proces kot del logističnega procesa

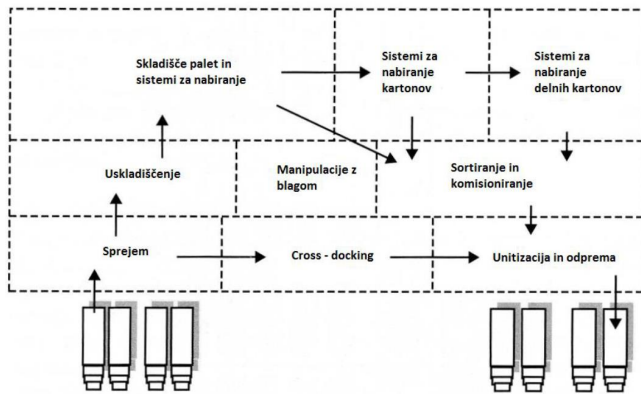
Skladišče je izraz, ki se uporablja za objekte, ki so namenjeni hrambi blaga, mislimo na objekte, ki jih opredelimo glede na blago oz. po namenu. Hramba pa je izraz s katerim ponazorimo proces hranjenja blaga in zalog. Skladišča imajo, ne glede na aktivnosti, ki jih vršijo, nekaj skupnih temeljnih aktivnosti. V nadaljevanju bomo našteali tiste, ki jih lahko najdemo v večini skladišč.

- sprejem,
- prepakiranje,
- uskladiščenje,
- skladiščenje,
- nabiranje blaga,
- pakiranje ali lepljenje cen, deklaracij itd.,
- sortiranje in
- unitizacija ter odprema.

Za ponazoritev navedenega na shemi št. 2 predstavljamo tok aktivnosti v skladišču.

Shema št. 2: Tloris skladišča s pretokom blaga

¹⁴ Bezjak, M. Učinkovito gospodarjenje v transportu in skladiščenju, Oskrbovalne verige v znanosti in praksi. 2014.



Vir: Frazelle, E. World-class warehousing and material handling. New York. McGraw, 2002.

Povzeto po Poljanec, Matej. Logistika notranjega transporta in skladiščenja Zavod IRC, (elektronski vir). Ljubljana. 2011.

Po Pušenjaku in Cedilniku¹⁵ moramo v skladiščni dejavnosti upoštevati ravni upravljanja. Prva raven upravljanja sistemov hrambe zalog je strateška raven. Načrtovali bomo lokacijo zalog in s tem skladišč glede na značilnosti blaga in tržne potrebe (lokacija skladišč). V okviru strateškega načrta lokacije je pomembno vprašanje kakšno skladišče potrebujemo. Cedilnik navaja organizacijsko klasifikacijo in sicer:

- lastno skladišče, ali najeti logistični servis,
- osnovno skladišče ali DC,
- prekladališče, zbirni center in
- CrD center (cross-docking).

Druga raven upravljanja je operativna. Upravljamo z instaliranimi kapacitetami, ki jih moramo stalno prilagajati dinamiki in pretokom zalog, ter tako zagotoviti razpoložljive kapacitete za oskrbo porabnikov.

Delitve in klasifikacije so pomembne zaradi urejanja posameznih vrst skladišč z vidika podatkov. Vsaka enota mora biti jasno definirana glede na namen in poslovanje, kar je osnova vsakega upravljanja.

3 Sistem Cross docking

Cross-docking v dobavni verigi je postopek, pri katerem izdelki iz proizvodnega obrata ali skladišča dobavitelja pridejo naravnost do maloprodajne verige ali kupca, pri čemer blago skorajda ne ostane v skladišču. Za ponazoritev: izdelki se raztovorijo s tovornjakov ali vlakov in skoraj takoj naložijo na tovornjake ali vlake, namenjene končnemu uporabniku: maloprodajni trgovini /verigi ali strankam. Če je veliko pošiljk namenjenih na isti cilj, bo potrebnih manj transportnih vozil; velike pošiljke lahko razdelimo v manjše skupine. V obeh primerih gre za učinkovitejšo in vitkejšo dobavno verigo.

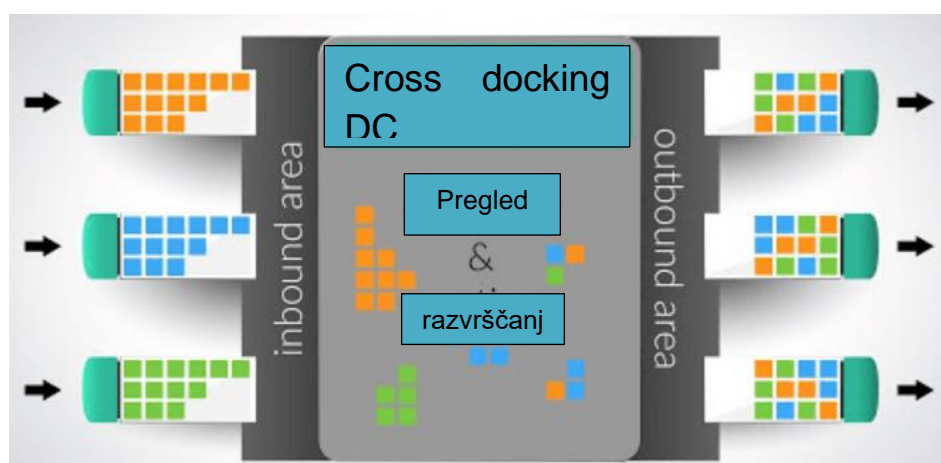
¹⁵ Pušenjak, F., Cedilnik, M. Logistika – vzorci in vsebine za učinkovito logistika. Forum Media.

Že v tridesetih letih 20. stoletja je ameriška transportna industrija izboljšala postopke in operacije cross-dockinga. Podjetja so iskala načine, kako povečati učinkovitost svojih sistemov upravljanja dobavne verige, pospešiti dostavo blaga potrošnikom in znižati stroške zalog. Implementacija metode cross-docking se je v Združenih državah Amerike nadaljevala v 50. letih 20. stoletja, kar je izboljšalo dobavne verige, zlasti v maloprodajnem sektorju. V osemdesetih letih prejšnjega stoletja je eden največjih svetovnih trgovcev na drobno, Walmart, uvedel cross-docking sistem in s tem ustvaril pomembno konkurenčno prednost¹⁶.

Zapišemo lahko, da sistem cross-docking ne moremo zapisati eno značajno. Poenostavljeno lahko navedemo, da je opisani sistem, sistem pošte, ali pa kontejnerska veriga. Eden ključnih dejstev je, ali imamo logistično enoto za končnega prejemnika, ali pa jo je za končnega prejemnika potrebno preoblikovati (količinsko, namestiti novo logistično nalepko idr.). Sistem lahko deluje na dnevnem nivoju, ko se pošiljka isti dan odpremi končnemu prejemniku, ali pa na tedenskem nivoju, ko se dela t.i. zbirnik.

Pomembno pa je razlikovati med cross-dockingom in drop-shippingom. Obe metodi pomagata preprečiti, da bi zaloge ležale v skladiščih. Pri drop-shippingu se artikli prodajajo neposredno od dobavitelja h končni stranki. Pri cross-dockingu se izdelki najprej pošljejo v skladišče, kjer se sortirajo in/ali prepakirajo, ter takoj pošljejo strankam - kupcem. Je pa drop-shipping izjemno priljubljen, saj nihče nima nobenih stroškov vzdrževanja zalog ali fizičnega štetja. Cross-docking sicer pomaga pri vitkejši dobavni verigi, vendar morda ni primeren za vsako podjetje ali skladišče. Pred prehodom na cross-docking je bistveno preučiti stroške, dejavnike produktivnosti, zadovoljstvo kupcev in spremembo procesov v podjetju. Cross-docking je še posebej uporaben za izdelke z nadzorom temperature, pokvarljive izdelke, blago, ki je že sortirano in zapakirano, pijače, hrana, kemikalije idr.

Shema št. 3: Sistem cross-docking



Vir: https://www.odoo.com/documentation/16.0/applications/inventory_and_mrp/inventory/routes/concepts/cross

¹⁶ <https://www.inboundlogistics.com/articles/cross-docking/>

Prednosti sistema¹⁷:

- Delovni procesi shranjevanja, upravljanja, štetja, varovanja, zavarovanja blaga, ter poškodbe, ali izgube blaga stanejo. Cross-docking odpravlja te stroške, saj se blago takoj pošlje v odhodni transport z minimalnim časom zadrževanja.
- Skladiščenje izdelkov je občasno, kar vodi k zmanjšanju manipulaciji in posledično večji stopnji zagotavljanja kakovosti.
- Stroški dela so nižji, saj ni več potrebno upravljanje z zalogami (manj delavne sile).
- Če stranke hitro prejmejo svoja naročila, s tem se zagotovi večje zadovoljstvo strank, kar pomaga povečati ugled pri hitrih dostavah idr.

Slabosti¹⁸:

- Priprava logističnih enot je lahko zamudna; mora biti natančno načrtovana in izvedena, da se zagotovi poslovna uspešnost.
- Potrebna je precejšnja naložba za vzpostavitev obrata cross-docking; terminali in precejšen vozni park tovornjakov in drugih transportnih vozil.
- V enem dnevu se pogosto opravi več dostav, zato je ključnega pomena, da je treba vse blago raztovoriti iz prihajajočih tovornjakov in naložiti na odhodne tovornjake hitro in v tesnih časovnih razporedih; da se ne ustvarijo zastoji, možnost poškodbe blaga, izgubi idr.
- Ni primeren za panoge z nizko stopnjo obračanja zalog, primeri: pohištvo, pisarniški material, idr.

Cross-docking je mogoče uporabiti pri vseh načinih prevoza, vključno z letalskim, cestnim, železniškim in pomorskim prometom. Doseže se s tremi bistvenimi metodami¹⁹:

- Neprekinjen navzkrižni docking; je metoda navzkrižnega dockinga, pri kateri se blago premika v stalnem toku med sprejemnim in odpremnim območjem.
- Metoda konsolidacije, ki združuje več majhnih pošiljk pred prevozom. Predmeti so začasno shranjeni v skladišču terminala, dokler niso odpremljeni iz objekta v polnih tovornjakih.
- Dekonsolidacija je metoda razdelitve velikih pošiljk v manjše serije. Pogosto se uporablja pri izpolnitvi za neposredno prodajo potrošnikom, kjer se blago dostavi strankam na dom ali poslovne lokacije.

Skladišče mora biti sposobno podpirati postopek cross-dockinga. Oblika skladišča mora biti zasnovana tako, da poveča prostor in zmanjša razdaljo potovanja. Prav tako je bistvenega pomena imeti skladišče z dobro organiziranim pretokom izdelkov v celotnem

¹⁷ <https://www.tranquilbs.com/cross-docking/>

¹⁸ <https://www.tranquilbs.com/cross-docking/>

¹⁹ <https://www.inboundlogistics.com/articles/cross-docking/>

skladišču, da se ohrani učinkovito delovanje. Število in postavitev nakladalnih ploščadi sta ključnega pomena pri načrtovanju. Glede na velikost skladišča si je potrebno prizadevati za enakomerno porazdelitev, ki lahko sprejme vse vhodne pošiljke. Število, velikost in postavitev dock-vrat določa, kako dolgo traja obdelava cross-docking operaciji.

4 Primera uporabe cross-docking sistema

4.1 Logist Schenker SLO

Pri logistu Schenker SLO so v svoj sklop logističnih centrov dodali še skladišče za navzkrižni pretovor oziroma cross-dock v Sneberjah. Uporabljajo ga za zbirnike, za lokalno distribucijo in kot oceansko središče, torej kot vozlišče za pristaniški tovor. Po podatkih iz prispevka²⁰ je nova stavba v celoti optimizirana za navzkrižno pretovarjanje (cross-dock). Objekt meri 4.397 kvadratnih metrov na zemljišču v velikosti 14.143 kvadratnih metrov. Opremljena je z 28 rampami za nakladanje in razkladanje in omogoča hiter obrat tovora. Za poslovanje imajo inštaliran sistem elektronskega prepoznavanja registrskih označb, ki predhodno napovedanim vozilom samodejno odpre zapornico. Nadzor dostopa, ki ga imajo zgolj pooblašcene osebe, zagotavljajo 24 ur na dan ter vse dni v tednu.

4.2 Trgovska družba Engrotuš d.o.o.

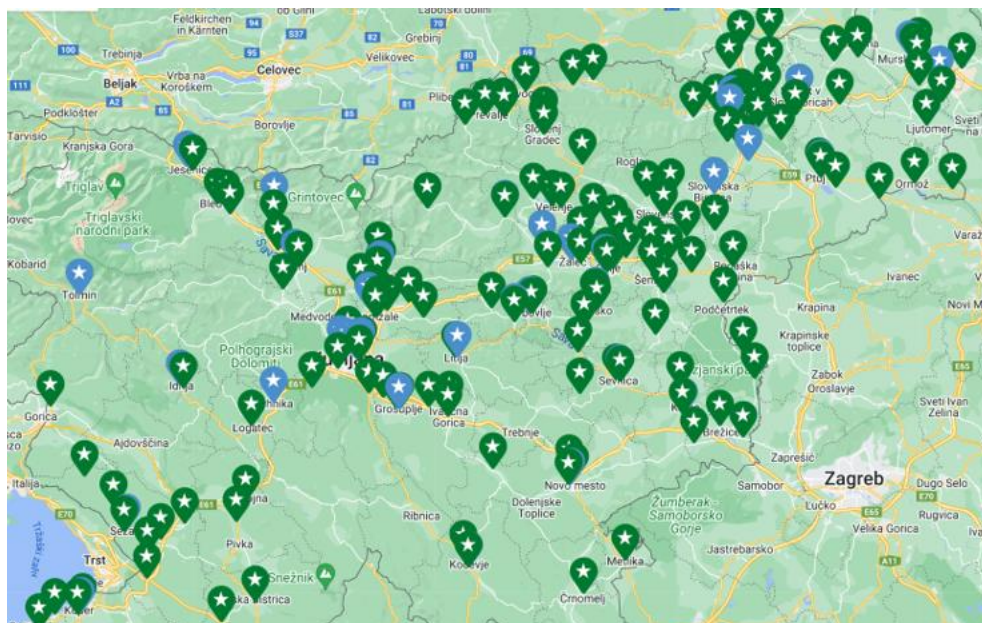
V Sloveniji cross-docking uvajajo tudi v podjetju Engrotuš d.o.o.. Osnovna dejavnost družbe je trgovina za gospodinjstva in poslovne uporabnike ter specializirana ponudba izdelkov za nego v drogerijah. S poslovalnicami po vsej Sloveniji in 2.635 zaposlenimi se družba uvršča med največja trgovska podjetja v Sloveniji.

Družbo Engrotuš d.o.o. je na dan 31. 12. 2022 sestavljalo:

- 101 marketov in supermarketov,
- 163 franšiznih poslovalnic,
- 7 poslovalnic Cash & Carry,
- 43 drogerij,
- 2 restavraciji Tuš,
- 2 slaščičarni De la Creme,
- spletna trgovina Tuš Cash & Carry,
- spletni supermarket hitrinakup.com in
- spletna drogerija tusdrogerija.si.

Shema št. 5: Mreža poslovalnic TUR trgovca

²⁰ <https://tl.finance.si/8998303/Tako-je-videti-novo-Schenkerjevo-oceansko-vozlisce-v-Ljubljani?src=XNASLZAD>.



Vir podloge: google

Trgovec ima v svoji organizaciji tudi centralni distribucijski center preko katerega v svoje poslovalnice dobavlja že skoraj 70 % svojega blaga. Z namenom širjenja količin dobave preko centralnega skladišča je družba kot enega izmed načinov dobave pričela uvajati tudi cross-docking. Dobave, ki potekajo na način cross-docking-a je družba za začetek preusmerila predvsem dobavitelje, ki so tranzitno po vseh poslovalnicah dobavljali manjšo količino blaga. Zaradi visokih transportnih stroškov je posledično bil visok tudi delež le teh na enoto blaga, kar je zelo povečevalo nabavno ceno na enoto. Cross-docking poteka na sledeči način:

1. Dobavitelj pripravi pakete (komisije) po poslovalnicah, ki so blago naročile.
2. Centralno skladišče deluje kot pošta:
 - prevzame pakete od dobavitelja (vsebine paketa ne pregleduje),
 - poskrbi za dostavo paketa v poslovalnico v okviru svojih rednih dostav,
 - sistem je nadzorovan z ustrezno programsko opremo.
3. Poslovalnica pregleda vsebino paketa in opravi prevzem.

Trenutno je sistem cross-dockinga v družbi še v razvoju, vendar je pri dobavah od dobaviteljev, ki so bili preusmerjeni na ta sistem ugotovila znižanje transportnih stroškov in s tem posledično nabavne cene teh artiklov.

5 Swot analiza

<p>Prednosti</p> <ul style="list-style-type: none"> - Eliminiranje nepotrebnih skladiščnih procesov in zalog. - Zniževanje stroškov, manj napak. - Hitrejši pretok blaga. 	<p>Priložnosti</p> <ul style="list-style-type: none"> - Konsolidacija delovnih procesov. - Optimiranje delovnih osnovnih sredstev.
<p>Slabosti</p> <ul style="list-style-type: none"> - Potrebuje se večja kapaciteta manipulativne površine (sprejemno/odprema cona). 	<p>Nevarnosti</p> <ul style="list-style-type: none"> - Prilagajanje procesov glede na dobavitelje.

- V primeru dveh ali več sistemov možnost ločevanja le teh.	
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Vir: Prirejeno po Higginson and Bookbinder, 2005. Bajec, P. Distribucijsko skladišče. Fakulteta za pomorstvo in promet, Portorož. 2019.

Po Bajčevi sta ključna dva predpogoja za uspešen cross-dock:

- učinkovita izmenjava blaga med pošiljatelji in skladiščem;
- učinkovita koordinacija blaga med vhodnimi in izhodnimi tokovi v/iz skladišče(a).

Oba pogoja pa zahtevata informatizacijo poslovanja skladiščene dejavnosti, kar je danes že obveza za doseganje poslovne odličnosti poslovanja.





Srednja šola za storitvene dejavnosti in logistiko

EGROTUŠ podjetje za trgovino, d.o.o.

Author:

mag. Roman Krajnc

mag. Julija Krajnc

12. CROSS-DOCKING IN SUPPLY CHAIN

Summary

With the development of logistics, various subsystems of logistical processes also evolved. This article utilises the understanding of three concepts/processes: logistics, supply chain and supply chain management. Companies, which participate in the supply chain, need to constantly improve their technical and technological processes. They have to be innovative and need to keep track of how processes in logistics are developing. Cross-docking is one of the processes-models that companies can use to increase their competitiveness. This article explores the role and importance of this logistical process.

Keywords: logistical chain, cross-docking, warehouse.

1 Introductions

Logistics is a broad field that examines planning, executing and overseeing an effective flow of goods, services and information from the source to the consumer. Its goal is to ensure the appropriate amount of goods reach the destination at the right time and with minimum cost. Let's define four concepts: logistics, supply chain, supply chain management and partnership in logistical supply chain.

There are three etymology sources of the word "logistics". The first origin of the word is the Greek term "logisticos". It meant calculated, logical thinking. Then there are ties with the French word "loger", which was used to describe preparing and supplying residences. The first usage of this term dates all the way back to the 12th century when they used it in army circles. Military logistics encompasses both transport, accommodation and care of the units, and transport, storage and maintenance of military cargo. In Germany, the word "logieren" started being used in 1600 to describe accommodation. In the 18th century, a Swiss general in the French and Russian army, Antoine-Henri Baron de Jomini (1779-1869), used the term "logistics" to describe a science useful for planning and leading the movement of the units, and building and enhancing depots to ensure adequate supply (Binner 2002, 29). At the end of the 19th century, the term also started to appear in military literature in the USA (Yelebika and Pupavac 2008, 15).

Supply chain is a system that incorporates supplier, procurement, manufacturer, distribution channels and consumer. It covers the goods flow from the supplier, across the manufacturer and distribution channels, to the consumer. In other words, it is a chain of relations and distribution potential, which serve the purpose of buying material, its modification into interim and final products, and distributing final products to the buyers. The complexity of the chain differs between different industries and companies.

Supply chain management is a process-oriented development, formation and guidance of all activities that begin with the purchase of raw materials and end with the sale of the final product to the consumer. Among other things, it also includes a comprehensive quality management.

Picture 1: Supply chain management



Source: AINA STEPHEN, B. Sc. (Hons), PGD, MBA, *Chief Regulatory Officer (CRO)*, NAFDAC, Nigeria. *Oskrbovalne verige v znanosti in praksi*. 2014.

The partnership between all the participants in the logistical supply chain is crucial for its quality. As per Bezzak¹, it enables the following:

- Reducing transport costs,
- Improving logistical network management,
- Reducing the number of detrimental events,
- Reducing fixed costs,
- Reducing warehouse costs,
- Reducing stock costs and
- Reducing administration costs.

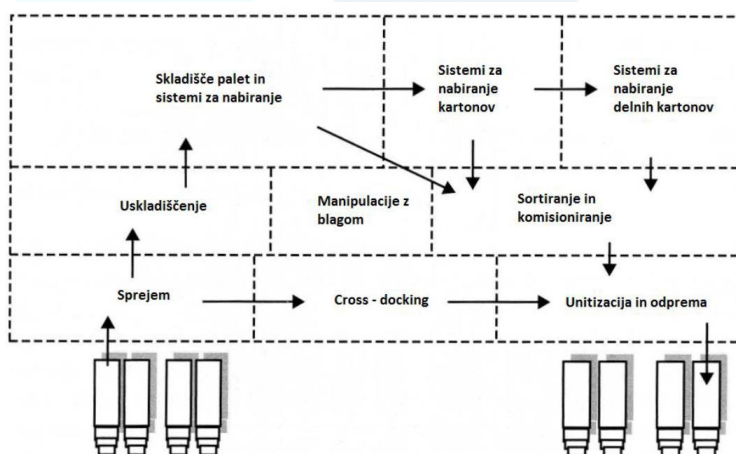
2 Warehouse process as part of the logistical process

The word “warehouse” describes facilities intended for storing goods – facilities that are categorised depending on the goods or the intended purpose. “Storage” is a term to describe the process of storing goods and stock. All warehouses share certain fundamental activities, regardless of their specific purposes. These are some that we can find in most warehouses:

- Collection,
- Repackaging,
- Storing,
- Gathering goods,
- Packaging and attaching price tags or declarations etc.
- Sorting and
- Unitization and shipping.

The picture below portrays these warehouse activities.

Picture 2: Ground plan of a warehouse and goods flow



Source: Frazelle, E. *World-class warehousing and material handling*. New York. McGraw, 2002.

After Poljanec, Matej. *Logistika notranjega transporta in skladiščenja* Zavod IRC, (elektronski vir). Ljubljana. 2011.

As per Pušenjak and Cedilnik¹, we need to consider management levels when it comes to warehouse activities. The first level of managing stock-storing systems is the strategy level. We plan the stock and warehouse locations based on the characteristics of the goods and the market needs (warehouse locations). As part of the strategic location planning, it is important to understand what kind of warehouse we need. Cedilnik lists an organization classification:

- Own warehouse or outsourced logistical service,
- Basic warehouse or DC,
- Transshipment platform, assembly centre and
- CrD centre (cross-docking).

The second management level is the operative level. We manage established capacities which need to be adjusted to the dynamics and goods flow and therefore ensure available supply capacities.

Definitions and classifications are important for organising different warehouse types depending on available data. Each unit needs to be clearly defined based on its purpose and business activity, which is the basis of each management.

3 Cross-docking system

Cross-docking, as part of the supply chain, is a process where all the products from the production plant or distributor's warehouse come directly to the retail chain or consumer, with minimal warehouse storage. Products are unloaded from trucks or trains and immediately loaded onto trucks or trains intended for the final user: retail shop/chain or customers. If there are many parcels with the same endpoint, there will be a need for fewer transport vehicles as we can divide larger parcels into smaller groups. On both occasions, we end with a more effective supply chain.

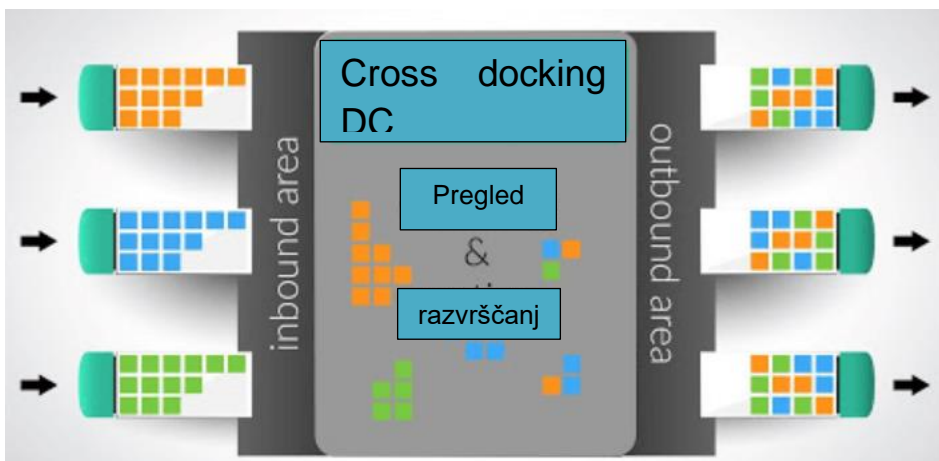
As early as the 30s of the 20th century, the American transport industry improved procedures and cross-docking operations. Companies were looking for ways to improve the effectiveness of their supply chain management systems, stimulate the speed of delivering goods to consumers and decrease stock costs. The implementation of the cross-docking method continued in the 50s, which improved supply chains, especially in the retail sector. In the 80s, one of the world's largest retailers, Walmart, introduced the cross-docking system and achieved an important competitive lead²¹.

We can say that the cross-docking system cannot be understood from just one perspective. Put simply, the described system is a posting system or a container chain. One of the most important facts is whether we have a logistical unit intended for the final user or whether it needs to be amended towards the final user (amending the quantity, attaching a new logistics sticker etc.) This system can work on a daily basis, where the parcel is shipped to the final user on the same day, or on a weekly basis, where we use an assembly point.

²¹ <https://www.inboundlogistics.com/articles/cross-docking/>

It is important to distinguish between cross-docking and drop-shipping. Both methods assist in preventing the stocks to lie around in warehouses. With drop-shipping, the products are sold directly by the supplier to the final customer. With cross-docking, the products are first sent to a warehouse, where they are sorted and/or repackaged, and then they are immediately sent to the final customers – consumers. Drop-shipping is extremely popular since there are no costs associated with maintaining stocks or manual counting. Although cross-docking assists with a smoother supply chain, it may not be the best solution for each company or warehouse. Before we start utilising cross-docking, we have to study the costs, productivity factors, customer satisfaction and process changes in a company. Cross-docking is especially useful for products that require monitoring temperature, perishable products, goods that have already been sorted and packaged, drinks, food, chemicals etc.

Picture 3: Cross-docking system



Source: https://www.odoo.com/documentation/16.0/applications/inventory_and_mrp/inventory/routes/concepts/cross

The benefits of this system²²:

- Storing, managing, counting, protecting, insurance and damage of the goods are expensive. Cross-docking removes these costs as the goods are immediately sent to outgoing transport with minimal retention.
- As they are stored for minimal time and barely handled, there is a lower risk of goods going bad or getting damaged, which improves the product quality.
- There are lower headcount costs as there is no need to handle stocks.

²² <https://www.tranquilbs.com/cross-docking/>

- Higher customer satisfaction as customers receive their orders quickly – which improves the delivery reputation etc.

The disadvantages of this system²³:

- Preparing logistical units can be time-consuming. It needs to be accurately planned and executed to ensure the success of the business.
- It requires a large investment to establish cross-docking – the terminals and vehicle lots.
- There can be multiple deliveries in one day which makes the speed of unloading incoming trucks and loading outgoing trucks crucial in tight schedules – to prevent congestion, damaging or losing goods etc.
- It isn't suitable for industries with a fewer stock turnaround – e.g. furniture, stationary etc.

Cross-docking can be used with all types of transport, including air, road, rail and maritime. We can achieve it using three basic methods:

- Continuous cross-docking – a method where the goods are moved in a continuous flow between the receiving and shipping areas.
- The consolidation method combines several small parcels before transport. Objects are temporarily stored in the warehouse terminal until they're shipped from the facility using fully loaded trucks.
- Deconsolidation is a method where large parcels are divided into smaller units. It is often used to sell directly to consumers – delivering to their homes or branches.

The warehouse needs to be able to support the cross-docking procedure. It needs to be shaped in a way that maximises the space and minimises the travel distance. It is crucial to have a warehouse with a well-organised flow of products to keep an efficient service. The number and positioning of loading ramps are crucial when it comes to planning. Depending on the size of the warehouse, we need to strive for an equal division that can accept all inbound parcels. The number, size and positioning of dock-doors defines how long the cross-docking operations will take.

4 Two examples of cross-docking system in use

4.1. Logist Schenker SLO

Logistics company Schenker SLO incorporated a cross-docking warehouse in Sneberje into their network of logistics centres. It is used for assembly points, local distribution and oceanic centres (junction for maritime cargo). As per the available data²⁴, the new building is fully optimised for cross-docking. The facility is 4,397 square meters in size and lies on an area that is 14,143 square meters in size. The building is fully optimised for cross-docking. It has 28 loading ramps and enables a quick cargo turnaround. They use a system for recognising

²³ <https://www.tranquilbs.com/cross-docking/>

²⁴ <https://tl.finance.si/8998303/Tako-je-videti-novo-Schenkerjevo-oceansko-vozlisce-v-Ljubljani?src=XNASLZAD>.

licence plates to automatically open the gates for the expected vehicles. Access is possible 24/7 but only for those who are authorised.

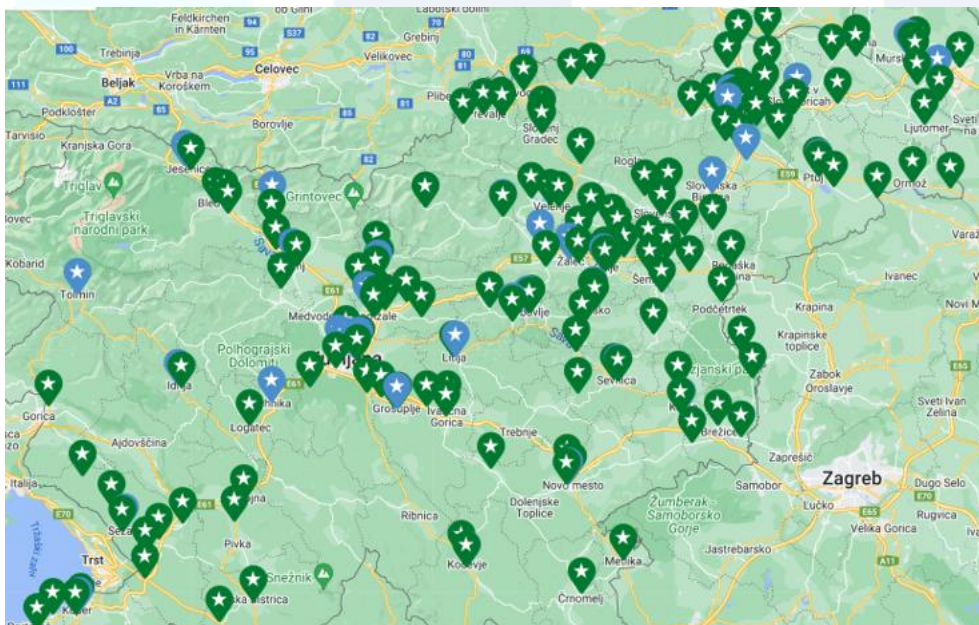
4.2. Retail company Engrotuš Ltd

Cross-docking is also being implemented at Engrotuš Ltd. The company's main business activity is retail stores for households and business customers, including specialised care products in their drugstores. With branches across Slovenia and 2,635 employees, it is one of the largest Slovenian retailers.

On the 31st of December 2022, Engrotuš Ltd consisted of:

- 101 stores and supermarkets,
- 163 franchise branches,
- 7 Cash & Carry branches,
- 43 drugstores,
- 2 restaurants,
- 2 cafes,
- online Cash & Carry store,
- online supermarket hitrinakupi.si and
- online drugstore tusdrogerija.si.

Picture 5: Tuš branches



Vir podloge: google

The retailer also operates a central distribution centre where 70% of the goods in the branches are distributed from. To increase the number of products distributed from the central warehouse, the company started incorporating cross-docking. At first, the cross-docking supply was used especially with suppliers who supplied the branches with a smaller amount of goods. Due to large transport costs, the cost ratio was large also per product unit which increased the wholesale price per unit. Cross-docking is done in the following way:

1. Suppliers prepare parcels according to the branches which ordered the goods;
2. Central warehouse functions as a postage centre:
 - Accepts the packages from the supplier (but does not check the contents)
 - Arranges the package to be delivered to the branch, together with the rest of the scheduled regular deliveries
 - The system is monitored with the appropriate programmes.
3. The branch checks the contents of the parcel and carries out a collection.

At the moment, the cross-docking system is still being developed but the company has already noticed the reduction of wholesale price and transport costs when it comes to the suppliers already using this system.

5. Swot analysis

Advantages	- Eliminating unnecessary warehouse processes and stocks; - Reducing costs, errors; - Increasing the speed of goods flow	Opportunities	- Consolidating operating processes; - Optimising operational fixed assets
Disadvantages	- A need for a larger capacity of handling surface (receiving and shipping zones); - Distinguishing systems when two or more are used; - Potrebuje se večja kapaciteta manipulativne površine (sprejemno/odpremna cona)	Dangers	- Adapting processes to suppliers

Source: After Higginson and Bookbinder, 2005. Bajec, P. Distribucijsko skladišče. Fakulteta za pomorstvo in promet, Portorož. 2019.

As per Bajec, there are two preconditions important for a successful cross-dock:

- Effective exchange of goods between the senders and the warehouse;
- Effective coordination of goods between inbound and outbound warehouse flows.

Both preconditions demand informatization of warehouse business activities, which is nowadays a necessity for creating a successful business.



СОУ „РИСТЕ РИСТЕСКИ-РИЧКО“, ПРИЛЕП

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13. ЗАЈАКНУВАЊЕ НА ВЕШТИНИТЕ И КОМПЕТЕНЦИИТЕ НА УЧЕНИЦИТЕ од СЕКТОР СООБРАЌАЈ, ТРАНСПОРТ И СКЛАДИРАЊЕ ПРЕКУ ERASMUS + ПРОЕКТОТ

Абстракт: Главна цел во овој труд е да се нагласи важноста од вклученоста на учениците од Сектор сообраќај, транспорт и складирање во Erasmus+ проекти кои се понудени на листата на Националната агенција во нашата држава. Имено се позабележително е дека учениците кои добиваат можности на овој начин да се анимираат во вакви и слични проекти стануваат поискусни, посигурни, повешти и поупатени во извршувањето на работните задачи посебно во делот на програмските содржини Учење преку работа кај работодавач.

Со овој наш труд сметаме дека ќе придонесеме кон подигање на свеста, зголемување на интересот на учениците за следење на наставните содржини и програми посебно од стручните предмети во рамките на овој Сектор како и привлекување на ученици при упис во следните години поради споделување на претходни добри практики и искуства. Акцентот ќе се стави на подготовките, реализацијата на проектот од самиот почеток до крај низ сите негови фази ,вклученоста на учениците во проектот, добивање на задачи и одговорности, начин на реализација на истите за време на дваесетдневниот престој во Барселос, Португалија во месец Април, 2023 година.

Цениме дека доколку и во иднина продолжиме да добиваме можност наши ученици да се вклучат во проекти како во овој за кој што ќе стане збор во трудот во голема мера ќе се подобри квалитетот на наставната во овој сектор, ќе бидеме препознатливи на мапата во европски рамки за реализација на проекти во делот на мобилности на ученици, ќе имаме се поквалитетни, позадоволни, поисполнети ученици и поголем интерес за упис на ученици во овој Сектор.

Клучни зборови: Erasmus+проект, ученици, мобилност, знаења,вештини, компетенции, работни задачи и одговорности.

1. Вовед

СОУ “Ристе Ристески-Ричко” од пред 5 години отпочна да се вклучува во различни проекти преку Erasmus+ програмите кои се транспарентно достапни на Националната агенција за образовни програми и мобилност при нашата држава.

Преку истата нашето училиште доби можност во повеќе наврати да биде вклучена во различни проекти кои беа од различни значења. Во некои од нив токму нашето училиште се појавуваше како носител т.е. координатор, во некои се приклучивме како партнер училиште а во рамките пак на КА 1- VET во два наврати наши ученици имаа можност да остваратт дваесетдневен престој во Mobility friends Кампусот за млади во Барселос, Португалија и во Словенија. Во првата ваква мобилност беа вклучени по 10 ученици од Сектор Електротехника и Машинство додека пак во 2023 година ваквата шанса ја добија учениците од Сектор Сообраќај, транспорт и складирање и Сектор Графичарство.

Во овој наш труд посебен акцент ќе се стави на искуствата, вклученоста на учениците во КА 1 VET од Сектор Сообраќај, транспорт и складирање кој се спроведе во месец Април 2023 година. Впрочем истиот проект требаше да се реализира многу порано но поради пандемијата со Covid 19 истиот беше одложен и краен рок за завршување беше во пролетниот период од 2023 година а се реализира од 02.04 до 23.04.2023.

Во рамките на овој проект учество зедаа вкупно 9 ученици од II и III година од двете квалификации, Техничар за Транспорт и шпедиција и Техничар за патен сообраќај. Избраните ученици беа придружувани од 1 професор кој им предава по стручни предмети во наставата, воедно истиот го предаваше и предметот учење преку работа кај работодавач. На тој начин учениците имаа целосна професионална, морална и емоционална поддршка за време на 20-ет дневниот престој во кампусот.

За тоа како течеа подготовките, за престојот на учениците во кампусот, нивните работни задачи, обврски и задолженија, стекнатите искуства, вештини и знаења, за забавениот дел од престојот кој е неизбежна компонента на едни вакви случувања и комплетната реализација на проектот ќе стане збор подолу во трудот.

2. Припреми и подготовка на учениците за вклучување во проектот

Со желба и намера како училиште да пристапиме сериозно кон целосната реализација и вклучувањето на учениците во проектот од КА 1 VET и достоинствено промовирање на нашето училиште во европски рамки во која можност преку вакви мобилности од Европската унија добиваат многу други стручни училишта од Европа кон спроведувањето на проектот од самиот почеток пристапиме крајно професионално и одговорно. Носители на спроведувањето на целокупните активности беа професорот Марјан Наумоски и Пипицаноска Ирена (педагог) кои низ годините се јавуваат како координатори на Erasmus+ проектите.

Најнапред на транспарентен начин на огласна табла во училиштето како и на WEB страната на училиштето беше истакнат конкурс за сите заинтересирани ученици кои сакаат да земат учество во проектот од Сектор Сообраќај, транспорт и складирање. Во конкурсот беа јасно ставени критериумите врз основа на кои требаше да се изврши селекција на учениците а тие беа следните:

- Успех во учењето од претходните години
- Поведение на учениците
- Оценки по стручните предмети
- Мислење на предметниот наставник кој е задолжен да го следи напредокот и работата во фирмите и институциите каде сераспределени учениците во рамките на предметот учење преку работа кај работодавач
- Поднесено CV
- Мотивационо писмо
- Учество на натпревари и освоени места , посебно во рамките на стручните предмети.

Покрај овие критериуми за сите заинтересирани ученици се спроведе тест за познавањата на Англискиот јазик во кој се содржеа 20 наменски прашања во насока на значењето и претходни искуства од вакви и слични проекти, за тоа какво значење имаат практично стекнатите знаења, нивната визија за идната професионална ориентација, што е она што е суштинско и најважно што го стекнуваат низ наставата и изучувањето на стручните предмети, нивниот интерес за стекнување на нови вештини, знаења и зајакнување на веќе стекнатите како и желбата , мотивираноста за запознавање на други култури, традиционални вредности и стекнување на нови пријателства.

После спроведениот тест се формира тричлена комисија која врз основа на поставените критериуми, покажаните резултати на тестот изготви бодовна листа со постигнатите резултати од сите пријавени ученици истата повторно се објави на огласна табла и на WEB страната од училиштето. На таков начин заврши циклусот на избор на ученици но после тоа следеше делот во кој беше повикана и реализирана родителска средба со родителите од сите ученици кои беа избрани. На средбата родители беа целосно информирани за се околу проектот, неговото значење,

одговорноста, задачите, начинот на однесување на нивните деца. Беше прочитан Кодексот на однесување на учениците за време на престојот и од страна на секој родител се побара да се потпише изјава со кои тие целосно ќе се согласни со се што беа запознати а и одговорни за однесувањето на своето дете за време на престојот во Барселос.

Средбата воедно беше искористена да им се прикаже кратка презентација за тоа што се треба да очекуваат учениците дека ќе се случува за време на реализацијата на проектот, кои се нивните обврски и задачи, беа запознати со Кампусот Mobility friends, неговиот капацитет и комодитет кој го нуди, за местата и градовите кои покрај работните обврски ќе имаат можност да ги посетат.

На средбата професорот придружник исто така потпиша изјава во која се обврзува дека ќе е крајно одговорен, професионален во извршувањето на својата мисија и ќе води подеднаква грижа за сите ученици.

3. Пристигнување на учениците во кампусот, доделување на работни задачи, задолженија и обврски

Во годината 2023, прогласена уште и како година за Европска во доемнот на вештините, преку Проектот „Your skills are your power“, „Твоите вештини се твоја сила“, 9 ученици од Секторот Сообраќај, транспорт и складирање заедно со својот предметен професор-придружник на 03.04.2023 се приклучија со другите учесници од други европски држави од исти и слични проекти во Кампусот Барселос, Португалија.



(слики од кампусот со учениците)

При самото пристигање беа детално запознати за условите кои ги нуди кампусот како и затоа кои денови им се определени како работни, со зададени задолженија според строго определен распоред за посета на реални компании и извршување на работни задачи.

Секој ученик однапред знаеше точно во кој ден во која релана компанија е распределен и на какви работни задачи. Навремено беа информирани за работните материјали со кои се задолжуваат во извршувањето на дадена работна задача, како да ракуваат со истите и како треба истите да ги остават на местото од каде што ги подигнале.

Се разбира дека пред извршување на било какво задолжение учениците беа запознавани со правилата, прописите, такаречи кодексот на однесување во Кампусот или пак во реалните компании. На овој начин се јакеше нивната морална компонента на личноста и се подигаше свеста за одговорност и професионалност.

Дел од работните активности се одвиваа во самиот кампус во специјализирано опремена и наменета просторија за извршување на работните обврски. Целта на сите активности без разлика кај беа водени беше иста, теоретски стекнатите знаења да ги зајакнат преку практични искуства, т.е преку искусвена настава на работно место под супервизија на назначено лице од компанијата или кампусот.

Воглавно целта беше насочена кон тоа како може да се употреби логистиката во најразлични транспортни цели и како да се организира целокупниот транспортен процес.

Во текот на работата и извршувањето на работните задолженија постојано на располагање ја имаа компјутерската технологија што во голема мера им олеснуваше на учениците во делот на пребарување на информации. На таков начин, лесно и едноставно имаа можност да наоѓаат различни рути и начини на превоз кој се користи ширум светот, се правеа пресметки за потребното време за транспорт и како би течел процесот на транспорт од почетната до крајната точка.

Самиот пестој во кампусот го искористија во него да научат од компететните и дознаат како се одвива конкретно работата-организацијата на транспортот во Mobility friends- кампусот во кој секојдневно организираа бројни транспортни рути за сите учесници кои беа сместувани во истиот.

Една од придобивките за учениците од престојот во кампусот беше и тоа што имаа можност да се упатат во видовите на транспортни возила со кои располагал кампусот како и во водењето на некој начин "попис" на истите во поглед на тоа дали се технички исправни, дали се безбедни за превоз и дали ги имаат потребните документи за превоз.

Конкретни задачи и задолженија кои им беа дадени на учениците а се однесуваа на подготовка на работно место беа следните :

- Пополнување на техничка документација-лист со технички податоци
- Водење на документација и дистрибуција
- Технички надзор во однос на уредите за контрола на сообраќајот
- Анализирање на податоците за сообраќајот
- Идентификација на приоритети
- Во рамки на тимско работење добиваа задачи запретходно подготвените предмети и стока да ги складираат, отстрануваат или пренесуваат по потреба

Повторно како придобивка во текот на изведување на практичната настава беше можноста учениците да ги вежбаат своите јазични способности затоа што целокупната комуникација со надредените се одвиваше на Англиски јазик. На овој начин покрај она што беше есенцијално во проектот, подобрување и усовршување на теоретските знаења непосредно преку работа и практично извршување на задачи, учениците едновременно ги зајакнуваа и меките вештини.

Кампусот и организацијата им овозможија да посетат и две големи компании, Correia and Casoro и Transport Nogueira, двете познати и признати во својот ресор на работа. Компанијата Correia and Casoro е компанија со традиција која постои веќе 50 години и истата е референтна во трговијата со индустриска, земјоделска опрема, хардвер, автогалантерија, бои, гас, предмети за домот и градината. Истата има комерцијална единица со површина од 300 метри квадратни која претставува реномирани, национални и меѓународни брендови.

Во рамките на оваа компанија учениците беа во состојба на директен начин да се запознаат со тоа на кој начин се изведува работата во магацините, како изгледаат некои од виљушкарите од кои дотогаш некои од нив ги имаа видено само преку слика од учебниците, како се врши контролата на документите наменети за стоката и со завршната фаза од пренос на стоката од продажниот во магацинскиот простор.

Втората компанија во која учениците од поблиску се запознаа со природата и начинот на функционирање на истата беше Transport Nogueira, која на пазарот на вршење на транспортни дејности постои од 1968 година. Истата развива иновативен и персонализиран патен транспорт на стоки и нуди логистички решенија. Компанијата поседува околу 300 сопствени камиони, влекачи и камиони-цистерни кои вршат транспорт низ повеќе европски држави.

На учениците им беше овозможено да го разгледаат работниот простор со кој располага компанијата, поточно канцелариите каде од компетентни и стручни лица им беше објаснето како се врши навигацијата, т.е. следењето на рутата на движење на нивните камиони низ европските држави.

Воедно во обиколката и разгледот на компанијата учениците го посетија и просторот наменет за сместување на камионите, нивно одржување и извршување на одредени поправки.

На непосреден начин на учениците им беше овозможено она што го учат во книгите да го доживеат искусно подобрувајќи си ги сопствените вештини и компетенции во доменот на транспортот, логистиката и шпедицијата. Некои нешта кои им „висеа“, и им беа недоволни јасни низ практични вежби и директно вклучени во работниот процес ги апсолвираа и на таков начин им станаа далеку поразбирливи но и интересни.



Вреди да се истакне дека за 20-ет дневниот престој учениците под надзор на наставникот -придружник како и на претпоставените во компаниите покажаа сериозен, одговорен пристап во работата за што потврда беше нивната навременост, професионално завршена работна задача, степенот на интерес кој го покажаа при извршување на работните обврски, манипулацијата со работните материјали со кои беа задолжени како и коректниот , дисциплиниран однос со сите за време на работата.

Искуството стекнато во кампусот се заокружи со неколкудневни прошетки до блиски места и градови до Барселос а од капитално значење се и пријателствата кои ги стекнаа за време на престојот како и запознавањето на нови култури и вредности.

За постигнатите резултати, покажаниот интерес и успешно звршена работа секој од учениците на крајот доби Eurorass сертификат како и сертификат оид самата организација од кампусот.На овој начин се валоризираше трудот и постигнатите резултати во работата.



(слики со сертификати)

4.Заклучни согледувања

Несомнено дека искуството кое го стекнаа учениците а им се овозможи преку Erasmus+ проектот, поконкретно во КА 1-VET е од непроценливо значење.

Она што посебно го издвојува проектот како успешен е тоа што овозможи дуализмот меѓу теоријата и праксата кој низ наставата во нашето училиште се чувствуваше да се надмине преку ставање на непосреден начин на учениците во улога на извршување на одговорни работни задачи и задолженија.

Од непроценливо значење пред е е тоа што учениците успеаја да ги прошират своите знаења воедно да ги зајакнат следните вештини и компетенции во делот на логистиката и транспортот:

- Идентификација на приоритети во работата
- Правилен избор на работни материјали и алтки
- Точно, прецизно пополнување и водење на техничка документација
- Правилно водење на документација и дистрибуција
- Правилна анализа на податоците во сообраќајот
- Препознавање на различни типови транспортни возила и нивна намена
- Правилно користење на компјутеската техника и технологија во транспортот
- Правилно селектирање на избор на документација при прием и дистрибуција на роба
- Правилно средување, складирање на стока во магацин



СОУ „РИСТЕ РИСТЕСКИ-РИЧКО“, ПРИЛЕП

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13. STRENGTHENING THE SKILLS AND COMPETENCIES OF STUDENTS FROM TRAFFIC, TRANSPORT AND STORAGE SECTOR THROUGH THE ERASMUS + PROJECT

Abstract: The main goal of this paper is to emphasize the importance of the involvement of students from the Traffic, Transport and Storage Sector in Erasmus+ projects that are offered on the list of the National Agency in our country. It is more noticeable that the students who get opportunities in this way to animate in such and similar projects become more experienced, more reliable, more skilled and more knowledgeable in the performance of work tasks, especially in the part of the program content Learning through work with an employer.

With this paper, we believe that we will contribute to raising awareness, increasing the interest of students in following the teaching content and programs, especially from professional subjects within this Sector, as well as attracting students for enrollment in the following years due to the sharing of previous good practices and experiences. The emphasis will be on the preparations, the realization of the project from the beginning to the end through all its phases, the involvement of the students in the project, receiving tasks and responsibilities, the way of realizing them during the twenty-day stay in Barcelos, Portugal in month of April, 2023.

We appreciate that if in the future we continue to get the opportunity for our students to get involved in projects like this one, which will be discussed in the paper, will greatly improve the quality of teaching in this sector, we will be recognizable on the map in European frameworks for realization of projects in the area of mobility of students, we will have better quality, more satisfied, more fulfilled students and more interest in enrolling students in this Sector.

Keywords: Erasmus+ project, students, mobility, knowledge, skills, competencies, work tasks and responsibilities.

1. Introduction

"Riste Risteski-Richko" Secondary School started 5 years ago to be involved in various projects through the Erasmus+ programs which are transparently available to the National Agency for Educational Programs and Mobility in our country.

Through it, our school got the opportunity on several occasions to be involved in different projects that were of different meanings. In some of them, it was our school that appeared as the holder, ie. coordinator, in some we joined as a partner school, and within the framework of KA 1-VET, on two occasions our students had the opportunity to spend a twenty-day stay at the Mobility friends Youth Campus in Barcelos, Portugal and in Slovenia. In the first such mobility 10 students from the Department of Electrical Engineering and Mechanical Engineering were involved, while in 2023 students from the Department of Traffic, Transport and Storage and the Department of Graphics received this opportunity.

In this paper of ours, special emphasis will be placed on the experiences, the involvement of the students in KA 1 VET from the Traffic, Transport and Storage Sector, which was implemented in the month of April 2023. In fact, the same project should have been implemented much earlier, but due to the Covid 19 pandemic, it was postponed and the deadline for completion was in the spring of 2023, and it will be realized from 02.04 to 23.04.2023.

In the framework of this project, a total of 9 students from second and third year of both qualifications took part, Transport and forwarding technician and road traffic technician. The selected students were accompanied by 1 professor who taught them professional subjects in the teaching, he also taught and the subject of learning through work at an employer. That way, the students had full professional, moral and emotional support during their 20-day stay on campus.

About how the preparations went, about the students' stay on campus, their tasks, responsibilities and duties, the acquired experiences, skills and knowledge, about the entertaining part of the stay which is an inevitable component of such developments and the complete realization of the project will be discussed below in the paper.

2. Prepare and prepare the students for inclusion in the project

With the desire and intention as a school to approach seriously the full implementation and inclusion of students in the KA 1 VET project and worthy promotion of our school in the European framework in which many other vocational schools from Europe get the opportunity through such mobility from the European Union to implement, we approached the project from the very beginning in an extremely professional and responsible manner. The bearers of the implementation of the overall activities were professor Marjan Naumoski and Irena Pipidzhanoska (pedagogue), who over the years appear as coordinators of Erasmus+ projects.

First of all, in a transparent way, on the bulletin board in the school as well as on the WEB page of the school, a contest was highlighted for all interested students who want to take part in the project from the Traffic, Transport and Storage Sector. In the competition, the criteria on the basis of which the students were to be selected were clearly stated, and they were as follows:

- Success in learning from previous years
- Student behavior
- Grades for professional subjects
- Opinion of the subject teacher who is in charge of monitoring progress and work in companies and institutions where students are distributed within the subject of learning through work for an employer
- CV submitted
- Motivational letter
- Participation in competitions and winning places, especially within professional subjects.

In addition to these criteria, a test on the knowledge of the English language was carried out for all interested students, which contained 20 dedicated questions in the direction of the meaning and previous experiences of such and similar projects, the significance of the practically acquired knowledge, their vision for the future professional orientation, which is what is essential and most important that they acquire through the teaching and learning of professional subjects, their interest in acquiring new skills, knowledge and strengthening the ones already acquired, as well as the desire, the motivation to get to know other cultures, traditional values and the acquisition of new friendships.

After the conducted test, a three-member committee is formed, which, based on the set criteria, the results of the test, prepared a score list with the results of all registered students, which was re-published on the bulletin board and on the WEB page of the school. In this way, the cycle of selecting students ended, but after that followed the part in which a parent's meeting was called and held with the parents of all the students who were selected. At the meeting, parents were fully informed about everything about the project, its meaning, responsibility, tasks, behavior of their children. The Student Code of Conduct during the stay

was read and each parent was asked to sign a statement that they fully agree with everything they have been made aware of and are responsible for their child's behavior during their stay at Barcelos.

The meeting was also used to show them a short presentation about what the students should expect that will happen during the implementation of the project, what are their responsibilities and tasks, they were introduced to the Mobility friends Campus, its capacity and the amenities it offers, about the places and cities that they will have the opportunity to visit in addition to their work duties.

At the meeting, the accompanying professor also signed a statement in which he undertakes that he will be extremely responsible, professional in the performance of his mission and will take equal care of all students.

3. Arrival of students on campus, assignment of tasks, duties and responsibilities

In the year 2023, also declared as the European year in the domain of skills, through the "Your skills are your power" Project, 9 students from the Department of Traffic, Transport and Storage together with their subject-accompanying professor on 03.04.2023 they joined other participants from other European countries from the same and similar projects in the Barcelos Campus, Portugal.



(pictures from the campus with the students)

Upon arrival, they were informed in detail about the conditions offered by the campus, as well as which days are designated as working days, with assigned tasks according to a strictly defined schedule for visiting real companies and performing work tasks.

Each student knew in advance exactly on which day he was assigned to which company and to which work tasks. They were informed in a timely manner about the work materials with which they are required to perform a given work task, how to handle them and how they should leave them at the place from where they were picked up.

XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

Of course, before performing any task, the students were familiarized with the rules, regulations, so-called code of conduct in the campus or in real companies. In this way, their moral component of the person was strengthened and the awareness of responsibility and professionalism was raised.

Part of the work activities took place in the campus itself in a specially equipped and dedicated room for the performance of work duties. The goal of all activities, regardless of where they were conducted, was the same, to strengthen the theoretically acquired knowledge through practical experiences, i.e. through experiential teaching at a workplace under the supervision of a designated person from the company or campus.

The main objective was focused on how logistics can be used in a variety of transport purposes and how to organize the entire transport process.

In the course of the work and the execution of the work duties, they had computer technology at their disposal at all times, which greatly facilitated the students in the search for information. In this way, they easily and simply had the opportunity to find different routes and modes of transportation that are used

around the world, calculations were made about the time required for transport and how the transport process would flow from the starting point to the end point.

They used the very time in the campus to learn from the competent people and find out how the work - the organization of transport in Mobility friends - the campus in which they organized numerous transport routes daily for all the participants who were accommodated in it, takes place.

One of the benefits for the students from their stay on campus was that they had the opportunity to familiarize themselves with the types of transport vehicles that the campus had, as well as keeping an "inventory" of them in terms of whether they are technically correct, whether they are safe for transportation and whether they have the necessary documents for transportation.

Specific tasks and tasks that were given to the students and related to the preparation of a workplace were the following:

- Completion of technical documentation-sheet with technical data
- Management of documentation and distribution
- Technical supervision regarding traffic control devices
- Analyzing traffic data
- Identification of priorities
- As part of teamwork, they were given tasks to store, remove or transfer the previously prepared objects and goods as needed.

Again, as a benefit during the performance of the practical teaching was the opportunity for the students to practice their language skills because the entire communication with the superiors took place in English. In this way, in addition to what was essential in the project, the improvement and refinement of theoretical knowledge directly through work and practical performance of tasks, students simultaneously strengthened their soft skills.

The campus and the organization allowed them to visit two large companies, Correia and Casoro and Transport Nogueira, both well-known and recognized in their field of work. The company Correia and Casoro is a company with a tradition that has existed for 50 years and it is a reference in the trade of industrial, agricultural equipment, hardware, auto accessories, paints, gas, items for the home and the garden. It has a commercial unit with an area of 300 square meters which represents renowned, national and international brands.

Within this company, the students were able to get to know in a direct way how work is done in the warehouses, what some of the forklifts look like, some of which they had only seen through a picture from the textbooks, how the control is carried out of the documents intended for the goods and with the final stage of the transfer of the goods from the sales area to the warehouse.

The second company in which the students got to know more closely the nature and way of functioning of it was Transport Nogueira, which has been in the market of carrying out transport activities since 1968. It develops innovative and personalized road transport of goods and offers logistic solutions. The company owns about 300 own trucks, tractors and tank trucks that carry out transport through several European countries.

The students were given the opportunity to look at the workspace available to the company, namely the offices, where competent and expert people explained to them how to navigate, i.e. tracking the route of their trucks across European countries.

At the same time, during the tour and inspection of the company, the students also visited the area intended for the accommodation of the trucks, their maintenance and the execution of certain repairs.



XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

In an immediate way, the students were enabled to experience what they learn in the books, improving their own skills and competencies in the domain of transport, logistics and forwarding. Some things that were "hanging" to them and were not clear enough through practical exercises and directly involved in the work process, they absolved them and in that way they became much more understandable and interesting.

It is worth emphasizing that for the 20th day stay, the students under the supervision of the accompanying teacher as well as the supervisors in the companies showed a serious, responsible approach to work, which was confirmed by their punctuality, professionally completed work tasks, the degree of interest they showed during execution of work duties, the manipulation of work materials with which they were in charge, as well as the correct, disciplined relationship with everyone during the work.

The experience gained on campus was rounded off with several weeks of walks to nearby places and cities to Barcelos, and the friendships gained during the stay as well as the acquaintance with new cultures and values are of capital importance.

For the achieved results, demonstrated interest and successfully completed work, each of the students eventually received a Europass certificate as well as a certificate from the organization itself from the campus.



(pictures with certificates)

4. Concluding observations

There is no doubt that the experience gained by the students and made possible through the Erasmus+ project, more specifically in KA 1-VET, is invaluable.

What makes the project stand out as successful is that it enabled the dualism between theory and practice that was felt throughout the teaching in our school to be overcome by putting the students directly in the role of performing responsible work tasks and chores.

It is of inestimable importance that the students were able to expand their knowledge and also strengthen the following skills and competencies in the area of logistics and transport:

- Identification of work priorities
- Correct selection of working materials and tools
- Accurate, precise filling and maintenance of technical documentation
- Proper management of documentation and distribution
- Correct analysis of traffic data
- Recognition of different types of transport vehicles and their purpose
- Correct use of computer technology and technology in transport
- Proper selection of documentation during receipt and distribution of goods
- Correct arrangement, storage of goods in a warehouse



Škola za cestovni promet

ŠKOLA ZA CESTOVNI PROMET, ZAGREB

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14. UTJECAJ UOČLJIVOSTI BICIKLISTA NA SIGURNOST U CESTOVNOM PROMETU

Sažetak:

Mobilnost je temeljno pravo svakoga čovjeka. Iako se biciklizam smatra dijelom aktivnog života koji je povezan sa zdravstvenim prednostima, biciklisti su izloženi nizu opasnosti tijekom sudjelovanja u prometu do željenog odredišta. Biciklisti, su obzirom na otpornost, brzinu i masu automobila uz pješake, najugroženija skupina sudionika u cestovnom prometu. Veliki broj opasnosti skriva se u nedovoljno osvijetljenoj biciklističkoj infrastrukturi, nedovoljno uočljivoj odjeći biciklista, lošim i nedovoljnim infrastrukturnim rješenjima, prometnoj signalizaciji i karakteristikama prometnog toka. Jedna od opasnosti je nedovoljno znanje biciklista o važnosti primjene reflektirajuće odjeće. Bilo bi, međutim, pogrešno ograničiti mobilnost biciklista kako bi se povećala sigurnost u prometu. Naprotiv, treba poduzeti mjere za promicanje neovisne, autonomne mobilnosti biciklista prilagodbom prometnoga okruženja. Sudionik je u prometu najvažnija karika u lancu sigurnosti prometa na cestama, neovisno o primijenjenim tehničkim mjerama i učinkovitosti politika. Sigurnost prometa na cestama ponajprije ovisi o ponašanju sudionika u prometu. Zbog toga su odgoj, obrazovanje, primjena i usklađivanje zakona osnova za postizanje cilja.

Ključne riječi:

- sigurnost biciklista
- uočljivost biciklista
- prometne nesreće

Utjecaj uočljivosti biciklista na sigurnost u cestovnom prometu

1. Cilj i svrha projekta

Glavni cilj predloženog projekta je povećanje sigurnosti biciklista na cestama na području Republike Hrvatske za 10% u dvije godine, što je u skladu s Nacionalnim planom sigurnosti cestovnog prometa RH 2021. - 2030. (50 % u 10 godina.), a definirano je područjem djelovanja PD7 (Aktivni oblici prometovanja). Ideja ovog projekta je utvrditi utječe li i u kojoj mjeri na njihovu sigurnost odjeća koju tijekom sudjelovanja u prometu koriste.

Podciljevi podrazumijevaju ispitivanje vidljivosti biciklista u različitim kombinacijama odjeće (svijetla odjeća, tamna odjeća, reflektirajući prsluci) noću i danju i pri različitim vremenskim uvjetima, kako bi se dobili kvantitativni podaci o broju korisnika, povećanje broja sudionika u prometu koji nose odjeću s retroreflektirajućim materijalima, povećanje broja sudionika u prometu koji imaju spoznaju o opasnostima kada je njihova uočljivost loša, provođenje preventivnih, edukativnih i promidžbenih aktivnosti o važnosti korištenja svjetala, reflektirajućih prsluka i kacige za bicikliste, kreiranje edukativnih programa vezanih uz uočljivost biciklista, izrada karte žarišta s prometnim nesrećama u kojima su sudjelovali biciklisti, prijedlog mjera za poboljšanje uočljivosti biciklista. Također, projektom se provode edukativne aktivnosti na prometnim vježbalištima s ciljem povećanja sigurnosti biciklista.

Svrha podciljeva projekta je prikazivanje važnosti vidljivosti biciklista s aspekta sigurnosti te analiziranje kako različita odjeća utječe na vidljivost biciklista. Rezultat projekta je usvajanje stava biciklista o važnosti uočljivosti, procjena utjecaja uočljivosti na nastanak prometnih nesreća i stjecanje znanja o korištenju odjeće i opreme s retroreflektirajućim oznakama. Edukacijom i preventivom, pokušava se postići daljnje odgovorno ponašanje biciklista u svrhu povećanja njihove sigurnosti. Indikatori kojima se mjeri učinkovitost projekta su broj prometnih nesreća s nastradalim biciklistima i udio biciklista s odgovarajućom retroreflektirajućom opremom.

Također, jedan od ciljeva projekta je prilagodba ponašanja biciklista različitim situacijama u prometu. Efekt implementacije navedenih mjera je nepouzdan na kratki rok, a održivost biti će vidljiva u dužem vremenskom periodu, od minimalno 3 i više godina. Boljim educiranjem svih sudionika u cestovnom prometu podiže se svijest o prometnoj sigurnosti kod građana koji su direktno ili indirektno involvirani u projekt.

2. Opis aktivnosti

U projektu se istraživanje, edukacija, prevencija i promidžba provodi u Gradu Zagrebu, na lokacijama najrizičnijim za bicikliste, na reprezentativnom uzorku od minimalno 700 biciklista, a rezultati istraživanja, edukacije, prevencije i promidžbe prezentiraju se i u ostalim većim gradovima u Republici Hrvatskoj (Split, Rijeka, Zadar, Šibenik, Gospić, Metković, Osijek, Beli Manastir, Varaždin i Čakovec). Edukacije, radionice, okrugli stolovi i treninzi održavaju se u Gradu Zagrebu i ostalim većim gradovima u Republici Hrvatskoj (Split, Rijeka, Varaždin, Osijek, Čakovec i dr.), na što većoj populaciji stanovnika.

Aktivnosti prema cilju "povećanje broja promotivnih aktivnosti o važnosti uočljivosti biciklista":

- Održavanje edukacijskih i promidžbenih aktivnosti, radionica i okruglih stolova na temu loše uočljivosti kao uzročnika prometnih nesreća u kojima su nastradali biciklisti.
- Organiziranje edukacija za bicikliste, radionice za prometne stručnjake kako bi kreirali rješenja koja bi doprinosila većoj sigurnosti u cestovnom prometu i okruglih stolova na kojima bi se prikazivali primjeri dobrih praksi.

Aktivnosti prema cilju "povećanje broja sudionika u prometu koji imaju spoznaju o opasnostima kada je njihova uočljivost loša":

- Provođenje preventivno- edukativnih i promidžbenih aktivnosti sa aspekta sigurnosti cestovnog prometa.
- Edukacija o opasnostima u cestovnom prometu kroz provođenje same kampanje o projektu, dijeljenje promidžbenih materijala na temu uočljivosti biciklista, održavanju edukacija na temu uočljivosti biciklista u osnovnim i srednjim školama i mjesnim odborima, promoviranje odgovornog ponašanja biciklista kroz društvene mreže te promidžbom u tiskanim i elektronskim medijima.

Aktivnosti prema cilju "povećanje broja sudionika u prometu koji nose odjeću i opremu s retroreflektirajućim materijalima":

- Intenzivno promicanje obaveze osvjetljavanja (retroreflektirajuće materijale) biciklista.

- Promocija važnosti korištenja odjeće sa retroreflektirajućim materijalima i svjetlećim oznakama kroz provođenje same kampanje o projektu, održavanju edukacija na temu uočljivosti u osnovnim i srednjim školama i mjesnim odborima.

Aktivnosti prema cilju "dobivanje podataka o svjesnosti biciklista o važnosti retroreflektirajućih i svjetlećih materija na obući i opremi":

- Anketiranje biciklista o njihovoj percepciji važnosti retroreflektirajućeg i svjetlećeg materijale na odjeći i opremi.
- Priprema, provedba, obrada anketa koje će se provesti među biciklistima na frekventnim lokacijama u urbanim sredinama o njihovoj percepciji važnosti retroreflektirajućeg materijala na odjeći i opremi.
- Ankete će se provoditi na terenu i preko društvenih i elektronskih medija.

Aktivnosti prema cilju "prijedlog mjera za poboljšanje uočljivosti biciklista":

- Široj zajednici prezentirat će se prijedlozi i smjernice koje će biti primjenjive na bicikliste kao jednu od najranjivijih sudionika u prometu, s aspekta dobre i jasne uočljivosti.
- Organiziranjem završnog okruglog stola, na kojem će biti pozvani svi tiskovni i elektronski mediji i drugi dionici (MUP, MMPI, MZOŠ, lokalna samouprava, prometni stručnjaci i dr), prezentirati će se glavne smjernice, na koji način se treba strateški i sustavno podizati svijest o uočljivosti i sigurnosti biciklista kako bi se smanjio broj prometnih nesreća s nastradalim biciklistima, sukladno Nacionalnom programu sigurnosti cestovnog prometa 2021. - 2030.

Aktivnosti prema cilju "izrada toplinskih karata potencijalnih lokacija opasnih mjesta prometnih nesreća u kojima sudjeluju biciklisti.":

- Unos i obrada podataka iz UPN-a u programskom paketu Q-GIS, te mapiranje svih prometnih nesreća s poginulim i nastradalim biciklistima.
- Sukladno podacima dobivenim iz upitnika o prometnim programskom alatu će se označiti točne lokacije svih prometnih nesreća na području Grada Zagreb i gradova prema kojima će biti usmjerene edukacije, prevencije i promidžbe, te će se utvrditi "crne točke" za bicikliste, tj. gdje se dogodilo više istoznačnih prometnih nesreća na određenoj lokaciji.

Aktivnosti prema cilju "povećanje sigurnosti biciklista na cestama u Republici Hrvatskoj za 10% u dvije godine":

- Međuinstitucionalna suradnja između više dionika u sigurnosti cestovnog prometa. Organiziranje više stručnih radionica, edukacija, promotivnih aktivnosti na društvenim mrežama i tiskovnim i elektronskim medijima, te u prostorima osnovnih i srednjih škola, gdje će biti pozvani svi zainteresirani dionici (MUP, MMPI, MZOŠ, tijela lokalne samouprave, rometni stručn/sci, dr.).

Aktivnost prema cilju "Ispitivanje vidljivosti biciklista kako bi se dobili kvantitativni podaci o broju korisnika koji upotrebljavaju reflektirajuće materijale":

- Prikupljanje podataka o korištenju različitih kombinacija odjeće (svijetla odjeća, tamna odjeća, reflektirajući prsluci, svjetleći uređaji) noću i danju i pri različitim vremenskim uvjetima.
- Definiranje pojedinih lokacija i vremenskih perioda prikupljanja podataka; Prikupljanje relevantnih statističkih podataka na pojedinim lokacijama; Anketiranje biciklista o uočljivosti kao čimbeniku sigurnosti cestovnog prometa; Prikupljanje podataka o osvjetljenosti na odabranim lokacijama tijekom određenim vremenskih perioda (pješački prijelazi, osvjetljenost razine kolnika, biciklističke staze i trake), Prikupljanje relevantnih statističkih podataka biciklističkog toka s aspekta uočljivosti.

Aktivnosti prema cilju "kreiranje edukativnih programa vezanih uz uočljivost biciklista":

- Organiziranje specijaliziranih edukacija na temu uočljivosti biciklista u prometu kao jednu od najranjivijih sudionika u prometu.
- Organiziranje više edukacija u prostorijama osnovnih i srednjih škola, mjesnih odbora, gradskih četvrti, gdje bi se učenicima i svim zainteresiranim građanima ukazalo na opasnosti, kada je uočljivost biciklista slaba, te na koji način poboljšati njihovu uočljivost.

Aktivnost prema cilju „provedenje biciklističkih ispita i poligona sigurne vožnje za učenike osnovnih i srednjih škola“.

- Škola za cestovni promet organizirala bi poligon sigurne vožnje za bicikliste, za sve dionike.

3. Područje djelovanja i pokazatelji rezultata

U realizaciju projekta uključena je lokalna samouprava na razini mjesnih odbora i gradskih četvrti Grada Zagreba, te će na taj način Projekt je i podržan i prepoznatljiv u lokalnoj zajednici. Projekt je dodatno popraćen od strane tiskovnih i elektronskih medija što pridonosi njegovoj transparentnosti kako na lokalnoj, tako i na nacionalnoj razini. Projekt je podržan

od strane Fakulteta prometnih znanosti, koji svojim stručnim kadrom i programskim alatima doprinosi implementaciji akcijskog plana izvedbe predviđenih projektnim zadatkom. Kroz aktivnosti djelatnika Škole za cestovni promet projekt iznosi rezultate na osnovnoškolsku i srednjoškolsku populaciju kako bi mogli preuzeti odgovornost za sigurnost kako sebe samih, tako i ostalih sudionika u prometu na cestama, u segmentu važnosti uočljivosti biciklista u prometu.

Promjenom ponašanja biciklista i ostalih sudionika u cestovnom prometu, kroz podizanje prometne kulture i poštivanja prometnih propisa i modifikacijom okruženja, moguće je poboljšanje sigurnosti biciklista na cestama i drugim prometnim površinama u urbanim sredinama. Povećanjem razine svijesti involviranih sudionika na projektu te povećanjem njihovog znanja o sigurnosti prometa na cestama neposredno se djeluje na ostvarivanje ciljeva iz Nacionalnog programa sigurnosti cestovnog prometa RH 2021 - 2030; u području djelovanja PD7 (Aktivni oblici prometovanja). Pokazatelji rezultata su:

- 500 učenika izravno i
- 2.000 osoba posredno preko različitih medijskih servisa.

Održivost projekta procjenjuju dionici projekta, te nadležne službe MUP-a po završetku realizacije projekta 2024. godine zajedno sa stručnjacima iz Škole za cestovni promet, Fakulteta prometnih znanosti i drugim neovisnim stručnjacima iz područja sigurnosti cestovnog prometa.

Evaluaciju će provesti izvoditelji projekta kroz redovna obvezna izvješća, te Ministarstvo unutarnjih poslova kroz povremenu kontrolu izvršenja predviđenih aktivnosti uz pomoć samih ciljanih sudionika projekta koji će u završnoj anketi iznijeti svoje ocjene i mišljenja o projektu i njegovoj izvedbi. Indikator kojim će se dokazati postizanje općeg cilja je smanjenje prometnih nesreća biciklista (s lakše ozlijeđenima, teže ozlijeđenima i poginulima). Sukladno poduzetim mjerama realno je očekivati povećanje sigurnosti pješaka na cestama u urbanim sredinama, u Republici Hrvatskoj za 10% u sljedeće dvije godine. Nadzor će provoditi voditelj projekta i predstavnici partnera u projektu.

4. Zaključak

Projekt o uočljivosti biciklista ujedno je i "nastavak" uspješno provedenog projekta financiranog iz NPSCP "Uoči me!!!" vezanog za uočljivost pješaka kojim se već 3. godinu nakon završetka projekta provode edukacijske, preventivne i promidžbene aktivnosti. Također, provedenim projektom se uspješno provodi i fakultativni predmet "Uočljivost pješaka" u kojem učenici Škole za cestovni promet educiraju učenike u Osnovnim Školama.

Ulaganjem u sigurnost biciklističkog prometa gradi se snažnija i veća biciklistička zajednica, potiče se zdrav načina življenja, te smanjuje utjecaj motornog prometa na zagađenje zraka i okoliša. Primjenom navedenih preventivnih akcija prevencija, edukacija i promidžba znatno se povećava sigurnost biciklističkog prometa u Republici Hrvatskoj.





Škola za cestovni promet

ŠKOLA ZA CESTOVNI PROMET, ZAGREB

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14. THE INFLUENCE OF VISIBILITY OF CYCLISTS ON SAFETY IN ROAD TRAFFIC

Abstract:

Mobility is a fundamental right of every human being. Although cycling is considered part of an active lifestyle that is associated with health benefits, cyclists are exposed to a number of hazards while participating in traffic to their desired destination. Cyclists, considering the resistance, speed and mass of cars along with pedestrians, are the most vulnerable group of participants in road traffic. A large number of dangers are hidden in insufficiently lit cycling infrastructure, insufficiently visible clothing of cyclists, poor and insufficient infrastructure solutions, traffic signals and traffic flow characteristics. One of the dangers is the insufficient knowledge of cyclists about the importance of using reflective clothing. However, it would be wrong to limit the mobility of cyclists in order to increase traffic safety. On the contrary, measures should be taken to promote the independent, autonomous mobility of cyclists adapted to the traffic environment. In traffic, the participant is the most important link in the chain of road traffic safety, regardless of the applied technical measures and efficiency policy. Traffic safety on roads primarily depends on the behavior of road users. This is why upbringing, education, application and harmonization of laws are the basis for achieving the goal.

Keywords:

- safety of cyclists
- visibility of cyclists
- traffic accidents

THE INFLUENCE OF VISIBILITY OF CYCLISTS ON SAFETY IN ROAD TRAFFIC

1. Goal and purpose of the project

The main goal of the proposed project is to increase the safety of cyclists on the roads in the Republic of Croatia by 10% in two years, which is in accordance with the National Road Traffic Safety Plan of the Republic of Croatia 2021 - 2030 (50% in 10 years), and is defined by the field of action PD7 (Active forms of traffic). The idea of this project is to determine whether and to what extent the clothing they use while participating in traffic affects their safety.

The sub-goals include examining the visibility of cyclists in different combinations of clothing (light clothing, dark clothing, reflective vests) at night and during the day and under different weather conditions, in order to obtain quantitative data on the number of users, increasing the number of road users wearing clothing with retroreflective materials, increasing the number of road users who are aware of the dangers when their visibility is poor, conducting preventive, educational and promotional activities about the importance of using lights, reflective vests and helmets for cyclists, creation of educational programs related to the visibility of cyclists, creation of a map of hotspots with traffic accidents involving cyclists, proposal of measures to improve the visibility of cyclists. Also, the project implements educational activities at traffic training grounds with the aim of increasing the safety of cyclists.

The purpose of the sub-goals of the project is to show the importance of visibility of cyclists from the aspect of safety and to analyze how different clothing affects the visibility of cyclists. The result of the project is the adoption of the attitude of cyclists on the importance of visibility, the assessment of the impact of visibility on the occurrence of traffic accidents and the acquisition of knowledge about the use of clothing and equipment with retroreflective markings. Through education and prevention, an attempt is made to achieve further responsible behavior of cyclists in order to increase their safety. The indicators used to measure the effectiveness of the project are the number of road accidents involving injured cyclists and the proportion of cyclists with appropriate retro-reflective equipment.

Also, one of the goals of the project is to adapt the behavior of cyclists to different traffic situations. The effect of the implementation of the mentioned measures is unreliable in the

short term, and the sustainability will be visible in a longer period of time, of at least 3 years and more. Better education of all participants in road traffic raises awareness of traffic safety among citizens who are directly or indirectly involved in the project.

2. Description of the activity

In the project, research, education, prevention and promotion are carried out in the City of Zagreb, at the most risky locations for cyclists, on a representative sample of at least 700 cyclists, and the results of research, education, prevention and promotion are also presented in other major cities in the Republic of Croatia (Split, Rijeka, Zadar, Šibenik, Gospić, Metković, Osijek, Beli Manastir, Varaždin and Čakovec). Education, workshops, round tables and trainings are held in the City of Zagreb and other major cities in the Republic of Croatia (Split, Rijeka, Varaždin, Osijek, Čakovec, etc.), for the largest possible population. Activities towards the goal of "increasing the number of promotional activities on the importance of being visible to cyclists":

- Holding educational and promotional activities, workshops and round tables on the topic of poor visibility as a cause of traffic accidents in which cyclists are killed.
- Organizing training sessions for cyclists, workshops for traffic experts to create solutions that would contribute to greater safety in road traffic and round tables where examples of good practices would be presented.

Activities towards the goal of "increasing the number of road users who are aware of the dangers when their visibility is poor":

- Implementation of preventive-educational and promotional activities from the aspect of road traffic safety.
- Education about the dangers in road traffic through the implementation of the campaign itself about the project, distribution of publicity materials on the topic of visibility of cyclists, holding educations on the topic of visibility of cyclists in primary and secondary schools and local committees, promoting responsible behavior of cyclists through social networks and advertising in print and electronic media.

Activities towards the goal of "increasing the number of road users wearing clothing and equipment with retroreflective materials":

XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

- Intensive promotion of the obligation to illuminate (retroreflective materials) cyclists.
- Promotion of the importance of using clothing with retroreflective materials and luminous markings through the implementation of the campaign itself about the project, holding educations on the subject of visibility in primary and secondary schools and local committees.

Activities towards the objective "obtaining data on cyclists' awareness of the importance of retroreflective and luminous materials on footwear and equipment":

- Surveying cyclists about their perception of the importance of retroreflective and luminous material on clothing and equipment.
- Preparation, implementation, processing of surveys that will be conducted among cyclists at frequent locations in urban environments on their perception of the importance of retroreflective material on clothing and equipment.
- Surveys will be conducted in the field and through social and electronic media.

Activities towards the goal of "proposed measures to improve the visibility of cyclists":

- Proposals and guidelines will be presented to the wider community that will be applicable to cyclists as one of the most vulnerable road users, from the aspect of good and clear visibility.
- By organizing a final round table, to which all press and electronic media and other stakeholders will be invited (MUP, MMPI, MZOS, local self-government, traffic experts, etc.), the main guidelines will be presented, how to strategically and systematically raise awareness of the visibility and safety of cyclists in order to reduce the number of traffic accidents with injured cyclists, in accordance with the National Road Traffic Safety Program 2021 - 2030.

Activities according to the objective "creation of heat maps of potential locations of dangerous places of traffic accidents in which cyclists participate.":

- Input and processing of data from UPN in the Q-GIS software package, and mapping of all traffic accidents with dead and injured cyclists.
- In accordance with the data obtained from the questionnaire on the traffic program tool, the exact locations of all traffic accidents in the area of the City of Zagreb and the cities to which education, prevention and publicity will be directed will be marked, and "black spots" for cyclists will be determined, i.e. where multiple traffic accidents of the same nature occurred in a certain location.

Activities towards the goal of "increasing the safety of cyclists on the roads in the Republic of Croatia by 10% in two years":

- Inter-institutional cooperation between multiple stakeholders in road safety. Organization of several professional workshops, educations, promotional activities on social networks and print and electronic media, and in the premises of primary and secondary schools, where all interested stakeholders will be invited (MUP, MMPI, MZOS, local self-government bodies, professional experts, etc.).

Activity according to the goal "Investigating the visibility of cyclists in order to obtain quantitative data on the number of users who use reflective materials":

- Collecting data on the use of different combinations of clothing (light clothing, dark clothing, reflective vests, lighting devices) at night and during the day and under different weather conditions.
- Defining individual locations and time periods of data collection; Collection of relevant statistical data at individual locations; Surveying cyclists about visibility as a road traffic safety factor; Collection of data on lighting at selected locations during specific periods of time (pedestrian crossings, pavement level lighting, bicycle paths and lanes), Collection of relevant statistical data of the bicycle flow from the aspect of visibility.

Activities towards the goal of "creating educational programs related to the visibility of cyclists":

- Organizing specialized training on the topic of visibility of cyclists in traffic as one of the most vulnerable participants in traffic.
- Organizing more educations in the premises of primary and secondary schools, local councils, city districts, where the dangers would be pointed out to students and all interested citizens, when the visibility of cyclists is poor, and how to improve their visibility.

Activity towards the goal of "carrying out cycling tests and safe driving test sites for primary and secondary school students".

- The school for road traffic would organize a training ground for safe driving for cyclists, for all stakeholders.

3. Area of activity and indicators of results

Local self-government at the level of local committees and city districts of the City of Zagreb is involved in the implementation of the project, and in this way the project is supported and recognizable in the local community. The project was additionally covered by print and electronic media, which contributes to its transparency both at the local and national level.

The project is supported by the Faculty of Traffic Sciences, which contributes with its professional staff and programming tools to the implementation of the action plan of performance foreseen in the project task. Through the activities of the employees of the Road Traffic School, the project presents the results to the elementary and high school population so that they can take responsibility for the safety of both themselves and other road users, in the segment of the importance of visibility of cyclists in traffic.

By changing the behavior of cyclists and other participants in road traffic, through raising traffic culture and compliance with traffic regulations and modifying the environment, it is possible to improve the safety of cyclists on roads and other traffic areas in urban areas. By increasing the level of awareness of the participants involved in the project and by increasing their knowledge about road traffic safety, the goals from the National Road Traffic Safety Program of the Republic of Croatia 2021 - 2030 are directly affected; in the area of activity PD7 (Active forms of traffic). The result indicators are:

- 500 students directly and
- 2,000 people indirectly through various media services.

The sustainability of the project is assessed by the stakeholders of the project and the competent services of the Ministry of Interior after the completion of the project in 2024 together with experts from the School of Road Traffic, the Faculty of Traffic Sciences and other independent experts in the field of road traffic safety.

The evaluation will be carried out by the project implementers through regular mandatory reports, and the Ministry of Internal Affairs through periodic control of the execution of the planned activities with the help of the targeted project participants themselves, who will present their evaluations and opinions about the project and its performance in the final survey. The indicator that will prove the achievement of the general goal is the reduction of cyclist traffic accidents (with minor injuries, serious injuries and fatalities). In accordance with the measures taken, it is realistic to expect an increase in the safety of pedestrians on the roads in urban areas in the Republic of Croatia by 10% in the next two years. Supervision will be carried out by the project manager and representatives of the partners in the project.

4. Conclusion

The project on the visibility of cyclists is also a "continuation" of the successfully implemented project financed by the NPSCP "Spot Me!!!" related to the visibility of pedestrians, with which educational, preventive and promotional activities have been carried out for the 3rd year after the end of the project. In addition, the implemented project successfully implements the optional subject "Pedestrian visibility" in which the students of the Road Traffic School educate students in Primary Schools.

By investing in the safety of bicycle traffic, a stronger and larger cycling community is built, a healthy lifestyle is encouraged, and the impact of motorized traffic on air and environmental pollution is reduced. The implementation of the aforementioned prevention, education and promotion actions significantly increases the safety of bicycle traffic in the Republic of Croatia.



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Srednja šola za
storitvene dejavnosti in logistiko

SREDNJA ŠOLA ZA
STORITVENE DEJAVNOSTI IN
LOGISTIKO

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15. VPLIV UPORABE TPMS NA PORABO GORIVA

Povzetek

Tlak zraka v pnevmatikah je pomemben, a pogosto zanemarjan parameter, ki bistveno vpliva na vožnjo: na udobje, vozne lastnosti, življenjsko dobo določenih delov vozila, zmogljivosti, ne nazadnje tudi na stroške. Z zbiranjem podatkov o tlaku v pnevmatikah avtomobilov, ki so se v času izvajanja meritev nahajali na službenem parkirišču sem zajel reprezentativni vzorec celotnega slovenskega avtoparka. Ker je vpliv tlaka v pnevmatikah na porabo goriva znan, so podatki v tabeli služili izračunu prekomerne porabe goriva celotnega nabora vozil. Anketa o navadah preverjanja tlaka v pnevmatikah je razkrila, da se le ta preverja premalo pogosto, saj večina proizvajalcev predpisuje kontrolo tlaka vsakih 14 dni, večina anketirancev pa tlak preverja enkrat na dva do tri mesce oz. po potrebi. Ker se je zbiranje podatkov izvajalo v aprilu, je od premontaže pnevmatik (z zimskega na letni set) preteklo šele en mesec. Če bi podatke zbiral npr. septembra, bi bila glede na rezultate ankete odstopanja tlakov od predpisanih bistveno večja, kar bi pomenilo tudi bistveno višjo prekomerno porabo. Izračuni s hipotetičnimi podatki, ki upoštevajo pogostost preverjanja tlaka in povprečno stopnjo puščanja zraka iz pnevmatik, so pokazali, da bi stanje tlaka v pnevmatikah sredi septembra povečalo porabo goriva celotnega nabora merjenih avtomobilov za okrog 190 litrov goriva letno. Zaradi velikih nihanj zimskih temperatur bi lahko bil rezultat še slabši...

Ključne besede: tlak, pnevmatike, poraba goriva, preverjanje tlaka

Uvod

Proizvajalci vozila v specifikacijah navedejo med drugim tudi pravilen tlak zraka v pnevmatikah. Tlak v pnevmatikah vpliva na mnogo parametrov: blaženje udarcev, hrup, kotalni upor, odziv oz. povratno informacijo, način kako »čutimo« vozilo, enakomernost oz. stopnjo obrabe pnevmatike ter še mnogo več. V motošportu je tlak v pnevmatikah še pomembnejši, saj neposredno regulira temperaturo pnevmatik, s čimer se le ta ohranja v delovnem temperaturnem območju, kjer pnevmatika dosega optimalne performanse, odziv ter obrabo.

Blaženje udarcev

Vozilo lahko razdelimo na vzmeteni in nevzmeteni del. V grobem smislu so nevzmetene mase tiste, ki v vožnji z gibanjem sledijo reliefu podlage, vzmetene pa tiste, ki ne sledijo. Zadeve pa niso tako enostavne, saj npr. kolesna obesa pri vpetju na eni strani sledi reliefu podlage, na drugi pa ne. Prav tako vzmet na enem koncu sledi reliefu, na drugem pa ne. Če gremo še bolj v podrobnosti, tudi te trditve niso popolnoma točne, saj tudi platišče ne sledi reliefu natančno – med platiščem in podlago je pnevmatika, ki prav tako omogoča določene premike v vertikalni (podobno kot kolesna vzmet) in prečni ter vzdolžni smeri (kot gumijasti zgloboi podvozja). Lastnosti oz. karakteristike pnevmatike se z različnim tlakom spreminjajo: pnevmatika deluje kot progresivna vzmet z določenim lastnim blaženjem. Z različnimi tlaki blaženje ostaja približno nespremenjeno, medtem ko se vzmetni koeficient močno spreminja. Ker pa je zaradi konstrukcije pnevmatika vezana zaporedno s kolesno vzmetjo in blažilnikom, se z različnim tlakom spreminjajo skupne nastavitve vzmetenja. S tem se spreminja tudi vzmetno število karoserije in posledično udobje in varnost.

Povratna informacija

Prenizek tlak v pnevmatikah praviloma dopušča prekomerne deformacije pnevmatik med vožnjo, kar zmanjša odzivnost vozila na komando oz. povzroči indirektnost krmiljenja. Občutek v vožnji je tako nenatančen, zamegljen. Varnost vozila s slabšim odzivom na komande je v kritičnih situacijah manjša.

Možnost poškodb

Zaradi prej omenjenih prekomernih deformacij lahko pride tudi do poškodbe pnevmatik. Na udarnih jamah se pnevmatika stisne do skrajne mere, kar povzroči neposreden stik med podlago, bočnico pnevmatike in platiščem, brez delovanja zračne blazine. To praviloma privede do poškodb pnevmatike in platišča.

Hrup

Nepravilen tlak v pnevmatikah vpliva tudi na neoptimalne (povečane) emisije hrupa. Previsok tlak se odrazi v manjši kontaktni površini ter preostanku tekalne površine, ki deluje kot opna, kar vpliva na povečanje emisije hrupa. Prenizek tlak povzroči večje deformacije pnevmatike med vožnjo, kar ponovno dvigne stopnjo emisije hrupa. Previsok tlak v pnevmatikah se odrazi tudi v zmanjšanih deformacijah pnevmatike na neravni podlagi, ki

zato prenese več sil udarcev na zglobe podvozja in karoserijo samo. Vožnja po neravni podlagi je tako bolj hrupna kot vožnja z optimalnim tlakom.

Temperatura

Tlak v pnevmatikah vpliva tudi na temperaturo le teh. To je še posebej očitno v motošportu, kjer je delovna temperatura pnevmatik bistveno višja od temperature okolice. Z višjim tlakom dosežemo, da se pnevmatika med vožnjo manj gnete, in s tem proizvaja manj toplote. Če pnevmatika deluje podhlajeno, se z nižjim tlakom doseže intenzivnejše gnetenje materiala med vožnjo, in s tem višjo temperaturo. Tako visoke temperature kot jih dosežejo dirkalne pnevmatike (65-90 °C) so pri civilnih pnevmatikah nezaželene, saj je njihov namen oz. delovno okno drugačno, zaradi drugačnih zmesi tako visoke temperature povzročijo predčasno degradacijo materiala in izgubo oprijema (pnevmatika se pregreje). S pregrevanjem se lahko pnevmatika tudi razplasti na tekalni površini (razpade) ali na bočnici (pojavijo se bule). Ta toplota, ki se ustvarja z gnetenjem materiala ob deformacijah pnevmatike, pride iz mehanskega dela pogonskega motorja – na kratko rečeno se energija, ki se porablja zaradi kotalnega upora pretvori v toploto, ki segreva pnevmatiko.

Kotalni upor

Kotalni upor vpliva na vzdolžne sile pnevmatike in s tem na spremembo navora na krmilni ročici. Krmilo postane težje za upravljanje. Pri motociklih je učinek večjega kotalnega upora še izrazitejši, saj je v zavoju (v nagibu) kontaktna površina pnevmatike s podlago izven središčnice motocikla. To pomeni, da kotalni upor povzroča moment na krmilo, kateri deluje tako, da krmilo obrača v notranjost zavoja. Le to hoče torej poravnati motocikel – v žargonu se motocikel »postavlja pokonci«, kar izniči nevtralnost krmiljenja in močno vpliva na odziv in s tem vozne lastnosti motocikla.

Kotalni upor pretvarja kinetično energijo v toplotno – s stališča voznika gre za izgubo energije. Kinetično energijo proizvaja pogonski motor, ki za to opravilo porablja pogonsko gorivo. To pomeni, da velikost kotalnega upora neposredno vpliva na porabo goriva. Na trgu že precej časa obstajajo pnevmatike z manjšim kotalnim uporom (t.i. eko pnevmatike), njihova ponudba pa se je s povečano popularnostjo električnih avtomobilov še precej razširila. Ker ima pogonski sklop električnega avtomobila bistveno višji izkoristek od motorja z notranjim zgorevanjem, je vsak vpliv na izgube v vožnji bistveno bolj izrazit kot pri avtomobilih z notranjim zgorevanjem, zato je pravi izbor pnevmatik (in tudi pravi zračni tlak) precej pomemben faktor.

Ob branju raziskovalne naloge »Vpliv tlaka v pnevmatikah na fizikalne lastnosti pnevmatike in avtomobila« (avtorja: Leon Gudlin in Nejc Žafran, mentor: Matic Turnšek, univ. dipl. inž.) sem prišel do uporabnih podatkov – meritev vpliva tlaka v pnevmatikah na dejansko porabo goriva v praksi. Ker precej časa preživim v avtoservisni delavnici, imam precej možnosti preverjanja tlaka pnevmatik avtomobilov, ki so v vsakdanji uporabi. Tlak v pnevmatikah bi se naj kontroliral vsakih 14 dni, a glede na stanje avtomobilov, ki vozijo po slovenskih cestah, se tega marsikdo ne drži. Meni bistvene rezultate raziskovalne naloge sem strnil v naslednjo tabelo:

Začetni tlak	Začetna temperatura	končna temperatura	hitrost	Trajanje	Povprečna hrupnost	Povprečna poraba goriva
2.3 bar	18	29	20kmh	5 min	88dB	4,7 l/100 km
1.8 bar	18	30,5	20kmh	5 min	89 dB	4,8 l/100 km
2,8 bar	18	28,5	20kmh	5 min	90dB	4,6 l/100 km

Rezultati kažejo, da se z nižjim tlakom poveča segrevanje pnevmatike, poraba goriva in hrupnost. Hkrati se s povišanim tlakom poveča stopnja hrupnosti. Test ni bil dovolj dolgotrajen da bi lahko proučili obrabljanje pnevmatik, sklepam pa, da bi se ob previsokem zaradi manjših deformacij v vožnji zmanjšalo obrabljanje robov tekalne površine in zato povečalo obrabljanje sredine tekalne površine in obratno – ob nižjem tlaku bi se zaradi povečanih deformacij prekomerno obrabljala robova tekalne površine.

Test je zajemal predpisani tlak, 0,5 bar višji tlak in 0,5 bar nižji tlak od predpisanega. Takšna odstopanja navzdol v praksi niso tako redek pojav. V praksi skoraj nobena pnevmatika ni popolnoma zrakotesna, in s časom tlak pade. Pomanjkljiva kontrola tlaka se torej čez čas praviloma odrazi v prenizkem tlaku v pnevmatiki. Rezultati ugotavljajo cca 2% spremembo porabe goriva ob 22% spremembi relativnega tlaka.

Raziskava

Za zajem čim bolj relevantnih podatkov sem nenapovedano preveril tlak v pnevmatikah vseh avtomobilov, ki sem jih srečal na službenem parkirišču. Podatke sem zbral v tabelo, le ti zajemajo tlake v posamični pnevmatiki ter model vozila, iz slednjega podatka pa sem poiskal predpisane tlake za posamično vozilo. Ker proizvajalci v določenih primerih predpisujejo različne tlake za različne načine uporabe, v teh primerih pa gre za prevoz na delo, sem predpostavil, da se je z vsakim avtomobilom pripeljal en človek, in da s seboj nima veliko prtljage. Od obremenitve vozila je namreč odvisno kakšen je predpisan tlak vpnevmatikah.

Glede na to, da nižji tlak od predpisanega poveča porabi goriva, višji tlak pa le to zmanjša, lahko izračun vpliva na porabo preprosto poenostavim v linearno funkcijo $f(x) = ax + n$, pri čemer $f(x)$ predstavlja izračunano porabo goriva glede na pogoje, x predstavlja porabo goriva ob predpisanem tlaku v pnevmatikah, a predstavlja razmerje med predpisano in dejansko vrednostjo tlaka, n pa predstavlja vpliv spremembe tlaka na porabo goriva. Primer:

$f(x) = (a - 1)x + n$, pri čemer velja:

$f(x)$ = dejanska poraba goriva,

n = poraba goriva pri predpisanem tlaku (primer: 6,65 l / 100 km),

a = razmerje med predpisanim in dejanskim tlakom zraka v pnevmatikah (primer: 2,5 / 2,3 bar),

x = vpliv spremembe tlaka na porabo goriva (npr. 2% porabe na 22% spremembe tlaka, iz česar izračunamo faktor 0,09 (100/0,22*0,02). Ker pa so vrednosti porabe goriva bile v

raziskovalni nalogi L. Gudlina in N. Žafrana bile merjene eno osno na valjih (z vrtečo se zgolj pogonsko osjo), lahko faktor vpliva tlaka na porabo goriva mirno podvojimo, in sicer na 0,18.

Torej za dani primer (6,65 l / 100 km in 2,2 namesto 2,5 bar izračunamo:

$$f(x) = ((2,5 \text{ bar} / 2,2 \text{ bar}) - 1) * 0,18 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = (1,364 - 1) * 0,18 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = 0,364 * 0,18 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = 0,066 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = 6,716 \text{ l}/100 \text{ km}$$

Sprememba se zdi minimalna, mene pa zanima celotna razlika porabe celotnega avtoparka skozi vse leto. Za poenostavitev izračuna bom predpostavil, da je normalna poraba povprečnega vozila s seznama 6,65 l/100 km, povprečen voznik dotičnega avtomobila pa prevozi letno 18000 km.

Iz podatkov v tabeli je razvidno, da so izmerjeni tlaki v pnevmatikah precej blizu predpisanim tlakom. Povprečje predpisanih tlakov je 2,2326 bar, medtem ko je povprečje izmerjenih tlakov 2,2359 bar.

S pomočjo excelove tabele sem prišel do rezultata, da so avtomobili v povprečju imeli pnevmatike premalo napolnjene za 0,09022 bar.

$$f(x) = ((2,3276 \text{ Bar} / 2,2359 \text{ Bar}) - 1) * 0,18 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = 6,66 \text{ l}/100 \text{ km}$$

Avtomobilov v izračunu je 46. Razlika v porabi na en avtomobil je torej zgolj 0,0074 litra na 100 prevoženih kilometrov. Pri 46 avtomobilih in 18000 km letno to nanese 61,1 litrov goriva.

September

Glede na rezultate ankete lahko predvidimo kakšni bi bili tlaki v pnevmatikah npr. septembra:

- 5% anketirancev preverja tlak 1x tedensko,
- 16% anketirancev preverja tlak enkrat mesečno,
- 36% anketirancev preverja tlak enkrat na dva do tri mesece,
- 10% anketirancev preverja tlak enkrat do dvakrat na sezono,
- 24% anketirancev preverja tlak po potrebi,
- 9% anketirancev nikoli ne preverja tlaka.

To pomeni, da bi:

- prvi dve skupini tudi septembra imeli enak tlak v pnevmatikah kot sedaj;
- tretja skupina imela v povprečju tlak nižji za pol meseca puščanja (za lažji izračun bom predpostavil, da je to 0,09 bar povprečna stopnja puščanja pnevmatike zaradi poroznosti v časovnem obdobju enega mesca),

- četrta skupina preveri tlak na tri do štiri mesece, kar pomeni v povprečju dodaten mesec izgube tlaka,
- ob pričakovanem puščanju po 6 mesecih izgubimo 0,54 bar, kar zazna le ostro oko; 24% anketirancev (»po potrebi«) bi so septembra v povprečju izgubilo dodatnih 0,45 bar;
- enako velja za zadnjo skupino.

Na kratko to pomeni:

- 21% anketirancem se tlak ne spremeni;
- 36% anketirancev izgubi povprečno 0,045 bar,
- 10% anketirancev izgubi 0,09 bar,
- nadaljnih 33% anketirancev izgubi 0,45 bar;

Skupna povprečna predvidena izguba tlaka v pnevmatikah za dotično množico anketirancev od aprila do septembra je torej 0,1737 bar, kar pomeni, da bi v tem trenutku povprečen tlak v pnevmatikah bil 0,2637 bar nižji od predpisanega, torej bi znašal le še 2,064 bar.

Za dani primer (6,65 l / 100 km in 2,064 namesto 2,3276 bar izračunamo:

$$f(x) = ((2,3276 / 2,064) - 1) * 0,18 + 6,65$$

$$f(x) = 6,673$$

Slednji rezultat priča o porabi goriva, ki je v povprečju za 0,023 litra na 100 km višja od porabe goriva ob predpisanem tlaku v pnevmatikah. S takšnim stanjem bi flota 46 vozil ob 18000 km letno porabila 190 litrov goriva več.

Rezultati so zanimivi, vendar sami po sebi ne najbolj uporabni, saj izračun zajema preveč nepredvidljivih spremenljivk. Nekatere pnevmatike puščajo hitreje, nekatere počasneje, različni tipi pnevmatik se različno odzivajo na spremembe tlaka, predvsem pa tlak močno niha že zaradi temperaturnih sprememb. Še eno pomembno dejstvo sem zanemaril v zadnjem izračunu – tlak sem hipotetično računal za točno določen trenutek, medtem ko bi se razlika v porabi goriva ustvarjala skozi vse leto – kar pa pomeni, da bi ob tem tudi tlak v pnevmatikah bil vse prej kot konstantno napačen.

Kljub temu, da so podatki zadnjega izračuna zgolj hipotetični, nam dajo neko sliko – to, da tlak v pnevmatikah zaznavno vpliva na porabo goriva, in pri skupini vozil se na daljši rok ustvari pomembna razlika – kar pri podjetjih z velikimi flotami avtomobilov ni nepomembno. Varnostnega vidika in vidika obrabe pnevmatik se nisem niti dotaknil.

Zaključek

Pri zbiranju podatkov me je presenetila relativna točnost tlakov glede na predpisane vrednosti. K temu botruje tudi dejstvo, da sem vrednosti meril v mesecu aprilu, tako rekoč mesec dni po menjavi pnevmatik za letni komplet, kar pomeni, da je tlak bil usklajen približno mesec dni pred meritvijo. Ker je vsaka guma delno porozna, tlak s časom pada. Dlje časa kot preteče od zadnje kontrole, nižji je tlak v pnevmatiki oz. večje je odstopanje od predpisanega tlaka - seveda v primeru, da je pnevmatika bila napolnjena na predpisani tlak.

Glede na izvedeno anketo o rednosti preverjanja tlaka v pnevmatikah se le to izvaja precej prereditko – večinoma enkrat na dva do tri mesece oz. po potrebi (kadar je stanje opazno slabše od idealnega). Meritve po letnem dopustu ali celo zgodaj jeseni bi najverjetneje pokazale večja odstopanja in tako bi izračunali še bistveno bolj povečano porabo goriva, in te podatke sem tudi okvirno predvidel z izračunom.

Priloge, viri in reference:

Gudlin, L., & Žafran, N. (2023). Vpliv tlaka v pnevmatikah na fizikalne lastnosti pnevmatike in avtomobila. (M. Turnšek, Mentor). Šolski center Celje, Srednja šola za storitvene dejavnosti in logistiko

Rezultati ankete o navadah preverjanja tlaka v pnevmatikah osebnega avtomobila (Celje, 23. 4. 2023)

št. Anketirancev: 42

Tlak v pnevmatikah preverjam enkrat na teden	2
Tlak v pnevmatikah preverjam enkrat na mesec	7
Tlak v pnevmatikah preverjam enkrat na dva do tri mesece	15
Tlak v pnevmatikah preverjam enkrat do dvakrat na sezono	4
Po potrebi	10
Nikoli	4



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LOGISTIKO

Autori:

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(VS)

15. VPLIV UPORABE TPMS NA PORABO GORIVA

Abstract

The air pressure in tires is an important but often neglected parameter that has a significant impact on driving: comfort, driving characteristics, the lifespan of certain vehicle parts, performance, and last but not least, costs. By collecting data on tire pressure of cars that were in the company parking lot at the time of the measurements, I got a representative sample of the entire Slovenian car park. Since the influence of tire pressure on fuel consumption is known, the data in the table served to calculate the excessive fuel consumption of the entire range of vehicles. A survey on the habits of checking tire pressure revealed that it is not being monitored and checked often enough, as most manufacturers prescribe a pressure check every 14 days, while the majority of survey respondents check pressures once every two to three months or if necessary. Since the data collection was carried out in April, only one month had passed since the refitting of the tires (from a winter set to a summer set). If I were to collect data in September for example, according to the results of the survey, the pressure deviations from the factory recommended ones would be significantly greater, which would also mean significantly higher excessive consumption. Calculations using hypothetical data, taking into account the frequency of pressure checks and the average rate of air leakage from the tires, showed that the state of tire pressure in mid-September would increase the fuel consumption of the entire set of cars measured by about 190 liters of fuel per year. Due to large fluctuations in winter temperatures, the result could be even worse...

Keywords: pressure, tires, fuel consumption, pressure check

Introduction

Among other things, the vehicle manufacturers specify the correct air pressure in the tires. Tire pressure affects many parameters: shock absorption rate, noise, rolling resistance, vehicle's input response or feedback, the way we "feel" the vehicle, uniformity or tire wear rate and much more. In motorsport, tire pressure is even more important, as it directly regulates the tire temperature, which must be kept in the working temperature range where the tire achieves optimal performance, response and wear.

Shock absorption

The vehicle can be divided into sprung and unsprung parts. In a rough sense, unsprung masses are those that follow the relief of the ground when driving over rough surface, and sprung masses are those that do not. But these things are not as straight forward, because some suspension parts follow the relief of the ground on one side, but not on the other. Also, the spring follows the relief at one end, but not at the other. If we go into more detail, even these statements are not completely accurate, because the rim does not follow the relief exactly - between the rim and the road there is a tire, which also allows certain movements in the vertical (similar to a wheel spring) and transverse and longitudinal directions (as rubber bushes change their shape due to huge forces). Properties or the characteristics of the tire change with different pressures: the tire acts as a progressive spring with a certain amount of self-damping. With different pressures, the damping remains approximately unchanged, while the spring coefficient varies greatly. However, since the tire is connected serially to the wheel spring and shock absorber due to suspension construction, the overall suspension settings change with different pressures. This also changes the spring rate of the body and consequently comfort and safety.

Tire pressure that is too low generally allows excessive deformation of tires while driving, which reduces the responsiveness of the vehicle to commands or results in indirect feedback. The driving feeling becomes imprecise, blurry. The safety of a vehicle with a poor response to controls is lower in critical situations

Possibility of damage

As a result of the aforementioned excessive deformations, tire damage can also occur. In impact pits, the tire is compressed to the extreme, causing direct contact between the ground, the sidewall of the tire and the rim, without the tire working as an air suspension component. This usually leads to damage to the tire and rim.

Noise

Incorrect tire pressure also affects suboptimal (increased) noise emissions. Too high pressure is reflected in a smaller contact surface and the rest of the running surface, which acts as a membrane, which affects the increase in noise emission. Too low pressure causes greater deformations of the tire during driving, which again raises the level of noise emission. Excessive tire pressure is also reflected in reduced deformations of the tire on uneven

ground, which therefore transfers more impact forces to the bushes of the chassis and the body itself. Driving on uneven ground is thus noisier than driving with optimal pressure.

Temperature

The pressure in the tires also affects the temperature of the tires. This is particularly evident in motorsport, where the operating temperature of the tires is significantly higher than the ambient temperature. With a higher pressure, we achieve that the tire is kneaded significantly less while driving, and thus produces less internal heat. If the tire might run undercooled, a lower pressure needs to be set, which results in more intense kneading of the material during driving, and thus a higher temperature. Temperatures as high as those reached by racing tires (65-90 °C) are undesirable for civilian tires, as their operating window is way different, due to the different compounds, such high temperatures may cause premature degradation of the material and loss of grip (the tire overheats). Overheating can also cause the tire to spread on the tread (disintegrate) or on the sidewall (bumps appear). This heat, which is created by kneading the material as the tire deforms, comes from the mechanical part of the drive motor - in short, the energy consumed due to rolling resistance is converted into heat that heats up the tire.

Rolling resistance

Rolling resistance affects the longitudinal forces of the tire and thus the change in torque on the control lever. The steering wheel becomes harder to control. In the case of motorcycles, the effect of higher rolling resistance is even more pronounced, since in a turn (on an incline) the contact surface of the tire with the ground is outside the centerline of the motorcycle. This means that the rolling resistance causes a torque on the handlebar, which acts to turn the rudder to the inside of the turn. This is what the motorcycle wants to straighten out - in jargon, the motorcycle "stands upright", which destroys the neutrality of the steering and greatly affects the response and thus the driving characteristics of the motorcycle.

Rolling resistance converts kinetic energy into heat – from the driver's point of view, it is a loss of energy. Kinetic energy is produced by the engine, which consumes fuel for this task. This means that the amount of rolling resistance directly affects fuel consumption. Tires with lower rolling resistance (so-called eco-tires) have been on the market for quite some time, and their range has expanded significantly with the increased popularity of electric cars. Since an electric car's powertrain has a significantly higher efficiency than an internal combustion engine, any impact on driving losses is significantly more pronounced than in an internal combustion car, so the correct selection of tires (and also the correct air pressure) is quite an important factor.

While reading the research paper "The influence of tire pressure on the physical properties of tires and cars" (authors: Leon Gudlin and Nejc Žafran, mentor: Matic Turnšek, univ. dipl. eng.) I came across useful information - measurement of the influence of tire pressure on the actual fuel consumption in practice. Since I spend a lot of time in the garage, I have a lot of opportunities to check the tire pressure of cars that are in daily use. Tire pressure should be checked every 14 days, but given the condition of the cars driving on Slovenian

roads, many people do not follow this. I have summarized the essential results of the research task in the following table:

Starting pressure	Starting temperature	End temperature	Speed	duration	Average noise	Average fuel consumption
2.3 bar	18	29	20kmh	5 min	88dB	4,7 l/100 km
1.8 bar	18	30,5	20kmh	5 min	89 dB	4,8 l/100 km
2,8 bar	18	28,5	20kmh	5 min	90dB	4,6 l/100 km

The results show that with lower pressure, heating of the tire, fuel consumption and noise increase. At the same time, the noise level increases with the increased pressure. The test was not long enough to be able to study the wear of the tires, but I conclude that if it is too high, due to minor deformations during driving, the wear of the edges of the tread surface would decrease and therefore the wear of the center of the tread surface would increase, and vice versa - at a lower pressure, it would wear excessively due to increased deformations the edge of the tread.

The test included the prescribed pressure, 0.5 bar higher pressure and 0.5 bar lower than the prescribed pressure. Such downward deviations are not so rare in practice. In practice, almost no tire is completely airtight, and pressure drops over time. Deficient pressure control is therefore usually reflected in too low a tire pressure over time. The results show an approx. 2% change in fuel consumption with a 22% change in relative pressure.

Research

In order to capture the most relevant data possible, I checked the tire pressure of all the cars I met in the office parking lot without notifying their owners in advance, so they wouldn't check the pressure only for that occasion. I collected the data in a table, it includes pressure for every individual tire, vehicle model, and from the latter data I found the prescribed pressures for the individual vehicle. I assumed that each car was driven by one person, and that person did not have much luggage with. The prescribed tire pressure depends on the load on the vehicle, so I used lowest tire pressure values prescribed by the manufacturer.

Given that lower than ideal pressure increases fuel consumption, and higher pressure reduces it, I can simply simplify the calculation of the effect on consumption into a linear function $f(x) = ax + n$, where $f(x)$ represents the calculated fuel consumption at given conditions, x represents the fuel consumption at the prescribed tire pressure, a represents the ratio between the prescribed and the actual pressure value, and n represents the influence of the pressure change on the fuel consumption. Example:

$f(x) = (a - 1)x + n$, where:

$f(x)$ = actual fuel consumption,

n = fuel consumption at prescribed pressure (example: 6.65 l / 100 km),

a = ratio between prescribed and actual tire air pressure (example: 2.5 / 2.3 bar),

x = influence of pressure change on fuel consumption (e.g. 2% consumption on 22% pressure change, from which we calculate the factor 0.09 (100/0.22*0.02). However, since the fuel consumption values were in the research paper of Mr. L Gudlin and N. Žafran were measured on one axis on the rolling road (with only the drive axis rotating), the pressure influence factor on fuel consumption can safely be doubled, namely to 0.18.

So for the given example (6.65 l / 100 km and 2.2 instead of 2.5 bar we calculate:

$$f(x) = ((2,5 \text{ bar} / 2,2 \text{ bar}) - 1) * 0,18 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = (1,364 - 1) * 0,18 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = 0,364 * 0,18 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = 0,066 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = 6,716 \text{ l}/100 \text{ km}$$

The difference seems negligible for a single vehicle, but I'm interested in the overall difference in consumption of the entire fleet throughout the year. To simplify the calculation, I will once again assume that the normal consumption of the average vehicle from the list is 6.65 l/100 km, and the average driver of the car in question travels 18,000 km per year. It can be seen from the data in the table that the measured tire pressures are quite close to the prescribed pressures. The average of the prescribed pressures is 2.2326 bar, while the average of the measured pressures is 2.2359 bar. With the help of an excel table, I came to the result that, on average, the cars had tires underinflated by 0.09022 bar.

$$f(x) = ((2,3276 \text{ Bar} / 2,2359 \text{ Bar}) - 1) * 0,18 + 6,65 \text{ l}/100 \text{ km}$$

$$f(x) = 6,66 \text{ l}/100 \text{ km}$$

There are 46 cars in the calculation. The difference in consumption per car is therefore only 0.0074 liters per 100 kilometer. With 46 cars and 18,000 km per year, results to 61.1 liters of additional fuel consumption.

September

Based on the results of the survey, we can predict what the tire pressures for example in the middle of September would be like:

- 5% of respondents check their tire pressure once a week,
- 16% of respondents check their tire pressure once a month,
- 36% of respondents check their tire pressure once every two to three months,
- 10% of respondents check the pressure once or twice a season,
- 24% of respondents check the pressure when necessary,
- 9% of respondents never check their tire pressure.

Based on the results of the survey, we can predict what the tire pressures would be in e.g. September:

- 5% of respondents check their tire pressure once a week,
- 16% of respondents check their tire pressure once a month,
- 36% of respondents check their tire pressure once every two to three months,
- 10% of respondents check the pressure once or twice a season,
- 24% of respondents check the pressure when necessary,
- 9% of respondents never check their blood pressure.

This means that you would:

- the first two groups also had the same tire pressure in September as now;
- the third group had an average pressure lower for half a month of leakage (for easier calculation, I will assume that this is 0.09 bar the average level of tire leakage due to porosity in the time period of one month),
- the fourth group checks the pressure every three to four months, which means an additional month of pressure loss on average,
- with the expected leakage after 6 months, we lose 0.54 bar on average, which is detected only by a sharp eye; 24% of respondents ("as needed") would lose an additional 0.45 bar on average in September;
- the same applies to the last group.

In short, this means:

- 21% of respondents have no change in tire pressure;
- 36% of respondents lose an average of 0.045 bar,
- 10% of respondents lose 0.09 bar,
- a further 33% of respondents lose 0.45 bar;

The total average predicted tire pressure loss for the relevant set of respondents from April to September is therefore 0.1737 bar, which means that at this moment the average tire pressure would be 0.2637 bar lower than the prescribed one, i.e. it would only be 2.064 bar

For the given example (6.65 l / 100 km and 2.064 instead of 2.3276 bar we calculate: In short, this means:

- 21% of respondents have no change in tire pressure;

- 36% of respondents lose an average of 0.045 bar,
- 10% of respondents lose 0.09 bar,
- a further 33% of respondents lose 0.45 bar;

The total average predicted tire pressure loss for the relevant set of respondents from April to September is therefore 0.1737 bar, which means that at this moment the average tire pressure would be 0.2637 bar lower than the prescribed one, i.e. it would only be 2.064 bar

For the given example (6.65 l / 100 km and 2.064 instead of 2.3276 bar we calculate:

$$f(x) = ((2,3276 / 2,064) - 1) * 0,18 + 6,65$$

$$f(x) = 6,673$$

The latter result testifies to the fuel consumption, which is on average 0.023 liters per 100 km higher than the fuel consumption at the prescribed tire pressure. With such a situation, a fleet of 46 vehicles at 18,000 km per year would consume 190 liters of fuel more.

The results are interesting, but in themselves not the most useful, as the calculation involves too many unpredictable variables. Some tires leak faster, some slower, different types of tires react differently to changes in pressure, and above all, the pressure fluctuates greatly due to temperature changes. I neglected another important fact in the last calculation - I calculated the pressure hypothetically for a specific moment, while the difference in fuel consumption would be created throughout the year - which means that the tire pressure would also be anything but constantly wrong .

Despite the fact that the data of the latest calculation is purely hypothetical, it gives us some picture - that tire pressure has a perceptible effect on fuel consumption, and a group of vehicles makes a significant difference in the long term - which is not insignificant for companies with large fleets of cars. I haven't even touched on the safety aspect and the tire wear aspect.

Conclusion

When collecting the data, I was surprised by the relative accuracy of the pressures compared to the prescribed value. This is also supported by the fact that I measured the values in April, so to speak, a month after changing the tires for the summer set, which means that the pressure was adjusted about a month before the measurement. Since every tire is partially porous, the pressure drops over time. The longer the time that has passed since the last check, the lower the tire pressure or the greater the deviation from the prescribed pressure - of course, if the tire was inflated to the prescribed pressure at all. According to the conducted survey on the regularity of tire pressure checks, this is carried out much too rarely - mostly once every two to three months or as needed (when the situation is noticeably worse than ideal). Measurements after the annual holiday or even in early autumn would most likely show larger deviations and thus calculate even significantly

more increased fuel consumption, and I also tentatively predicted this data with the calculation.

Annexes, sources and references:

Gudlin, L., & Žafran, N. (2023). Vpliv tlaka v pnevmatikah na fizikalne lastnosti pnevmatike in avtomobila. (M. Turnšek, Mentor). Šolski center Celje, Srednja šola za storitvene dejavnosti in logistiko

Rezultati ankete o navadah preverjanja tlaka v pnevmatikah osebnega avtomobila (Celje, 23. 4. 2023)

št. Anketirancev: 42

Tlak v pnevmatikah preverjam enkrat na teden	2
Tlak v pnevmatikah preverjam enkrat na mesec	7
Tlak v pnevmatikah preverjam enkrat na dva do tri mesece	15
Tlak v pnevmatikah preverjam enkrat do dvakrat na sezono	4
Po potrebi	10
Nikoli	4



САОБРАЋАЈНО-ТЕХНИЧКА ШКОЛА „12. ФЕБРУАР“, НИШ

Autor:

Далибор Стојанов, дипл. инж. саобраћаја

16. ЗНАЊЕ НЕ ЗНА ЗА ГОДИНЕ!

1. Увод

Циљ код безбедности у саобраћају јесте да се стабилизује и смањи ниво смртних случајева у саобраћају широм света. Процењује се да би током деценије на светским путевима могло да буде спашено 5 милиона живота. С тим у вези нам је част да учествујемо у решавању проблема у области безбедности саобраћаја.

2. Идеја

Постоји много проблема у саобраћају. Када смо размишљали о учешћу свих генерација у повећању безбедности, почели смо да размишљамо на прави начин. Први корак је био проналажење ученика заинтересованих за пројекат. Пошто се испрва појавило много идеја, организовали смо брејнсторминг састанке.



И тако је све почело... Разговарајући о идејама дошли смо до закључка да се већина учесника бави проблемима деце и младих у саобраћају. Зато смо одлучили да се

позабавимо старијим учесницима у саобраћају. Наша циљна група су искусни возачи. Идеја је да се утврди колико су упознати са правилима саобраћаја и колико су упознати са изменама Закона. У ту сврху смо направили тест. Тест се састоји од 18 питања тако да учесници не троше превише времена. Питања нису тешка, већина са сликама, укључујући и две раскрснице. Имали смо и помоћ полицајаца који су заустављали возаче док су наши ученици предавали тестове. Проверили смо и знање наших колега, радника наше школе.



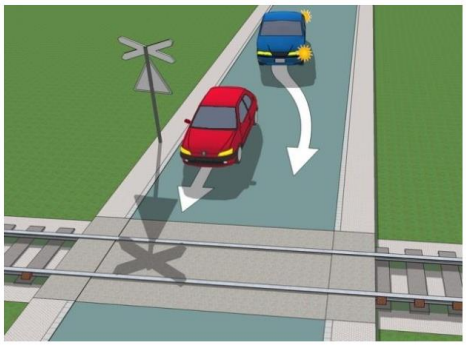
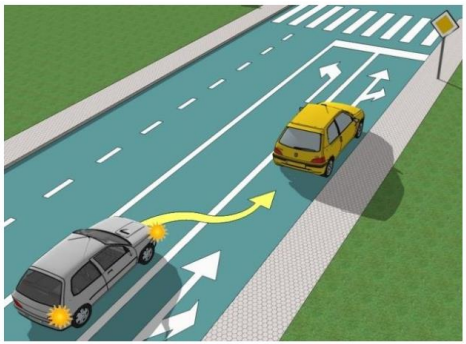
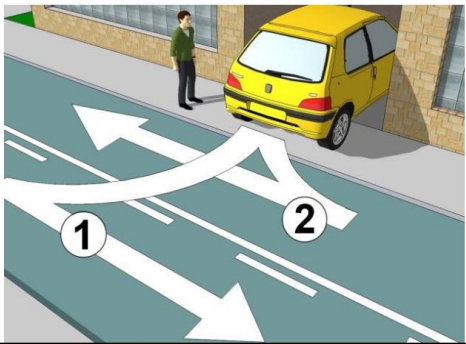


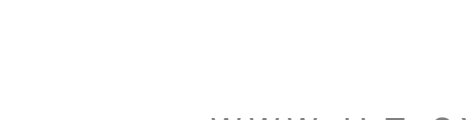

Тестирали смо родитеље ученика наше школе у току родитељских састанка.



3. Истраживање

Испитаници су подељени у 3 групе. Прву групу чине случајно одабрани људи које је полиција зауставила (94 испитаника). Другу групу чине наставници. Трећу групу чине родитељи. Урађено је 177 тестова са 18 питања.

Пример теста:

Познавање саобраќајних прописа				
1. Пол	М	Ж		
2. Године возачког стажа	0 – 4.99	5 – 9.99	10 – 19.99	>20+
3. Да ли сте изазвали неку СН у периоду вожње?	ДА	НЕ		
4. Да ли знате да је последња измена закона била 2018. године?	ДА	НЕ		
	1. Возач плавог путничког возила, у ситуацији приказаној на слици, врши претицање:			
	а) прописно.			<input type="checkbox"/>
	б) непрописно.			<input type="checkbox"/>
	в) прописно, само ако не омета возила која му долазе у сусрет.			<input type="checkbox"/>
	2. На прелазу пута преко железничке пруге, возач је дужан да пропусти шинско возило које се креће по железничкој прузи:			
	а) да.			<input type="checkbox"/>
	б) да, само шинско возило које наилази са десне стране.			<input type="checkbox"/>
	в) не.			<input type="checkbox"/>
	3. У ситуацији приказаној на слици, возачу сиво путничког возила:			
	а) дозвољено је да изврши престојаване у саобраћајну траку која се простире уз десну ивицу коловоза.			<input type="checkbox"/>
	б) није дозвољено да изврши престојаване у саобраћајну траку која се простире уз десну ивицу коловоза.			<input type="checkbox"/>
	4. У ситуацији приказаној на слици, возач жутог путничког возила:			
	а) може наставити кретање у свим смеровима.			<input type="checkbox"/>
	б) може извршити скретање улево или наставити кретање право.			<input type="checkbox"/>
	в) може наставити кретање право или извршити скретање удесно.			<input type="checkbox"/>
	5. Путничко возило се, у ситуацији приказаној на слици, прописно укључује у саобраћај:			
	а) путањом број 1.			<input type="checkbox"/>
	б) путањом број 2.			<input type="checkbox"/>
	в) било којом путањом.			<input type="checkbox"/>
	6. У ситуацији приказаној на слици, возач путничког возила који се укључује у саобраћај:			
	а) дужан је да пропусти пешаке који се крећу тротоаром.			<input type="checkbox"/>
	б) није дужан да пропусти пешаке који се крећу тротоаром.			<input type="checkbox"/>
	в) није дужан да пропусти пешаке који се крећу тротоаром, али је дужан да употреби звучни знак упозорења.			<input type="checkbox"/>
	7. У ситуацији приказаној на слици, у случају отежаног мимоилажења, дужан је да заустави своје возило:			
	а) возач трактора.			<input type="checkbox"/>
	б) возач путничког возила.			<input type="checkbox"/>
	8. Првенство пролаза, у ситуацији приказаној на слици, регулисано је:			
	а) међусобним договором возача, давањем светлосног или звучног знака упозорења.			<input type="checkbox"/>
	б) постављеним саобраћајним знаком.			<input type="checkbox"/>
	в) правилом саобраћаја.			<input type="checkbox"/>

<p>9. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<p>10. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
	<p>11. Допунска табла, приказана на слици, означава да ограничење брзине датим саобраћајним знаком важи:</p> <p>а) када пада киша <input type="checkbox"/></p> <p>б) када пада снег <input type="checkbox"/></p> <p>в) када је снег на коловозу. <input type="checkbox"/></p> <p>12. Саобраћајни знак „ограничење брзине”, приказан на слици, припада групи знакова:</p> <p>а) обавештења <input type="checkbox"/></p> <p>б) изричитих наредби. <input type="checkbox"/></p> <p>в) опасности. <input type="checkbox"/></p>
	<p>13. У ситуацији, приказаној на слици, неспрекидана ивична линија означена је бројевима:</p> <p>а) 1 и 3 <input type="checkbox"/></p> <p>б) 2 и 5 <input type="checkbox"/></p> <p>в) 1 и 4 <input type="checkbox"/></p> <p>14. Ознаке којима се обележавају места за одређене намене (аутобуска стајалишта, такси возила, полиција и др) су:</p> <p>а) наранџасте боје <input type="checkbox"/></p> <p>б) беле боје. <input type="checkbox"/></p> <p>в) жуте боје <input type="checkbox"/></p>
	<p>15. Према редоследу појављивања светлосних саобраћајних сигнала на тробојном семафору, након завршетка истовремено укљученог жутог и црвеног светла укључиће се:</p> <p>а) жуто светло <input type="checkbox"/></p> <p>б) зелено светло. <input type="checkbox"/></p> <p>в) црвено светло. <input type="checkbox"/></p>
	<p>16. Светлосни саобраћајни знак - зелено светло са симболом једне или више стрелица, које даје семафор, има значење:</p> <p>а) забрањен пролаз у смеру означеном стрелицом, односно смеровима означеним стрелицама, осим у случају када се возило не може безбедно зауставити испред наведеног знака. <input type="checkbox"/></p> <p>б) забрањен пролаз у смеру означеном стрелицом, односно смеровима означеним стрелицама. <input type="checkbox"/></p> <p>в) дозвољен пролаз само у смеру означеном стрелицом, односно смеровима означеним стрелицама. <input type="checkbox"/></p>
<p>17. Моторно возило које је првенствено намењено за извођење одређених радова (комбајн, ваљак, грејдер, утоваривач, ровокопач, булдожер, виљушкар и сл) и чија највећа конструктивна брзина кретања не прелази 45 km/h је:</p> <p>а) радна машина. <input type="checkbox"/></p> <p>б) мотокултиватор. <input type="checkbox"/></p>	
<p>18. Пролажење учесника у саобраћају поред другог учесника у саобраћају који долази из супротног смера је:</p> <p>а) претицање <input type="checkbox"/></p> <p>б) мимоилажење <input type="checkbox"/></p> <p>в) обилажење. <input type="checkbox"/></p>	

4. Закључци

Након анализе резултата, дошли смо до следећих закључака.



ZAKLUČCI

Ispitanici su bili podeljeni u tri grupe:

Prvu grupu se sastoji od slučajno izabranih ljudi koje je policija zaustavila (94 ispitanika)

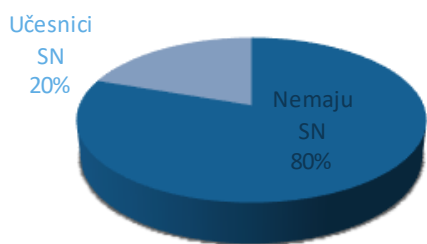
Druga grupa su radnici naše škole (40 ispitanika)

Treća grupa su roditelji naših dece (43 ispitanika)

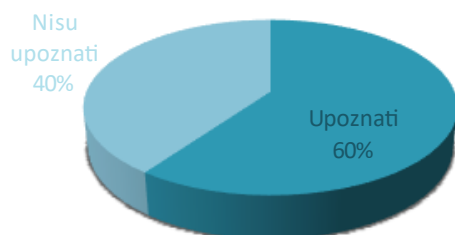
Ukupno je odrađeno 177 testova sa po 18 pitanja. Nakon analiziranih rezultata došlo se do sledećih zaključaka.

Постигнуће на тесту у зависности од категорије испитаника. Исправност тестова је задовољавајућа, односно од укупног броја испитаника 86% је тачно одговорило на питања. Такође можемо закључити да су наставници били нешто успешнији са 89% тачних одговора.

Од укупног броја испитаника 80% није начинило саобраћајну незгоду (142 испитаника), док њих 20% није имало саобраћајне незгоде (35 испитаника).



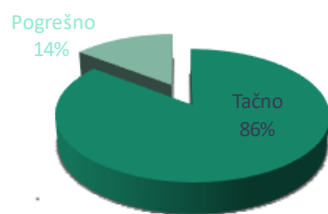
Od ukupnog broja ispitanika 80 % nije načinilo saobraćajnu nezgodu (142 ispitanika), dok je 20% njih izazvalo neku saobraćajnu nezgodu (35 ispitanika).



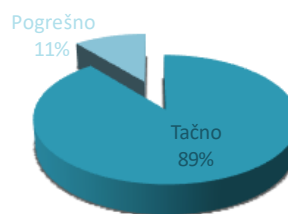
60% (106 ispitanika) je upoznato da je novi Zakon o bezbednosti saobraćaja izašao 2018. ali uglavnom ne znaju koje su najbitnije izmene, dok 40 % (71 ispitanik) sa time nije upoznato.

60% испитаника (106 испитаника) зна да је нови Закон о безбедности саобраћаја изашао 2018. године, али углавном не зна које су најважније измене, док 40% (71 испитаник) не зна ништа о томе.

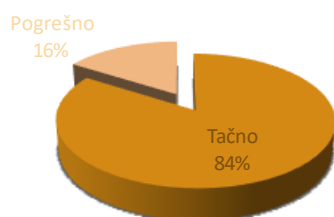
Uspeh na testu u zavisnosti od kategorije ispitanika



Sa policijom



Nastavnici



Roditelji

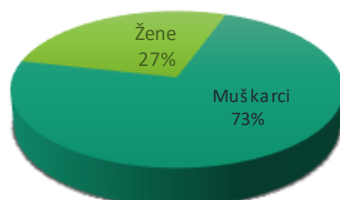


UKUPNO

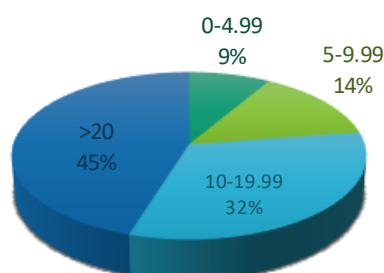
Од укупног броја испитаника 73% су мушкарци (128 испитаника), док је 27% женског пола (49 испитаника), што је нормално јер у саобраћају има више мушкараца возача.

Што се тиче старости испитаника, већина возача има преко 20 година возачког стажа (80 испитаника), следе са возачким искуством између 10 и 19,99 (57 испитаника),

затим измеѓу 5 и 9,99 (25 испитаника) и на крају возачи са не више од 5 година возачког искуства (15 испитаника).



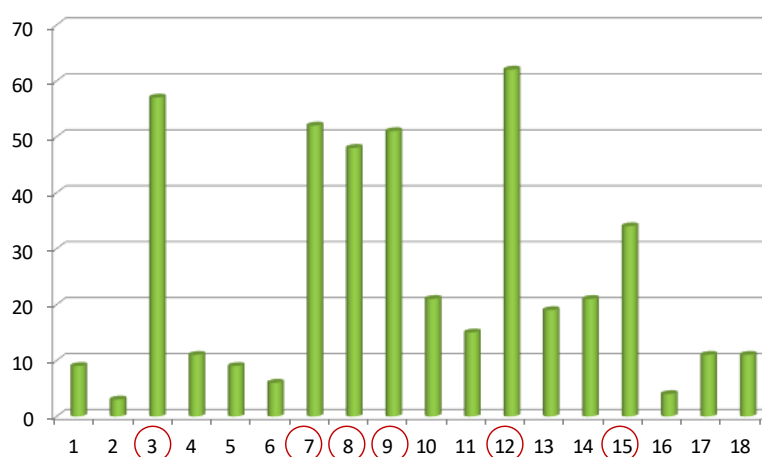
Od ukupnog broja ispitanika 73 % su osobe muškog pola (128 ispitanika), dok je 27 % osoba ženskog pola (49 ispitanika), što je normalno jer u saobraćaju ima više muškaraca vozača.



Što se tiče starosne kategorije, najviše je vozača sa vozačkim stažom iznad 20 godina (80 ispitanika), slede vozači sa stažom od 10 do 19.99 godina (57 ispitanika), zatim od 5 do 9.99 godina (25 ispitanika) i na kraju, do 5 godina iskustva (15 ispitanika).

Крајње изненађујући податак је да чак 57 испитаника није знало да је прелазак „пуне“ линије забрањен.

Broj netačnih odgovora po pitanjima



Велики број нетачних одговора на питања 7 и 8 односи се на чињеницу да многи испитаници не познају мимоилажење по правилима.

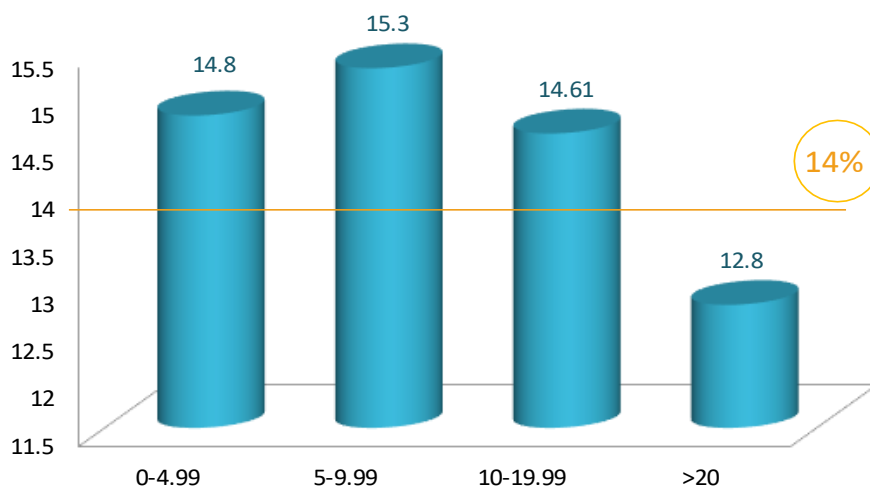
Чак 51 испитаник није тачно урадио питање на раскрсници 9 што указује да не познаје правила проласка на раскрсницама.

Највећи број нетачних одговора (62) био је на питање 12. Али то није забрињавајуће, јер је важније знати значење саобраћајног знака него којој групи припада.

Многи људи не знају које светло иде после истовремено укљученог црвеног и жутог, светла на семафору, јер не обраћају пажњу на то.

Процент нетачних одговора у односу на године возачког искуства илуструје занимљиве чињенице. Овај графикон показује да је просечан проценат нетачних одговора 14%, али да су изнад границе просека чак 3 од 4 категорије возача.

Procenat pogrešnih odgovora u odnosu na godine vozačkog staža



Ovaj grafik pokazuje da je prosečan procenat pogrešnih odgovora 14%.

5. Иницијатива

Након сумирања резултата и интервјуа са испитаницима о томе шта их највише занима и о чему су највише упућени у области саобраћаја, направили смо презентацију. Презентација, осим одговора са теста, садржи најважније измене новог Закона о безбедности саобраћаја.

Одржали смо серију предавања како наставницима тако и родитељима.

Ученици који су учествовали у пројекту организовали су радионице као начин вршњачке едукације осталих ученика који нису учествовали у пројекту. Обе стране, едукатори и учесници били су веома мотивисани и заинтересовани. Сматрамо да је било важно да ученици, будући возачи, подигну свест о значају препознавања и учења саобраћајних правила. Саобраћајној полицијцима, као нашим партнерима, представљени су и резултати спроведених акција како би се подигла свест о великим проблемима у саобраћају у локалној заједници чији смо сви ми део.



Надамо се да ќе наша помоћ у идентификовању проблема помоћи у предузимању даљих корака и радњи за унапређивање безбедности саобраќаја. Пошто желимо да што више људи буде упознато са резултатима нашег пројекта, пројекат смо представили и на локалним ТВ станицама и покушали да подигнемо свест о значају теме, тако да свако од нас пружи лични допринос безбедности саобраќаја.



Надамо се да смо својим преданим радом дали скроман допринос унапређењу безбедности саобраќаја. Људи које смо интервјуисали били су веома заинтересовани да провере своје знање и науче нешто ново. Најважније је да смо их подсетили да: Знање не познаје старосну границу!



TRAFFIC-TECHNICAL SCHOOL „12. FEBRUARY“, NIS

Author:

Dalibor Stojanov, Graduated Traffic Engineer

16.KNOWLEDGE KNOWS OF NO AGE!

1. Introduction

The goal of traffic safety is to stabilize and reduce number of deaths in traffic accidents all over the world. It's estimated that in one decade 5 million lives could be preserved. Keeping that in mind, it is our honor to participate in finding solutions for improvement of traffic safety.

2. Idea

There are many problems in traffic. When we started thinking of all the generations and the way they could participate in improvement of traffic safety, only then we started to think of the prevention. First, we needed to find school students interested to participate in the project. Since, at the beginning, there were many ideas for the project, we organized meetings and started with brain storming among ourselves.



And so, it began... While talking about ideas we concluded that most experts in the field are involved in issues regarding children and youth traffic safety. We decided to address the issue of traffic safety of older generations. Our target group included „the experienced

drivers”. The idea was to determine how familiar they are with traffic rules and how familiar they are with changes to the Law. For this purpose, we created a test. The test consists of 18 questions so that participants do not need too much time for the test. The questions are not difficult, most with pictures, including two intersections. We also had the help of police officers who stopped drivers while our drivers were taking their tests that students gave them to solve. We also tested the knowledge of our colleagues, employees of our school.



We tested the parents of our school's students during parent-teacher meetings.



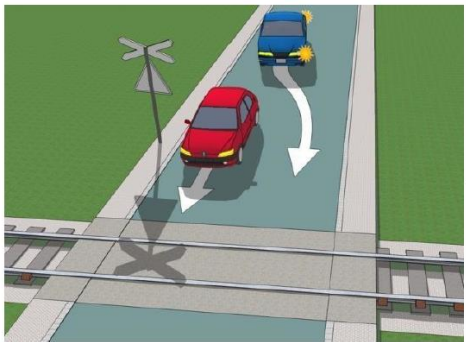

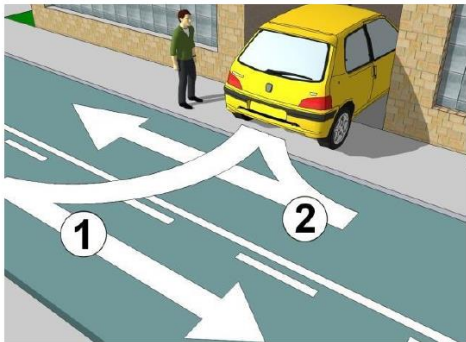


3. Research


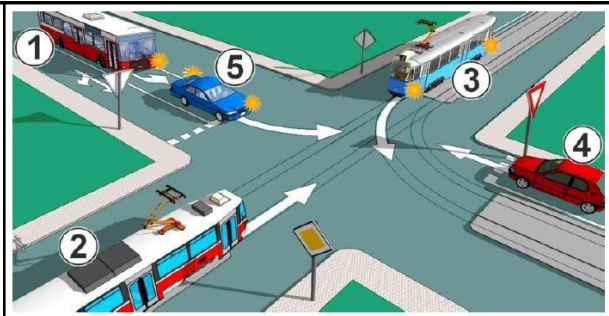

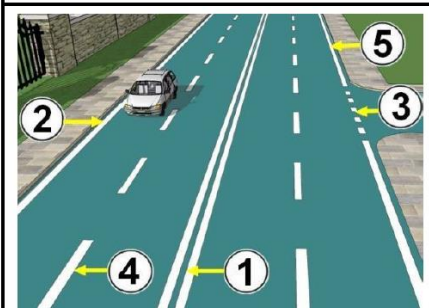
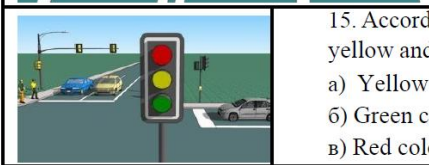

Испитаници су подељени у 3 групе. Прву групу чине случајно одабрани људи које је полиција зауставила (94 испитаника). Другу групу чине наставници. Трећу групу чине родитељи. Урађено је 177 тестова са 18 питања.

Пример теста:

The participants were divided into 3 groups. The first group consists of randomly selected people who were stopped by the police (94 respondents). The second group consists of teachers. The third group consists of parents. 177 tests with 18 questions were taken.

Example test:

Knowing of traffic regulations				
1. Gender	Male	Female		
2. Year's of drivers experience	0 – 4.99	5– 9.99	10 – 19.99	>20+
3. Have you caused an accident during the driving period?	YES	NO		
4. Do you know that the last amandment to the law was in 2018?	YES	NO		
	1. The driver of a blue vehicle, in the situation shown in the picture, performs overtaking:			
	a) Properly.....			<input type="checkbox"/>
	b) Unproperly.....			<input checked="" type="checkbox"/>
	B) Properly, only if he doesn't endanger vehicles coming in the opposite direction.....			<input type="checkbox"/>
	2. At a railway crossing, a driver must yeald train			
	a) Yes.....			<input checked="" type="checkbox"/>
	b) Yes, only if it comes from the right hand side.....			<input type="checkbox"/>
	B) No.....			<input type="checkbox"/>
	3. In the situation shown in the picture, the driver of the gray vehicle:			
	a) Is allowed to swerve to the traffic lane along the right side of the road.....			<input type="checkbox"/>
	b) Isn't allowed to swerve to the traffic lane along the right side of the road.....			<input checked="" type="checkbox"/>
	4. In the situation shown in the picture, the driver of the yellow vehicle:			
	a) Can continue driving in all directions.....			<input type="checkbox"/>
	b) Can turn left or continue driving straight ahead.....			<input type="checkbox"/>
	B) Can continue driving straight ahead or turn right.....			<input checked="" type="checkbox"/>
	5. The vehicle, shown in the picture, is properly entering the traffic:			
	a) Route number 1.....			<input type="checkbox"/>
	b) Route number 2.....			<input checked="" type="checkbox"/>
	B) Any route number.....			<input type="checkbox"/>
	6. In the situation shown in the picture, the driver of a vehicle entering the traffic:			
	a) Must let the pedestrian on the pavement.....			<input checked="" type="checkbox"/>
	b) Doesn't have to let the pedestrian on the pavement.....			<input type="checkbox"/>
	B) Doesn't have to let the pedestrian on the pavement but he must use the sound signal.....			<input type="checkbox"/>
	7. In the situation shown in the picture, when it is difficult to pass by a driver must stop his vehicle:			
	a) Tractor driver.....			<input checked="" type="checkbox"/>
	b) Vehicle driver.....			<input type="checkbox"/>
	8. The right-of-way, as shown in the picture, is regulated by			
	a) Mutual agreement between drivers, by giving light or sound warning signal.....			<input type="checkbox"/>
	b) A traffic sign.....			<input type="checkbox"/>
	B) A traffic regulation.....			<input checked="" type="checkbox"/>

	
<p>9. 5 2 6 3 4 7 1 8</p>	<p>10. 2 3 4 5 1</p>
	<p>11. Additional sign, shown in the picture, indicates that the speed limit on the traffic sign above applies:</p> <p>a) When it's raining. <input checked="" type="checkbox"/></p> <p>б) When it's snowing. <input type="checkbox"/></p> <p>в) When there is a snow on the road. <input type="checkbox"/></p> <p>12. Traffic sign 'speed limit', shown in the picture belongs to the following group of signs:</p> <p>a) Informative signs. <input type="checkbox"/></p> <p>б) Prohibitory signs. <input checked="" type="checkbox"/></p> <p>в) Warning signs. <input type="checkbox"/></p>
	<p>13. In the situation shown in the picture, full border line is marked by following numbers:</p> <p>a) 1 and 3 <input type="checkbox"/></p> <p>б) 2 and 5 <input checked="" type="checkbox"/></p> <p>в) 1 and 4 <input type="checkbox"/></p> <p>14. Signs that mark places for specific purpose (eg. bus stop, taxi, police...) are:</p> <p>a) Orange colour. <input type="checkbox"/></p> <p>б) White colour. <input type="checkbox"/></p> <p>в) Yellow colour. <input checked="" type="checkbox"/></p>
	<p>15. According to the order of light traffic signals on a tricolour traffic light when the yellow and red lights are turned off simultaneously, the next light is:</p> <p>a) Yellow colour. <input type="checkbox"/></p> <p>б) Green colour. <input checked="" type="checkbox"/></p> <p>в) Red colour. <input type="checkbox"/></p>
	<p>16. Light traffic sign - green light with one or more arrows on the traffic light means:</p> <p>a) Not allowed to drive in the direction of the green light, unless the vehicle cannot stop safely in front of the sign. <input type="checkbox"/></p> <p>б) Not allowed to drive in the direction of the green light. <input type="checkbox"/></p> <p>в) Allowed to drive only in the direction of the green light. <input checked="" type="checkbox"/></p>
<p>17. A vehicle for specific usage such as combine, grader, bulldozer, forklift...etc with the max speed limit of 45 km/h is:</p> <p>a) Working machine. <input checked="" type="checkbox"/></p> <p>б) Cultivator. <input type="checkbox"/></p>	
<p>18. Passing one traffic participant by the other coming from the opposite direction is called:</p> <p>a) Overtaking <input type="checkbox"/></p> <p>б) Passing by <input checked="" type="checkbox"/></p> <p>в) Going around. <input type="checkbox"/></p>	

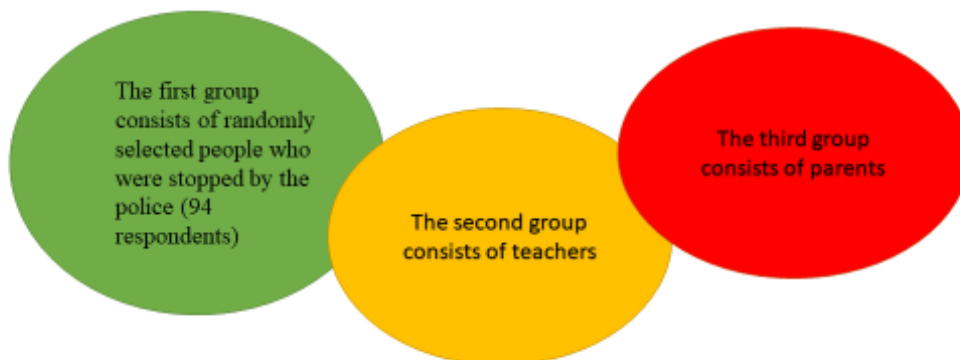
4. Conclusions

After analyzing the results, we arrived to the following conclusions.



CONCLUSIONS

The participants were divided into 3 groups



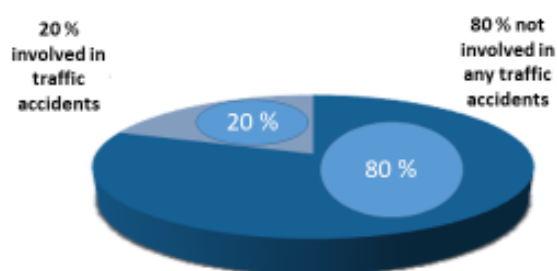
177 tests with 18 questions were taken

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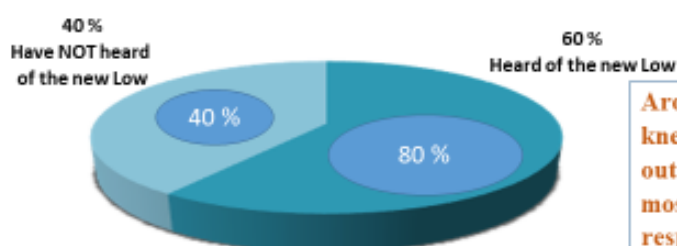
Achievement on the test depended on the category of the examinees. The correctness of the tests is satisfactory, i.e. out of the total number of respondents, 86% answered the questions correctly. We also concluded that teachers were somewhat more successful with 89% of correct answers.

Од укупног броја испитаника 80% није начинило саобраћајну незгоду (142 испитаника), док њих 20% није изазвало саобраћајне незгоде (35 испитаника).

Out of the total number of respondents, 80% were not involved in any traffic accidents (142 respondents), while 20% did not cause traffic accidents (35 respondents).



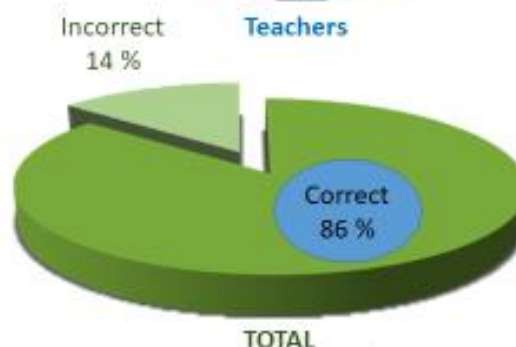
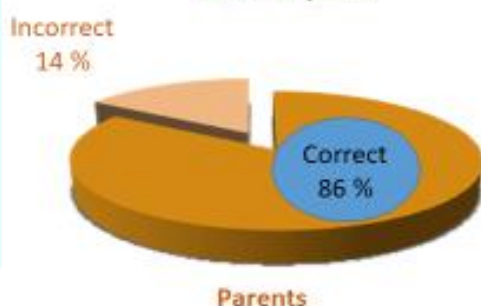
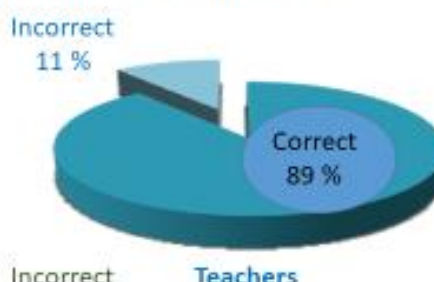
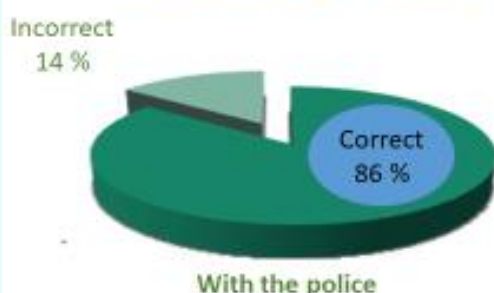
Out of the total number of respondents, 80% were not involved in any traffic accidents (142 respondents), while 20% did not cause traffic accidents (35 respondents)



Around 60% of respondents (106 respondents) knew that the new Law on Traffic Safety came out in 2018, but mostly do not know what the most important changes were, while 40% (71 respondents) do not know anything about it.

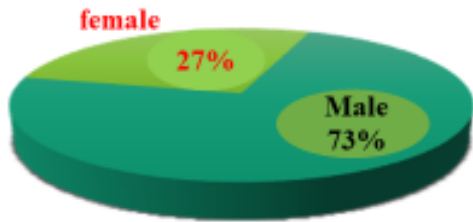
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SUCCESS ON THE TEST DEPENDING ON THE CATEGORY OF THE PARTICIPANT

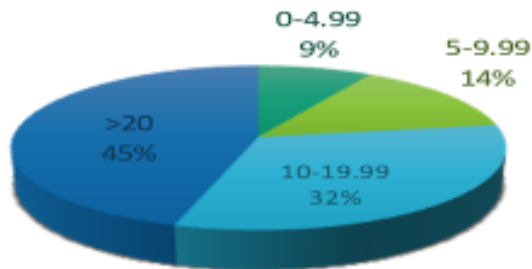


Out of the total number of respondents, 73% are men (128 respondents), while 27% are female (49 respondents), which is normal because there are more male drivers in traffic.

Regarding the age of the respondents, the majority of drivers have over 20 years of driving experience (80 respondents), followed by those with driving experience between 10 and 19.99 years (57 respondents), then between 5 and 9.99 years (25 respondents) and finally drivers with no more than 5 years of driving experience (15 respondents).



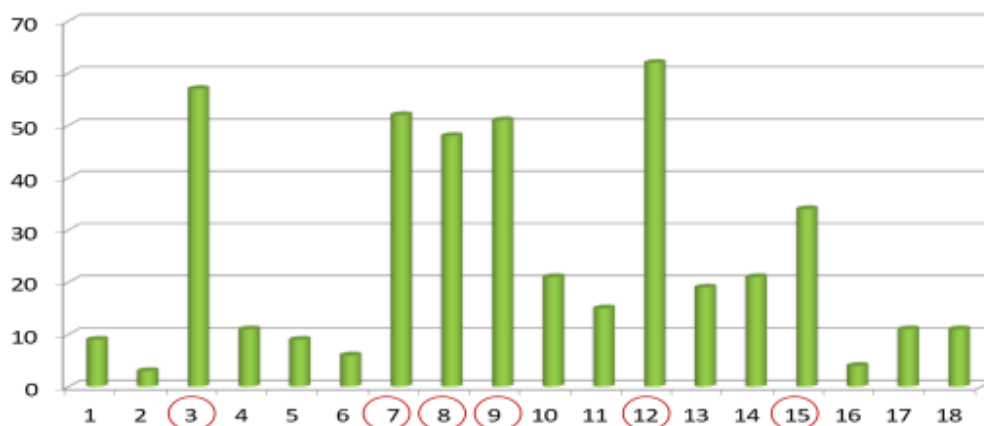
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Drivers with over 20 years of driving experience (80 respondents), followed by those with driving experience between 10 and 19.99 years (57 respondents), then between 5 and 9.99 years (25 respondents) and finally drivers with no more than 5 years of driving experience (15 respondents).

The most surprising answer is that more than 57 respondents did not know that crossing the "full" line is prohibited.

Number of incorrectly answered questions



The large number of incorrect answers to questions 7 and 8 refers to the fact that many respondents do not know how to pass by according to the rules.

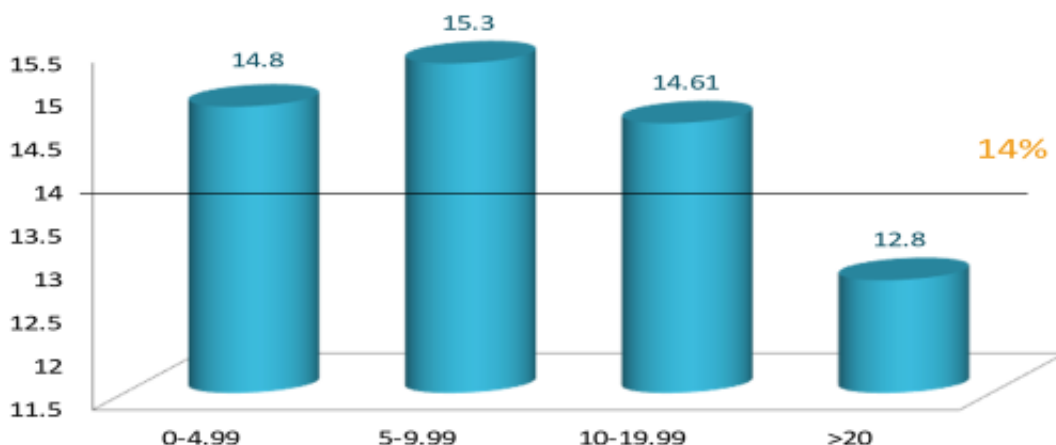
As many as 51 respondents did not correctly answer the question at intersection 9, which indicates that they do not know the rules for passing at intersections (wright of way).

The highest number of incorrect answers (62) was on question 12. But that is not worrying, because it is more important to know the meaning of a traffic sign than to which group it belongs.

Many people don't know which light lights after the red and yellow lights on the traffic lights, because they don't pay attention to it.

The percentage of incorrect answers in relation to years of driving experience illustrates interesting facts. This graph shows that the average percentage of incorrect answers is 14%, but that even 3 out of 4 categories of drivers are above the average limit.

PERCENTAGE OF WRONG ANSWERS IN RELATION TO YEARS OF DRIVING EXPERIENCE



THE GRAPH SHOWS THAT THE AVERAGE PERCENTAGE OF WRONG ANSWERS IS 14 %

5. Initiative

After summarizing the results and interviewing respondents about what they are most interested in and what they are most knowledgeable about in the field of traffic, we made a presentation. The presentation, apart from the answers from the test, contains the most important changes to the new Law on Traffic Safety.

We held a series of lectures for both teachers and parents.

Students who participated in the project organized workshops as a way of peer education for other students who did not participate in the project. Both sides, educators and participants were very motivated and interested. We believe that it was important for students, future drivers, to raise awareness of the importance of recognizing and learning traffic rules. The traffic police, as our partners, were also presented with the results of actions implemented to raise awareness of major traffic problems in the local community of which we are all a part.



We hope that our help in identifying the problem will help in taking further steps and actions to improve traffic safety. Since we want as many people as possible to be familiar with the results of our project, we also presented the project on local TV stations and tried to raise awareness of the importance of the topic, so that each of us can make a personal contribution to traffic safety.



Надамо се да смо својим преданим радом дали скроман допринос унапређењу безбедности саобраћаја. Људи које смо интервјусали били су веома заинтересовани да провере своје знање и науче нешто ново. Најважније је да смо их подсетили да: Знање не познаје старосну границу!

We hope that with our dedicated work we have made a modest contribution to the improvement of traffic safety. The people we interviewed were very interested in testing their knowledge and learning something new. The most important thing is that we reminded them that: Knowledge knows of no age limit!



Srednja šola za
storitvene dejavnosti in logistiko

SREDNJA ŠOLA ZA
STORITVENE DEJAVNOSTI IN
LOGISTIKO

Autor:

Darja Rebevšek, prof

17.PRENOVLJENI IZOBRAŽEVALNI PROGRAM LOGISTIČNI TEHNIK

Povzetek

Leta 1979 se je takratni celjski šoli, ki je izobraževala za poklic prometnega tehnik, pridružila Šola za cestni promet iz Zagreba, ki je uvedla dislocirano enoto. Na šoli je delovala vse do 1981 leta, ko je šola samostojno verificirala izobraževalni program prometni tehnik. S tem se je uvedla usmeritev za promet in zveze.

Po nekaj letih izobraževanja dijakov v programu Prometni tehnik in eni prenovi je prišlo do spoznanja in težnji po prenovi takratnega programa prometni tehnik. Leta 2011 je takratni izobraževalni program Prometni tehnik nadomestil program Logistični tehnik. Zaradi nenehnega spreminjanja, analiz obstoječih programov uvajanja digitalizacije logističnih procesov, trajnostne mobilnosti, oskrbovalnih verig ter trajnostnega razvoja in prometne varnosti se pojavljajo težnje po novi spremembi obstoječega izobraževalnega programa. V novi program Logistični tehnik so sledile spremembe strokovno-teoretičnega področja medtem ko se obseg in struktura splošnoizobraževalnega dela programa s prenovno programa ne spreminja, prav tako ostajajo v veljavi katalogi znanja za splošnoizobraževalne predmete.

Prenovljeno strokovno-teoretično področje vsebuje poglavja področij: blago in embalaža, logistika skladiščenja, podjetništvo in gospodarsko poslovanje, tehnologija komuniciranja, transportna in manipulacijska sredstva, logistika prevoza tovora in potnikov, mednarodna blagovna menjava, prometna geografija, trajnostna mobilnost in trajnostni razvoj, prometna varnost v cestnem prometu, pomorska agentura, digitalizacija logističnih procesov in poslovna logistika.

Spremembam potrebnih kompetenc ob spremembi oziroma prenovi logističnega programa sledijo prenovljeni ali novi kurikuli.

Ključne besede: izobraževalni program logistični tehnik, kurikulum, kompetence.

1. Uvod

Vsi izobraževalni programi morajo slediti spremembam, razvoju, inovacijam in trendom družbe. Enako se je izkazalo tudi na področju logistike, globalne spremembe so zahtevale spremenjeno področje logistike. Ob ohranjanju splošno-teoretičnih znanj potreba po spremembah strokovno-teoretičnega področja narašča. Ob vseh teh spremembah potrebnih kompetenc se je za nujno in potrebno pokazala težnja po spremembi logističnega programa izobraževanja in s tem nastanek novih kurikulov.

2. Temeljna izhodišča za spremembe izobraževalnih programov

2.1. Kompetenčna zasnovanost

Pri izvajanju in načrtovanju poklicnega in strokovnega izobraževanja je najpomembnejši razvoj ključnih in poklicnih kompetenc. V celoten izobraževalni sistem se morajo povezovati strokovno-teoretična in praktična izobraževanja, ob tem se morajo sistematično vključevati ključne kompetence.

Pri tem je pomemben sistem kreditnih točk, ki se opira na priporočila Evropskega sistema prenašanja kreditnih točk v poklicnem izobraževanju in usposabljanju (European Credit System for Vocational Education and Training – ECVET), podpira kompetenčno zasnovanost izobraževalnih programov. Kreditne točke so numerična prezentacija „teže“ opredeljenih učnih izidov izobraževalnega programa in posameznih enot.

2.2. Modularizacija izobraževalnih programov

Gre za oblikovanje širših izobraževalnih programov enote, ki na eni strani izhajajo iz zahtev poklicnih standardov, na drugi strani pa vodijo k celoviti poklicni kvalifikaciji. Modularni izobraževalni programi upoštevajo zahteve delovnih in poslovnih procesov, ki so definirani s poklicnimi standardi, s čimer se v ospredje postavlja razvoj ključnih in poklicnih kompetenc s ciljem večje zaposljivosti udeležencev. Z modularizacijo izobraževalnih programov in z ustreznim vključevanjem poklicnih standardov bo omogočeno povezovanje temeljnega in nadaljevalnega poklicnega izobraževanja.

2.3. Odprti kurikulum

Osnovno načelo priprave odprtega kurikula je hitro prilagajanje potrebam delodajalcev. Dejavnější mora biti vloga socialnih partnerjev na regionalni ravni, saj gre na ta način za razbremenitev razreševanja specifičnih regionalnih vprašanj. Torej se z odprtim kurikulumom šola sprotno odziva na potrebe trga, pri čemer je pomembno vključevanje delodajalcev, kar se lahko doseže z večjimi materialnimi vložki kakor tudi z večjim obsegom praktičnega usposabljanja v podjetjih. Del obsega odprtega kurikula bodo šole namenile praktičnemu usposabljanju v podjetjih.

3. Sprememba programa logistični tehnik

Program logistični tehnik je bil zadnjič vsebinsko prenovljen leta 2008. Leta 2022 so bili prenovljeni poklicni standardi, na katerih je temeljil program iz leta 2008. Z analizo prenovljenih poklicnih standardov: Prometnik/prometnica v cestne promet, Špediter/špediterka in Skladiščnik/skladiščnica v logistiki se je pokazala potreba po vsebinski prenovi programa.

V skladu z zahtevami poklicnega standarda Prometnik/prometnica v cestnem prometu so bile v program kot obvezne dodatno vključene kompetence s področja načrtovanja prevoza potnikov. Posodobljene ali dodane so bile kompetence s področja digitalizacije logističnih procesov, trajnostne mobilnosti, oskrbovalnih verig ter trajnostnega razvoja in prometne varnosti.

V skladu z Dopolnjenimi izhodišči za pripravo izobraževalnih programov nižjega in srednjega poklicnega izobraževanja ter programov srednjega strokovnega izobraževanja (2019), je povečan obseg praktičnega izobraževanja pri delodajalcih iz štirih na osem tednov in zmanjšan obseg odprtega kurikula iz 578 na 400 ur. Izbirni del programa ponuja aktualne vsebine s področja prometne varnosti, digitalizacije, poslovne logistike in pomorske agenture.

Tako so sedaj pripravljene novi katalogi znanja strokovnih modulov ter nova predmetna izpitna kataloga za 2. predmet mature logistika in 4. izpito enoto poklicne mature – izdelek ali storitev z zagovorom. Pri tem se obseg in struktura splošnoizobraževalnega dela programa s prenovno programa ne spreminja, prav tako ostajajo v veljavi katalogi znanja za splošnoizobraževalne predmete.

4. Primerjava starega in prenovljenega programa Logistični tehnik

Ob primerjavi obstoječega programa s prenovljenim so spremembe le na strokovno-teoretičnem področju. Do tega so pripeljala nova spoznanja s področja prometa in logistike, kar je logična posledica sprememb, inovacij, ki se dogajajo na teh področjih. Ob vsej modernizaciji, avtomatizaciji, uvajanju digitalizacije in elementov trajnostnega razvoja so spremembe logične in nujne. Prenova izobraževalnega program je bila posledica novih spoznanj s področja prometa in logistike. Torej posodobljene kompetence posameznih modulov izražajo potrebo po novih znanj in spretnosti. V veliki meri se sledi uvajanju digitalizacije, avtomatizaciji in elementom trajnostnega razvoja.

Tabela št. 1: Programske enote preteklega programa Logistični tehnik

PROGRAMSKE ENOTE	OZNAKA	obvezno/ izbirno	1. leto	2. leto	3. leto	4. leto	SKUPAJ KT
Splošno izobraževalni predmeti:							
P1	Slovenščina	SLO obvezno	✗	✗	✗	✗	24
P2	Matematika	MAT obvezno	✗	✗	✗	✗	20
P3	Tuji jezik I	ANG obvezno	✗	✗	✗	✗	20
P4	Tuji jezik II	NEM obvezno	✗	✗	✗	✗	10
P5	Umetnost	UME obvezno	✗				3
P6	Zgodovina	ZGO obvezno	✗	✗			5
P7	Geografija	GEO obvezno		✗			3
P8	Sociologija	SOC izbirno			✗		3
P10	Fizika	FIZ obvezno	✗	✗	✗		6
P11	Kemija	KEM obvezno	✗				3
P12	Športna vzgoja	ŠVZ obvezno	opuščen	opuščen	opuščen	opuščen	14
Strokovni moduli:							
M1	Tehnologija blagovnih tokov	TBT obvezno		✗			11
M2	Tehnologija komuniciranja	TGO obvezno			✗		11
M3	Podjetništvo in gospodarsko poslovanje	PGP obvezno	✗				8
M4	Transportna sredstva	TSR obvezno			✗	✗	12
M5	Logistika tovarnih tokov	LTT obvezno	✗	✗	✗	✗	24
M6	Mednarodna blagovna menjava	MBM izbirno		✗	✗		10
Praktično izobraževanje v šoli:							
Praktično izobraževanje pri delodajalcu:							
Praktično usposabljanje z delom							
	PID	obvezno			✗		
Interesne dejavnosti							
	IND	obvezno					14
Odpri kurikulum:							
		obvezno					29
OK1	Logistika potniških tokov, M7	LPT obvezno				✗	
OK2	Poslovno komuniciranje v slovenskem jeziku	PKS obvezno				✗	
OK3	Informatika v vsakdanji rabi	INF obvezno			✗		
OK4	Medosebni odnosi in reševanje konfliktov	MOK obvezno		✗			
Poklicna matura (izdelek oz. storitev in zagovor)							
Skupaj							
							240

Vir: <http://eportal.mss.edus.si/>

Tabela št. 2: Programske enote prenovljenega programa logistični tehnik

Oznaka	Programske enote	Obvezno/ izbirno	Skupno število ur	Število kreditnih točk
A – Splošnoizobraževalni predmeti				
P1	Slovenščina	obvezno	487	24
P2	Tuji jezik I	obvezno	417	20
P3	Tuji jezik II	obvezno	204	10
P4	Matematika	obvezno	408	20
P5	Umetnost	obvezno	70	3
P6	Zgodovina	obvezno	102	5
P7	Geografija	obvezno	70	3
P8	Sociologija	izbirno	70	3
P9	Psihologija	izbirno	70	3
P10	Fizika	obvezno	140	6
P11	Kemija	obvezno	70	3
P12	Športna vzgoja	obvezno	340	14
Skupaj A			2378	111
B – Strokovni moduli				
M1	Blago in embalaža	obvezno	136	6
M2	Logistika skladiščenja	obvezno	158	7
M3	Podjetništvo in gospodarsko poslovanje	obvezno	164	8
M4	Tehnologija komuniciranja	obvezno	204	10
M5	Transportna in manipulacijska sredstva	obvezno	204	10
M6	Logistika prevoza tovora in potnikov	obvezno	324	16
M7	Mednarodna blagovna menjava	obvezno	170	8
M8	Prometna geografija	obvezno	68	3
M9	Trajnostna mobilnost in trajnostni razvoj	obvezno	68	3
M10	Prometna varnost v cestnem prometu	izbirno	68	3
M11	Pomorska agentura	izbirno	68	3
M12	Digitalizacija logističnih procesov	izbirno	68	3
M13	Poslovna logistika	izbirno	68	3
Skupaj B			1564	74
Od tega minimalno za praktično izobraževanje:				
C- Praktično izobraževanje v šoli				
	Praktični pouk		480	19
Č – Praktično usposabljanje z delom				
	Praktično usposabljanje z delom		304	12
D – Druge oblike vzgojno-izobraževalnega dela				
	Aktivno državljanstvo		35	2
	Interesne dejavnosti		317	13
Skupaj D			352	15
E – Odprti del kurikuluma				
	Odprti kurikulum		400	24
Skupaj pouka (A+B+E)			4342	209
Skupaj praktičnega izobraževanja (C+Č)			784	31
Skupaj izobraževanja v šoli (A+B+D+E)			4694	224
Skupaj (A+B+Č+D+E)			4998	236
Poklicna matura (izdelek oziroma storitev in zagovor)				4
Skupaj kreditnih točk				240
Število tednov izobraževanja v šoli			131	
Število tednov praktičnega usposabljanja z delom			8	

Število tednov drugih oblik vzgojno-izobraževalnega dela		11	
Skupno število tednov izobraževanja		150	

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Tabela št. 3: Primerjava iztekajočega in prenovljenega programa Logistični tehnik

Splošnoizobraževalni predmeti in strokovni moduli v programu logistični tehnik	
OBSTOJEČI - IZTEKAJOČI PROGRAM	PRENOVLJENI PROGRAM
Slovenščina	Slovenščina
Tuji jezik I	Tuji jezik I
Tuji jezik II	Tuji jezik II
Matematika	Matematika
Umetnost	Umetnost
Zgodovina	Zgodovina
Geografija	Geografija
Sociologija	Sociologija
Psihologija	Psihologija
Fizika	Fizika
Kemija	Kemija
Športna vzgoja	Športna vzgoja
Tehnologija blagovnih tokov	Blago in embalaža
Tehnologija komuniciranja	Logistika skladiščenja
Podjetništvo in gospodarsko poslovanje	Podjetništvo in gospodarsko poslovanje
Transportna sredstva	Tehnologija komuniciranja
Logistika tovornih tokov	Transportna in manipulacijska sredstva
Mednarodna blagovna menjava	Logistika prevoza tovora in potnikov
Logistika potniških tokov	Mednarodna blagovna menjava
Sredstva mehanizacije	Prometna geografija
Avtomatizacija in robotizacija	Trajnostna mobilnost in trajnostni razvoj
	Prometna varnost v cestnem prometu
	Pomorska agentura
	Digitalizacija logističnih procesov
	Poslovna logistika

5. Nove poklicne kompetence prenovljenega izobraževalnega programa

K oblikovanju novih oz. prenovi nekaterih obstoječih modulov so se oblikovale nove poklicne kompetence. Te za kakovostno izvajanje vsebin opredeljuje informativne in formativne cilje.

5.1. Blago in embalaža

Blago je potrebno razumeti kot predmet prevoza. Z njim upravljajo vsi deležniki v oskrbovalni verigi, od proizvajalca/pridelovalca do končnega kupca/uporabnika. Cilj je, da se z blagom izvaja čim manj manipulacij in fizičnega stika z njim. Pomembna je digitalizacija sistema ravnanja z blagom. Kompetence na tem področju so: ravnanje z blagom v prometu, transportu in logistiki v skladu s pravnimi viri; ravnanje z blagom glede na tehniško-tehnološke značilnosti; ravnanje z blagom glede na skladiščno transportne lastnosti blaga; izbiranje vrste embalaže; načrtovanje procesov pakiranja blaga, priprava

na komisioniranje, skladiščenje in transport blaga; upravljanje oskrbovalnih verig in uporaba GS 1 standardov in identifikacije blaga.

5.2. Logistika skladiščenja

Skladiščenje je eden od pomembnih procesov ravnanja z blagom. Kompetence opredeljujejo načrtovanje skladiščne dejavnosti; izbiri vrste skladišč, opreme skladišč, tehnik in tehnologij skladiščenja; vodenju skladiščne dokumentacije; načrtovanju uporabe pretvorne in skladiščne mehanizacije; uporabi transportnih priprav; izvajanju in upravljanju skladiščnih procesov; načrtovanju zalog in upravljanju s skladiščenja; uporabi informacijsko komunikacijske podpore pri skladiščenju in zagotavljanju varnega dela v skladiščih in v notranjem transportu.

5.3. Podjetništvo in gospodarsko poslovanje

Za poslovno uspešno poslovanje podjetij so pomembna znanja s področja ekonomije in marketinga. Kompetence opredeljujejo delovanje v skladu z osnovami ekonomske teorije, delovanja tržnega mehanizma ter mednarodne trgovine; izračunavanje različnih vrst stroškov, vpliva stroškov na poslovanje podjetja; izdelave poslovnih načrtov podjetij in uporaba različnih marketinških strategij v logističnih podjetjih.

5.4. Tehnologija komuniciranja

Prvi poslovni stiki v podjetjih stečejo med udeleženci s komunikacijo, ki mora biti jasna in razumljiva. Primerna tehnologija komuniciranja je dosegljiva z uporabo osnovnih komponent informacijske tehnologije; znanjem urejanja besedil, preglednic in predstavitev z uporabo programske opreme; uporabo informacijskih virov in zagotavljanjem varnosti računalniških omrežij; obvladovanjem različnih vrst komuniciranja; pripravo poslovne korespondence ter poslovnega bontona; razvijanjem usposobljenosti za delo v skupini in ustrezno ravnanje s človeškimi viri, kot kompetence v tem modulu.

5.5. Transportna in manipulacijska sredstva

Področje transportnih in manipulacijskih sredstev temelji na kompetencah: uporaba pravil in komuniciranje s pomočjo tehnične dokumentacije; načrtovanje in uporaba različnih vrst manipulacijskih in transportnih sredstev; načrtovanje uporabe transportnih in manipulacijskih sredstev glede na njihovo tehnično, tehnološko in eksploatacijsko značilnost; izbiranje vrste pogonskih strojev transportnih in manipulacijskih sredstev; načrtovanje nabave transportnih in manipulacijskih sredstev ter načrtovanje procesov vzdrževanja transportnih in manipulacijskih sredstev.

5.6. Logistika prevoza tovora in potnikov

To je eden bolj obsežnih modulov in zajema večje število kompetenc. Potrebna so znanja (osvojene kompetence) organiziranja prevoza tovora in potnikov v skladu z domačimi in mednarodnimi pravnimi viri; organiziranje prevozov v različnih prometnih sistemih in podsistemih; organiziranje in načrtovanje procesa prevoza tovora; organiziranje

specifičnih prevozov tovora; priprava tovora za transport, natovarjanje, namestitvev in pritrditev tovora na tovorni prostor vozil; organiziranje in načrtovanje procesa prevoza potnikov; načrtovanje dela in obsega voznega parka ob upoštevanju standardov kakovosti logističnih procesov prevoza tovora in potnikov; pridobivanje in uporaba prevozne dokumentacije in evidenc pri prevozu tovora in potnikov; upoštevanje elementov logistične infrastrukture pri načrtovanju in organizaciji prevoza tovora in potnikov; uporaba prometne signalizacije prometnih podsistemov; uporaba informacijske tehnologije za obvladovanje prevoznega procesa; presojanje elementov nadzora in kakovosti ter izvajanje nadzora prevoza tovora in potnikov.

5.7. Mednarodna blagovna menjava

To področje zajema znanja in veščine s področja mednarodne trgovine, špedicije, carine in zavarovalništva. Kompetence obravnavajo uporabo pravnih virov špeditorske dejavnosti in prepoznavanje dejavnosti logističnih operaterjev; načrtovanje špedicijskih poslov in dela špediterja; uporabo trgovskih pogodb in klavzul; uporaba dokumentov transporta, špedicije in tovora; poznavanje vloge carine; uporabo tarif in izvajanje osnovnih procesov carinskih postopkov; uporabo pravnih virov v zavarovalništvu ter določitev vrst zavarovanj glede na logistične procese.

5.8. Prometna geografija

To področje zajema znanja o prometnem načrtovanju, ki temelji na razumevanju geografije in znanja o nacionalnih in svetovnih prometnih tokovih. Kompetence vključujejo analizo osnovnih naravno geografskih in družbeno geografskih značilnosti prometne geografije in njihovega vpliva na prometne sisteme v Sloveniji, evropskih in ostalih državah sveta; analize prometnega položaja Slovenije, evropskih in ostalih državah sveta in najpomembnejših prometnih smeri-koridorjev; načrtovanje prometne in urbane strukture okolja ter uporaba kartografije in geografskega informacijskega sistema.

5.9. Trajnostna mobilnost in trajnostni razvoj

Trajnostni razvoj opredeljuje razvoj, ki zadovoljuje trenutne potrebe, ne da bi pri tem ogrožal zadovoljevanje potreb prihodnjih generacij. Preko kompetenc dijaki osvojijo znanja in veščine s področij upoštevanje vplivov prometa na okolje; razumevanje uporabe in pridobivanja goriv – energentov; uporabo alternativnih in obnovljivih virov energije ter možnosti njihove uporabe v prometu; ravnanje v skladu z načeli trajnostne mobilnosti ; trajnostno načrtovanje prevoza potnikov; uporabo predpisov in postopkov za ravnanje z odpadki in razumevanje pomembnosti racionalne rabe energije in krožnega gospodarstva.

5. 10. Prometna varnost v cestnem prometu

Področje varnosti v cestnem prometu mora temeljiti zagotavljanju varnosti cestnega prometa vsem. Zato so potrebne naslednje kompetence: poznavanje dejavnikov varnosti cestnega prometa; analiziranje stanj prometne varnosti na cestah za izdelavo ocene

prometne varnosti; načrtovanje vsebine delavnic iz prometne varnosti in načrtovanje varnih prometnih poti.

5.11. Pomorska agentura

Pomorska agentura se ukvarja z raziskavo tržišč in prometnih tokov, trženjem in zaključevanje ladijskega prostora ter organizacija prevozov v linijskem kontejnerskem in konvencionalnem poslovanju. Na tem področju je potrebno osvojiti kompetence: poznavanje dejavnosti, postopkov in pravnih virov pomorskih agentov in posrednikov; razumevanje osnovnih značilnosti pomorske in logistične dejavnosti; razumevanje poteka domačih in mednarodnih blagovnih tokov; izpolnjevanje in pridobivanje prometne, pomorske in druge dokumentacije; poznavanje udeležencev in njihovih vlog v mednarodni pomorski verigi; uporabljanje trgovskih pogodb in klavzul; izvajanje postopkov pomorskega agenta in pomorskega posrednika ter razumevanje tarif in zaračunavanje agencijskih in posredniških storitev.

5.12. Digitalizacija logističnih procesov

Nove digitalne tehnologije ponudnikom tovora omogočajo, da svoje procese spremljajo v realnem času in analizirajo prometne informacije, da bi na tak način optimizirali produktivnost svoje dobavne verige ter čim bolj znižali svoje stroške. Potrebna so znanja (osvojene kompetence) analiziranja okolij delovanja globalnih oskrbovalnih verig; uporabe programskega orodja za upravljanje vozniških parkov in vodenje transportne dokumentacije; uporabe programskih in spletnih platform za organizacijo logističnih procesov in uporabe orodij za optimizacijo logističnih procesov.

5.13. Poslovna logistika

Gre za spoznavanje trendov, ki imajo v zadnjih časih zelo velik vpliv na logistiko, ter zunanjo oskrbo v logistiki. Kompetence tega področja so izvajanje procesov v poslovnem sistemu v skladu s cilji poslovne logistike; upravljanje logističnih aktivnosti znotraj poslovnega sistema in oskrbovalnih verig; načrtovanje, organiziranje in kontrola logističnih procesov znotraj logističnega sistema; upravljanje globalnih oskrbovalnih verig in spremljanje sodobnih trendov in razvoja logistike v prihodnosti.

6. Zaključek

Vse nove opisane poklicne kompetence se v tem trenutku kažejo kot potrebne in nujne. Razvoj v prihodnosti bo verjetno pripeljal do spremembe omenjenih kompetenc in elementov trenutne preнове. Zaradi tega razloga je potrebno poudariti, da spremembe logističnih kompetenc postajajo stalnica logističnega področja.



Srednja šola za
storitvene dejavnosti in logistiko

SCHOOL CENTRE CELJE
SECONDARY SCHOOL FOR
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17. RENOVATION OF EDUCATIONAL PROGRAMME LOGISTICS TECHNICIAN

Abstract

The Road Traffic School from Zagreb, which introduced a dislocated unit was joined to the school in Celje in 1979. That school trained for the profession of traffic technician.

That school educated students until 1981, when the school independently verified the education program for traffic technicians. That way the department for traffic and connections was introduced.

After several years of educating students in the traffic technician programme and one renovation, it was realized and desired to renew the traffic technician programme of that time.

In 2011, the Transport Technician educational programme was replaced by the Logistics Technician programme.

Due to constant changes, analysis of existing programmes, introductions of digitization of logistics processes, sustainable mobility, supply chains and sustainable development and traffic safety, there are tendencies for a new change in the existing educational programmes.

The new Logistics Technician programme was followed by changes in the professional-theoretical field, while the scope and structure of the general educational part of the programme does not change with the renewal of the programme. The catalogues of knowledge for general educational subjects also remain valid.

The renewed professional-theoretical field contains chapters in the fields of: goods and packaging, warehousing, entrepreneurship and economic operations, communication technology, transport and manipulation means, logistics of transport of freight and passengers, international commodity exchange, geography of transport, sustainable mobility and sustainable development, transport safety in road transport, maritime agency, digitization of logistics processes and business logistics.

Changes of the necessary competencies within logistics programmes are followed by renewed or new curriculums.

Key words: educational programme for logistics technicians. curriculum, competencies



1. Introduction

All educational programmes must follow the changes, developments, innovations and trends of society. The same was true in the field of logistics, global changes required a changed field of logistics. While maintaining general-theoretical knowledge, the need for changes in the professional-theoretical field is growing. With all these changes of necessary competences, the tendency to change the logistics programme of education and thus the creation of new curricula proved to be urgent and necessary.

2. Basic starting points for changes of educational programmes

2.1. Planning of competencies

When implementing and planning vocational and professional education, the most important thing is the development of key and professional competencies. Professional-theoretical and practical training must be integrated into the entire educational system, and key competencies must be systematically integrated. The credit system, which is based on the recommendations of the European Credit System for Vocational Education and Training (ECVET), is important in this regard, and supports the competency-based design of educational programmes. Credit points are a numerical representation of the "weight" of the defined learning outcomes of the educational programmes and individual units.

2.2. Modularization of educational programmes

It is about the creation of broader educational programmes of the unit, which on one hand derives from the requirements of professional standards, and on the other hand leads to a comprehensive professional qualification. Modular educational programmes take into consideration the requirements of work and business processes, which are defined by professional standards, which put the development of key and professional competences in the foreground with the aim of increasing the employability of the participants. The modularization of educational programmes and the appropriate inclusion of professional standards will enable the integration of basic and continuing vocational education.

2.3. Open curriculum

The basic principle of preparing an open curriculum is quick adaptation to the needs of employers. The role of the social partners at the regional level must be more active, as this is the way to relieve the burden of solving specific regional issues. Therefore, with an open curriculum, the school responds to the needs of the market on an ongoing basis, and the involvement of employers is important, which can be achieved with greater material inputs as well as with a greater range of practical training in companies. Part of the range of the open curriculum will be devoted to practical training in companies.

3. Changes of logistics technician programme

The content of the logistics technician programme was last revised in 2008. In 2022, the professional standards on which the programme from 2008 was based were revised. With the analysis of the renovated professional standards: Transport operator in road transport, Freight forwarder and Warehouse worker in logistics, the need for content renovation of the programme became apparent.

In accordance with the requirements of the road traffic operator professional standard, additional competences in the field of passenger transport planning were included in the programme as mandatory. Competences in the field of digitalisation of logistics processes,

sustainable mobility, supply chains and sustainable development and traffic safety were updated or added.

In accordance with the Supplemented starting points for the preparation of educational programmes of lower and secondary vocational education and programmes of secondary vocational education (2019), the range of practical training at employers has been increased from four to eight weeks and the range of the open curriculum has been reduced from 578 to 400 hours. The optional part of the programme offers current content in the field of traffic safety, digitalization, business logistics and maritime agency.

Thus, new catalogues of knowledge for professional modules and new subject exam catalogues for the 2nd subject of vocational matura in logistics and the 4th exam unit of the vocational matura - product or service with oral presentation have now been prepared. At the same time, the range and structure of the general educational part of the programme does not change with the renewal of the programme, and the knowledge catalogues for general educational subjects also remain valid.

4. Comparison of the old and renewed Logistics Technician programme

When comparing the existing programme with the renewed one, there are changes only in the professional-theoretical field. New insights from the field of transport and logistics led to this, which is a logical consequence of the changes and innovations taking place in these areas. With all the modernization, automation, introduction of digitalisation and elements of sustainable development, changes are logical and necessary. The renovation of the educational programme was the result of new knowledge in the field of transport and logistics. Therefore, the updated competences of individual modules express the need for new knowledge and skills. The introduction of digitalisation, automation and elements of sustainable development is followed to a large extent.

Chart no. 1: Program units of the previous Logistics Technician programme

PROGRAMSKE ENOTE	OZNAKA	obvezno/ izbirno	1. leto	2. leto	3. leto	4. leto	SKUPAJ KT
Splošno izobraževalni predmeti:							
P1	Slovenščina	SLO obvezno	✗	✗	✗	✗	24
P2	Matematika	MAT obvezno	✗	✗	✗	✗	20
P3	Tuji jezik I	ANG obvezno	✗	✗	✗	✗	20
P4	Tuji jezik II	NEM obvezno	✗	✗	✗	✗	10
P5	Umetnost	UME obvezno	✗				3
P6	Zgodovina	ZGO obvezno	✗	✗			5
P7	Geografija	GEO obvezno		✗			3
P8	Sociologija	SOC izbirno			✗		3
P10	Fizika	FIZ obvezno	✗	✗	✗		6
P11	Kemija	KEM obvezno	✗				3
P12	Športna vzgoja	ŠVZ obvezno	oproščen	oproščen	oproščen	oproščen	14
Strokovni moduli:							
M1	Tehnologija blagovnih tokov	TBT obvezno		✗			11
M2	Tehnologija komuniciranja	TGO obvezno			✗		11
M3	Podjetništvo in gospodarsko poslovanje	PGP obvezno	✗				8
M4	Transportna sredstva	TSR obvezno			✗	✗	12
M5	Logistika tovornih tokov	LTT obvezno	✗	✗	✗	✗	24
M6	Mednarodna blagovna menjava	MBM izbirno		✗	✗		10
Praktično izobraževanje v šoli:							
Praktično izobraževanje pri delodajalcu:							
	Praktično usposabljanje z delom	PID obvezno			✗		6
Interesne dejavnosti							
	Interesne dejavnosti	IND obvezno					14
Odpri kurikulum:							
	Odpri kurikulum	obvezno					29
OK1	Logistika potniških tokov, M7	LPT obvezno				✗	
OK2	Poslovno komuniciranje v slovenskem jeziku	PKS obvezno				✗	
OK3	Informatika v vsakdanji rabi	INF obvezno			✗		
OK4	Medosebni odnosi in reševanje konfliktov	MOK obvezno		✗			
Poklicna matura (Izdelek oz. storitev in zagovor)							
	Poklicna matura (Izdelek oz. storitev in zagovor)						4
Skupaj							240

Sources: <http://eportal.mss.edus.si/>

Chart no. 2: Program units of the renewed logistics technician program

Mark	Program units	Obligatory/ optional	Total number of lessons	Number of credit points
A – General educational subjects				
P1	Slovene	obligatory	487	24
P2	Foreign language I	obligatory	417	20
P3	Foreign language II	obligatory	204	10
P4	Mathematics	obligatory	408	20
P5	Art	obligatory	70	3
P6	History	obligatory	102	5
P7	Geography	obligatory	70	3
P8	Sociology	optional	70	3
P9	Psychology	optional	70	3
P10	Physics	obligatory	140	6
P11	Chemistry	obligatory	70	3
P12	Physical Education	obligatory	340	14
Total A			2378	111
B – Professional modules				
M1	Goods and packaging	obligatory	136	6
M2	Logistics of warehousing	obligatory	158	7
M3	Entrepreneurship and business operations	obligatory	164	8
M4	Technology of communication	obligatory	204	10
M5	Means of transport and manipulation	obligatory	204	10
M6	Cargo and passenger transport logistics	obligatory	324	16
M7	International trade	obligatory	170	8
M8	Traffic geography	obligatory	68	3
M9	Sustainable mobility and sustainable development	obligatory	68	3
M10	Traffic safety in road traffic	optional	68	3
M11	Maritime Agency	optional	68	3
M12	Digitalisation of logistics processes	optional	68	3
M13	Business logistics	optional	68	3
Total B			1564	74
Of this, the minimum is for practical education:				
C- Practice at school				
	Practice		480	19
Č – Practical training with work				
	Practical training with work		304	12
D – Other ways of education				
	Active citizenship		35	2
	Extracurricular activities		317	13
Total D			352	15
E – Open part of curriculum				
	Open curriculum		400	24
Total number of lessons (A+B+E)			4342	209
Total number of practice (C+Č)			784	31
Total number education at school (A+B+D+E)			4694	224
Total (A+B+Č+D+E)			4998	236
Vocational matura (product or service with oral examination)				4
Total of credit points				240
Number of weeks of education at school			131	
Number of weeks of practical training with work			8	
Number of weeks of other ways of educational work			11	
Total number of weeks of education			150	

Source: <http://eportal.mss.edus.si/>

Chart no. 3: Comparison of the expiring and renewed Logistics Technician programme

General educational subjects and professional modules in the logistics technician programme	
CURRENT EXPIRING PROGRAMME	RENOVATED PROGRAMME
Slovene	Slovene
Foreign language I	Foreign language I
Foreign language II	Foreign language II
Mathematics	Mathematics
Art	Art
History	History
Geography	Geography
Sociology	Sociology
Psychology	Psychology
Physics	Physics
Chemistry	Chemistry
Physical education	Physical education
Technology of commodity flows	Goods and packaging
Technology of communication	Logistics of warehousing
Entrepreneurship and business operations	Entrepreneurship and business operations
Means of transport	Technology of communication
Logistics of freight flows	Means of transport and manipulation
International trade	Cargo and passenger transport logistics
Logistics of passenger flows	International trade
Means of mechanization	Traffic geography
Automation and robotization	Sustainable mobility and sustainable development
	Traffic safety in road traffic
	Maritime Agency
	Digitalisation of logistics processes
	Business logistics

5. New vocational competencies of renewed educational programme

To create new or renovate some of existing modules, new vocational competences were formed. These define informative and formative goals for the high-quality implementation of content.

5.1. Goods and packaging

The goods must be understood as an object of transport. It is managed by all stakeholders in the supply chain, from the producer/grower to the end customer/user. The aim is to use as little manipulation and physical contact with the goods as possible. Digitalization of the goods handling system is important. Competences in this field are: dealing of goods in traffic, transport and logistics in accordance with legal sources; dealing of goods according to technical and technological characteristics; dealing of the goods according to the storage and transport properties of the goods; choosing the type of packaging; planning the processes of packing goods, preparing for commissioning, storage and transport of goods; supply chain management and the use of GS 1 standards and identification of goods.

5.2. Logistics of warehousing

Storage is one of the important processes of handling goods. Competences define the planning of storage activities; choosing the type of warehouses, warehouse equipment, storage techniques and technologies; management of storage documentation; planning the use of conversion and storage machinery; use of transport equipment; implementation and management of warehouse processes; inventory planning and storage management; the use of information and communication support in storage and ensuring safe work in warehouses and in internal transport.

5.3. Entrepreneurship and business operations

Knowledge in the field of economics and marketing is important for the business success of companies. Competences define functioning in accordance with the basics of economic theory, functioning of the market mechanism and international trade; calculation of different types of costs, the impact of costs on the company's operations; creation of business plans of companies and the use of various marketing strategies in logistics companies.

5.4. Technology of communication

The first business contacts in companies are made between the participants through communication, which must be clear and comprehensible. Appropriate communication technology can be achieved using the basic components of information technology; knowledge of editing texts, spreadsheets and presentations using software; use of information resources and ensuring the security of computer networks; mastering different types of communication; preparation of business correspondence and business etiquette; developing skills for working in a group and proper handling of human resources, as competencies in this module.

5.5. Means of transport and manipulation

The area of transport and handling means is based on competences: application of rules and communication with the help of technical documentation; design and use of various types of handling and transport means; planning the use of transport and handling means according to their technical, technological and operational characteristics; choosing the type

of drive machines of transport and handling means; planning the procurement of transport and handling equipment and planning processes for the maintenance of transport and handling equipment.

5.6. Cargo and passenger transport logistics

This is one of the more extensive modules and covers a larger number of competencies. Knowledge (acquired competence) of organizing cargo and passenger transport in accordance with domestic and international legal sources is required; organizing transport in various transport systems and subsystems; organization and planning of the cargo transportation process; organizing specific cargo transports; preparation of cargo for transport, loading, installation and fastening of cargo to the cargo space of vehicles; organizing and planning the passenger transportation process; planning of the work and volume of the vehicle fleet taking into account the quality standards of logistics processes for transporting cargo and passengers; acquisition and use of transport documentation and records in the transport of cargo and passengers; consideration of logistics infrastructure elements in the planning and organization of cargo and passenger transport; use of traffic signalisation of traffic subsystems; use of information technology to manage the transport process; assessing elements of control and quality and carrying out control of cargo and passenger transport.

5.7. International trade

This area covers knowledge and skills in the field of international trade, forwarding, customs and insurance. Competences deal with the use of legal resources of freight forwarding activity and identification of activities of logistics operators; planning of forwarding business and the work of a forwarder; the use of commercial contracts and clauses; use of transport, forwarding and cargo documents; knowledge of the role of customs; the application of tariffs and the implementation of the basic processes of customs procedures; the use of legal resources in the insurance industry and the determination of types of insurance based on logistical processes.

5.8. Traffic geography

This area covers knowledge of transport planning based on an understanding of geography and knowledge of national and global traffic flows. Competences include the analysis of the basic natural geographical and socio-geographic characteristics of transport geography and their impact on transport systems in Slovenia, Europe and other countries of the world; analysis of the transport situation of Slovenia, European and other countries of the world and the most important transport routes-corridors; planning the traffic and urban structure of the environment and the use of cartography and geographic information systems.

5.9. Sustainable mobility and sustainable development

Sustainable development defines development that meets current needs without compromising the needs of future generations. Through the competencies, students acquire knowledge and skills in the areas of considering the impact of traffic on the environment; understanding the use and production of fuels - energy sources; the use of alternative and renewable energy sources and the possibility of their use in transport; acting in accordance with the principles of sustainable mobility; sustainable passenger transport planning;

application of regulations and procedures for waste management and understanding the importance of rational energy use and circular economy.

5. 10. Traffic safety in road traffic

The field of road safety must be based on ensuring road safety for everyone. Therefore, the following competencies are required: knowledge of road traffic safety factors; analysing traffic safety conditions on roads to create a traffic safety assessment; planning the content of traffic safety workshops and planning safe traffic routes.

5.11. Maritime agency

The maritime agency deals with the research of markets and traffic flows, the marketing and completion of shipping space, and the organization of transportation in liner container and conventional business. In this area, it is necessary to acquire competences: knowledge of the activities, procedures and legal resources of maritime agents and intermediaries; understanding the basic characteristics of maritime and logistics activity; understanding of domestic and international commodity flows; filling in and obtaining transport, maritime and other documentation; knowledge of the participants and their roles in the international maritime chain; the use of commercial contracts and clauses; implementation of maritime agent and maritime broker procedures and understanding of tariffs and billing for agency and brokerage services.

5.12. Digitalisation of logistics processes

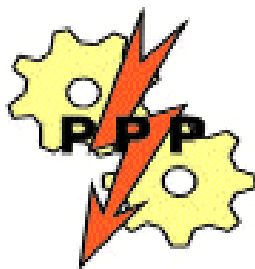
New digital technologies allow freight providers to monitor their processes in real time and analyse traffic information in order to optimize the productivity of their supply chain and reduce their costs as much as possible. Knowledge (acquired competence) of analysing the operating environments of global supply chains is required. The same is with the use of a software tool for fleet management and transport documentation management and the use of software and online platforms for the organization of logistics processes and also the use of tools for the optimization of logistics processes.

5.13. Business logistics

It's about getting to know the trends that have had a very big impact on logistics in recent times, as well as external supply in logistics. The competences of this area are the implementation of processes in the business system in accordance with the goals of business logistics; management of logistics activities within the business system and supply chains; planning, organizing and controlling logistics processes within the logistics system; managing global supply chains and monitoring modern trends and future logistics developments.

6. Conclusion

All new described vocational competences appear to be necessary and urgent at the moment. Development in the future will probably lead to a change in the mentioned competences and elements of the current renovation. For this reason, it is necessary to emphasize that changes in logistics competencies are becoming a constant in the logistics field.



S. O. U. RISTE RISTESKI RIČKO –
PRILEP

Author:

dipl. soobr. ing. Sekuloska Violeta

18.ZAKONSKATA REGULATIVA VO PATNIOT SOOBRAĀAJ

Abstrakt:

Soobrќajot kako sopanska granka nesomneno e dejnost koja site nie aktivno ja koristime. Bez razlika za koj vid na soobraќaj stanuva zbor istiot go koristime kako direktni uĉesnici vo nego, no ĉesto pati go koristime i indirektno bez pri toa da sme svesni deka sme go iskoristile.

Namirnicite koi sekojdnevno doaѓaat vo nařite domovi se rezultat na primenata na soobraќajot i toa za korisnicite se poveќe kako indirektno, a se pomalku kako direktna primena na soobraќajot. Celiot toj sklop na soobraќajni granki so nivnite razliĉni prevoznii sredstva, razliĉna infrastruktura, pravila i propisipravat eden složen sistem koj se narekuva soobraќaen sistem. Nie korisnicite na soobraќajot kako posredni ili neposredni uĉesnici vo nego, sme samo eden mal no znaĉaen del od toj sistem. Dokolku sekoj od uĉesnicite vo toj sistem se odnesuva svoevolno bi dořlo do haotiĉnost na soobraќajniot sistem so nesomneno teřki posledici kako po zdravjeto i ųivotot za luĳeto taka i po materijalnite dobra, prirodata, ųivotot svet pa i vozduhot i atmosverata. Moųebi ova konstatacija na prv pogled zvuĉ surovo no sepak e bolnata vistina koja sekoj od nas ja znae no ne saka da si ja priznae.

Zatoa e potrebna soodvetna i seriozna zakonska regulativa vo soobraќajot kako na lokalno taka i na globalno nivo.

Patniot soobraќaj e eden od najrasprostranetite vidovi na soobraќaj i so toa najĉesto primenuvanii. Za pogolemiot del od luĳeto ovoj vid na soobraќaj e najprifatliv no i najdostapen. Od druga strana patniot soobraќaj ima i svoja mraĉna strana a toa se golemii broj na soobraќajni nezgodi. Dokolku se napravi sporedba so drugite vidovi na soobraќaj, patniot soobraќaj nesomneno e na prvoto mesto spored brojot na soobraќajnite nezgodi. Toa e nepobiten dokaz koj e dobien kako relevanten podatok od SZO (Svetskata Zdravstvena Organizacija).

Kluĉni zborovi: Soobraќaj; Sistem; Korisnici; Uĉesnici; Posledici.

Glaven del:

Sovremeniot čovek ne može da go zamisli svoeto sekojdnevie bez soobračaj. Toj ne samo što go koristi soobračajot tuku e negov sostaven del isto taka i go sozdava soobračajot. Znači čovekot e toj koj go formira soobračajot i toa vo sekoja alka na soobračajniot lanec.

Dinamikata na životot kaj sovremeniot čovek se poveќе i poveќе se zgolemuva i se poveќе i poveќе e prisutna i toa vo site 24 časa od denot. Soobračajot se poveќе stanuva ne samo potreben tuku se poveќе i opasen istovremeno. Soobračajnite nezgodi poleka no sigurno se iskačvaat visoko na listata kako glavni pričiniteli za smrtnost vo svetot. Crnata statistika raste, žrtvite stanuvaat visoki brojki, a se čini deka učesnicite vo soobračajot, a posebno vozačite zaslepeni od svojot sekojdneven angažman, voopšto ne se grižat za svojata bezbednost. Najčesto istite ne samo što ne gi počituvaat soobračajnite pravila i propisi tuku namerno gi prekršuvaat. Svetskata statistika za smrtnost kaj naselenieto pokažuva deka soobračajni nezgodi se edinaesetata najčesta pričina za smrtnost na sekade vo svetot. Biten podatok e i toa deka soobračajnite nezgodi se prva pričina za smrtnost kaj mladite. Gledano vo svetski ramki najolem broj na soobračajni nezgodi ima vo zemjite so nizok i sreden ekonomski rast bidejki vo ovie zemji mnogu e mala investicijata vo izgradba i rekonstrukcija na patišтата i vo zdravstvenata podgotvenost za pomoš na patišтата. Tuka isto taka bi trebalo da se napomene i relativno postariot vozen park koj go poseduvaat žitelite na ovie zemji so site svoi nedostatoci koi ovoj vozen park bi gi imal zatoa što del od ovie vozila ne gi ispolnuvaat osnovnite standardi za bezbeden soobračaj.

Da ne se zaboravi, isto taka i deka žitelite na ovie zemji se odlučuvaat točno zaradi ekonomskata sostojba, na nekaov alternative prevoz kako što e prevozot so velosipedi ili velosipedi so motor, a vo posledno vreme i električnite trotineti. Za žal vo ovie zemji, ovoj vid na soobračaj često pati e prepleten so ostanatiot motoren soobračaj povtorno zaradi slaboto infrastrukturno rešenje so velosipedski pateki.

Zaradi ovie izneseni fakti, no i zaradi niza na drigi pričini, ovaa kategorija na učesnici e klasificirana kako ranliva kategorija na učesnici vo soobračajot.



Slika broj 1: Alternativen soobračaj

Ova se samo eden mal del od faktite koi se česti pričiniteli za soobračajni nezgodi. Vpročem pričiniteli ima mnogu koi vo različni zemji go menuvaat mestoto na listata na klasifikacija.

Priĉinite za golemiot broj na soobraќjani nezgodi se mnogubrojni i zaradi toa Ńto ĉesto pati vo razliĉen period prednaĉi razliĉen priĉinitel, a kako najĉesti priĉiniteli bi gi nabroile slednite:

1. Brzoto vozenje;
2. Vozenje pod dejstvo na alcohol i psihotropni supstanci;
3. Nepoĉituvanje na pravila i propisi;
4. Vozaĉkoto iskustvo;
5. Koristenje na mobilnite telefoni;
6. Zamorot;
7. Raseano vozenje i nefokusiranost;
8. Tehniĉkata neispravnost na voziloto;
9. MeteŃot vo soobraќajot;
10. Neprilagodенost kon vremenskite uslovi i sostijbata na patiŃtata i sl.

Site ovie spomenati priĉiniteli no i onie koi ne se spomenati, imaat potreba da bidat analizirani i soodvetno tretirani, no sepak, gledani statistiĉki neкои od niv se so pogolem intenzitete, se poĉesti i se na pogolema teritorija na dejstvuvanje. Tie kako "top 5" priĉiniteli sepak se slednite:

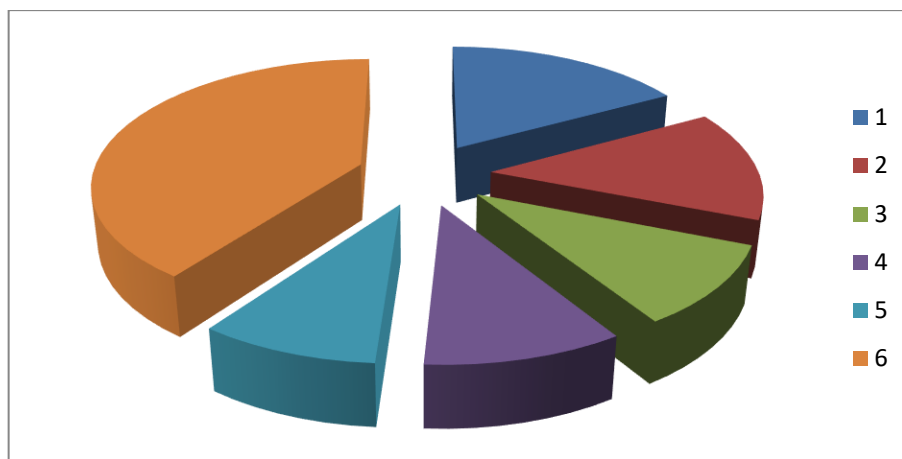
1. Brzoto vozenje;
2. Vozenje pod dejstvo na alcohol i psihotropni supstanci;
3. Nepoĉituvanje na pravila i propisi;
4. Vozaĉkoto iskustvo;
5. Koristenje na mobilnite telefoni.

Procentualnata zastapенost na ovie priĉiniteli se menuva vo tekot na godinite, no promenлива e i vo tekot na edna godina pa zatoa podatocite koi gi dobivame za nivnata zastapенost e pauŃalna i istata bi bila sledna:

Tabela broj: 1 Procentualna zastapенost na osnovnite priĉiniteli

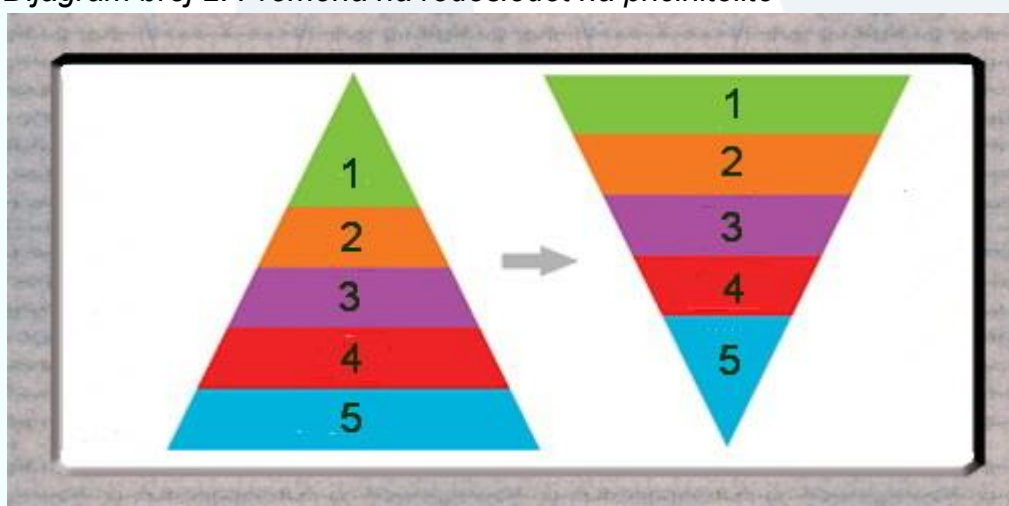
Причини во %	
1.Brzo vozenje	17
2.Nepocituvanje pravila	14
3.Vozenje pod dejstvo na alcohol	10
4.Koristenje na mobilен телефон	10
5.Iskustvo	9
6.Ostanati priĉiniteli	40

Dijagram broj 1: Procentualna zastapенost na priĉinitelite

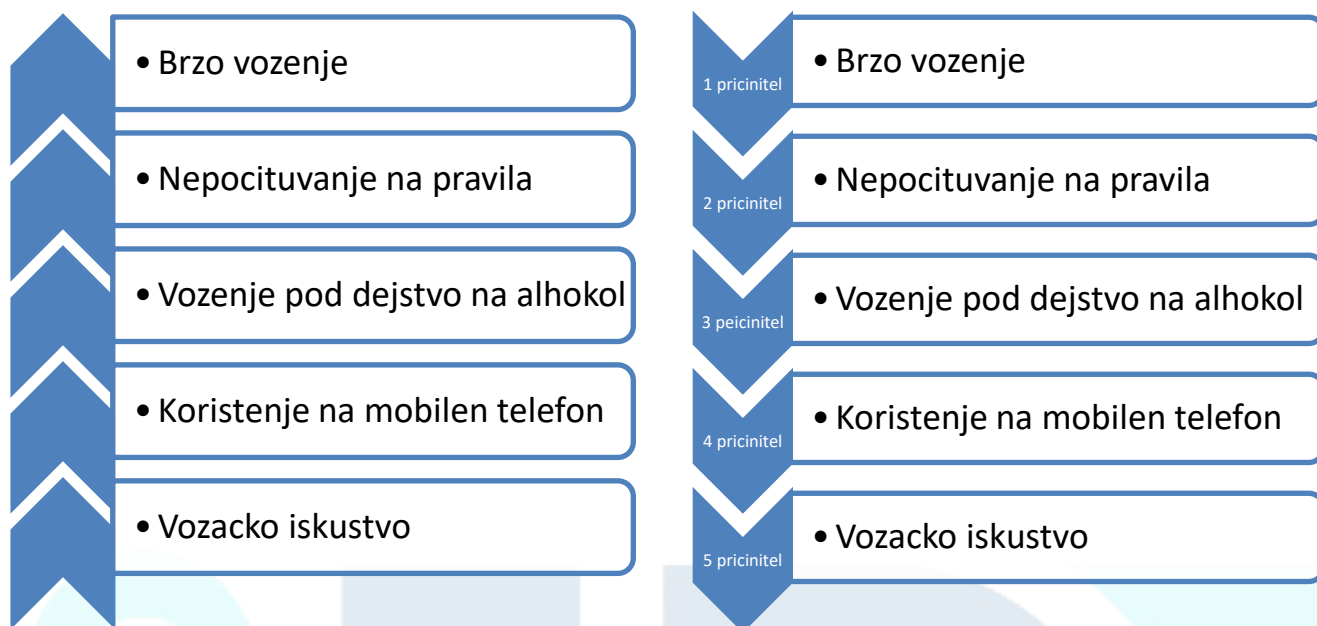


Statistikata pokažuva deka ovie 5 pričiniteli ne samo što se so različna procentualana zastapenost, tuku često pati go menuvaat i svoeto mesto na redosled na skalata na pričiniteli, a so toa istite se podednakvo značajni za analiza, no i za obrabotka koga se diskutira za celokupnata soobračajna slika.

Dijagram broj 2: Promena na redosledot na pričinitelite



1. Brzo vozenje;
2. Nepočitivanje na pravila;
3. Vozenje pod dejstvo na alcohol;
4. Koristenje na mobilen telefon;
5. Vozačko iskustvo.



Ova analiza ni pokažuva deka ovie 5 pričiniteli morame da gi tretirame zaedno dokolku sakame da postignime rezultati za poboljšanje na soobraќajna slika. No isto taka ovie 5 pričiniteli ne možeme da gi tretirame “zatvoreni” vo granice na edna država. Samiot fakt što sovremeniot čovek se poveќе patuva ne samo vo sopstvenata zemja tuku i nadvor od nea, ni dava za pravo da kažeme deka ovie 5 ključni pričiniteli ne se samo naš problem tuku se problem na balkansko, evropsko pa i na svetsko nivo.

Možebi našite ingirencii nemožat da odat mnogu daleku no dovolno e da probame da napravime pobezbeden soobraќaen Balkan, a so toa da dademe svoj pridonos kon poboljšanje na celokupnata soobraќajna slika. Toa so pomoš na ovoj naš sobir imame možnost da go postignime. Potrebno e soodvetno da se organizirame i soodvetno da se predstavime no vo pravo vreme i na pravo mesto.

Organiziranje treba da započne od najsitnata členka vo soobraќajniot sistem koja bi imala soodvetna uloga a toa e opštinskiot sovet za bezbednost na soobraќajot na patištata koj ponatamu bi prodolžil do republičkrite soveti za bezbednost vo soobraќajot na patištata. Sekoj predstavnik od republičkrite soveti, spored izgotven statut, da ima polno pravno členstvo na povisoko nivo na združuvanje. Dalí tie predstavnici bi se narekuvale internacionalni koordinatori za soobraќaj ili bi se formirala meѓunarodna agencija za soobraќaj, toa i nee tolku bitno Taa organizacija za da dobie soodvetna uloga treba da bide registrirana ne samo kako sovetodavno telo tuku i kako telo koe ќе može da predlaga zakoni t.e. členovi na zakonot ili alijansi i stavovi na členot od zakonot, pa i da menuva neкои od veќе postoečkrite členovi vo zakonot dokolku istiot veќе nee pravno opravdano potreben.



Slika broj 2: Soobraќajna povrzanost

Potkrepeno so zakon, vo koj ќе bidat opfateni pette osnovni pričiniteli, pa i poveќе, gledani od bezbednosni aspekt zaradi golemiot broj na soobraќajni nezgodi no na meѓunarodno nivo, sigurno deka ќе se postigne sakaniot efekt. Efektot ќе go koristat site direktni ili indirektni učesnici vo soobraќajot i vpročem točno toa e momentot na koj treba da im se dade akcent za počtok na ponatamošno sproveduvanje na ova idea.

Zakonskata regulative da predvidi sekoja zemja vo svojot parlamentaren sostav zadolžitelno da ima lica koi se kompetentni za da pri donesuvanje na zakonski akti od oblasta na soobraќajot ukažat dali i kolku istiite se soodvetni vo odredeno vreme i na odredeno mesto. Ušte pri donesuvanje na amandmanite kako predlog rešenija, zadolžitelno da ima kompetentno telo kako sovetodavno telo od oblasta na soobraќajot. Ova telo ќе može so iznesuvanje na soodvetni argument da ovozmoži dobližuvanje na odredeni fakti do site lica koi treba da go razgledaat no i da go izglaaat i donesat predlog zakonot koj bi se odnesoval na soobraќajot.

Od druga strana, dokolku zakonite koi se donesuvaat a se odnesuvaat na soobraќajot, "izlezat" od granicite na edna državata i stanat meѓunarodni zakoni togaš sekoj učesnik vo soobraќajot ќе nema potreba od prilagoduвање na zakonite ili propisite koi važat za nekoja, a za učesnikot vo soobraќajot nadvorešna zemja. Meѓunarodniot učesnik vo soobraќajot vo toj slučaj ќе se čustvuva kako da e učesnik vo soobraќajot na svojata zemja zatoa što odredeni zakoni i pravila koi se ključni za soobraќajot bi važele niz celiot Balkan pa i poširoko. Kako primer bi go posočila donesuvanje na zakon na primer za bezrezervno nekoristenje na mobilni telefon za vreme na upravuvanje so vozilo no toa da bide bezrezervno za cela edna meѓunarodna teritorija.

Istražuvajќi za ovaj podatok zabeležav deka site zemji na balkanot dozvoluvaat koristenje na mobilni telefon za vreme na upravuvanje so vozilo samo dokolki imaat soodveten držač na telefonot, t.e. po principot „slobodni race”, (HAND FREE). Spored toa site zemji se odlučile za edno zaedničko rešenje. Na toj princip bi trebalo da se izvrši rešavanje i na drugite problemi koi gi stavivme kako glavni pričiniteli na soobraќajnite nezgodi.

Tuka na primer bi go spomenala podatokot za godinite na starost kako uslov za steknuвање na pravoto za polaganje na vozački ispit, koj vo regionot se dviži pomeѓu 17 i

18 godišna vozrast, za koja lično smetam deka e mala, a koja vo mnogu vlijae vrz bezbednoto odvivanje na soobraќajot, vključuvajќi pri toa i procesot na vozač početnik koj isto taka se tretira različno vo različni zemji na našeto opkruživanje i toa kako vo smisla na dozvoleniot procent na alcohol vo krvta taka i vo odnos na dozvolenata brzinata na dviženje a i vo odnos na moќnosta na motorot na voziloto koi vozačot početnik go upravuva. Tuka povtorno bi se osvrnala na mladata populacija zatoa što tie se najčesto vpročem vozači početnici i tie se onie koi vo posledno vreme se međunarodni učesnici vo soobraќajot.

Koga kon ova bi se dodal podatokot za golemiot broj na soobraќajni nezgodi vo koi mladite se pričiniteli ili učesnici, ne doveduva do podatokot deka ovoj del od zakonskata regulative mora da bide na međunarodno nivo.

Visinata na kazni za prekšuvanje na pravila i propisi vo različni zemji e različna I pred se zavisi od vidot na prekršokot koj vozačot go napravil, a se odnesuva na nepočitivanje na soobraќajnite pravila i propisi, koi sekako deka zaslužuvaat i soodvetna analiza, za da se ovozmoži istite da se tretiraat isto na što e možno pogolema teritorija.

Vozačkoto iskustvo isto taka značeen element za bezbednosta vo soobraќajot, možeme da ja donesime so zakonska regulative koja bi važela na nivo na golemi teritorii kako što se kontinentite na primer. Zakonskata regulative bi se odnesovala na soodvetni ograničuvanja pri upravivanje so vozilo vo odredeni vremenski uslovi ili soobraќajni situacii, a bi se osnesovala na vozači so relativno malo vozačko iskustvo, a toj podatok bi se dobival so brojot na izminati kilometric koi bi se včituvale so individualna vozački kartici koi bi bile zadolžitelni za sekoj vozač posebno.

Koga stanuva zbor za brzoto vozenje kako najsenzitivniot problem ne samo kaj nas tuku I nasekade vo svetot, spored moe misljenje merkite ne se soodvetni , nekade se dosta visoki , što doveduva i do nus pojavi, a so toa pravenje na poveќе prekršoci pa i soobraќajni nezgodi. Znači efektot so zgolemuvanje na kaznite ne bi se dobil, naprotiv imame situacii na manipulacija so samite kazni kako i izbegnuvanje na radarskata kontrola koja samo po sebe nosi dosta rizici. Vo ovoj slučaj zakonskata regulative bi se nasočila kon edukacija, no soodvetna izrabotena i spovedena od relevantni subjekti i istata da bide zadolžitelna bez pravo na odstupivanje. Dokolku istiot prekršok prodolžuva i ponatamu, na vozačot da mu se odzeme vozačkata dozvola na odreden rok, pa i trajno dokolku i toa ne vrodi so plod. Takvi bi bile samo neкои incidentni slučaevi koi bi gi tretirale na ovaj naćin.

Procentot na dozvolen alcohol vo krvta kaj vozačite e razlićen kaj različni zemji na našeto opkruživanje.

Samo taka i samo togaš ovie 5 top pričiniteli ќе go namalat svoeto agresivno dejstvo vrz učesnicite vo soobraќajot no i vrz okolinata, a nie kako stručna fela samo taka i samo togaš ќе možeme da bidime del od timot koj težnee za bezbeden soobraќaj. Istražuvajќi za ovaj podatok zabeležav deka site zemji na balkanot dozvoluvaat.

Табела број: 2 *Dozvoleni promili na alkohol vo krvta vo razlicni zemji od 2016god*

Држава	Возачи на моторни возила	Комерцијални – професионални возачи	Возачи почетници
Македонија	0.5	0.09	0.09
Австрија	0.5	0.1	0.1
Белгија	0.5	0.2	0.5 (0.2 од Декември 2015)
Бугарија	0.5	0.5	0.5
Хрватска	0.5	0.0	0.0
Кипар	0.2	0.2	0.2
Чешка	0.0	0.0	0.0
Данска	0.5	0.5	0.5
Естонија	0.2	0.2	0.2
Финска	0.5	0.5	0.5
Франција	0.5	0.5 (0.2 за возачи на автобус)	0.2
Германија	0.5	0.0	0.0
Грција	0.5	0.2	0.2
Унгарија	0.0	0.0	0.0
Ирска	0.5	0.2	0.2
Италија	0.5	0.0	0.0
Латвија	0.5	0.5	0.2
Литванија	0.4	0.0	0.0
Луксембург	0.5	0.2	0.2
Малта	0.8	0.8	0.8
Холандија	0.5	0.5	0.2
Полска	0.2	0.2	0.2
Португалија	0.5	0.2	0.2
Романија	0.0	0.0	0.0
Словачка	0.0	0.0	0.0
Словенија	0.5	0.0	0.0
Шпанија	0.5	0.3	0.3
Шведска	0.2	0.2	0.2
Англија	0.8	0.8	0.8
Швајцарија	0.5	0.1	0.1
Шкотска	0.5	0.5	0.5
Србија	0.3	0.0	0.0
Албанија	0.01	0.01	0.01
Црна Гора	0.3	0.0	0.0
Босна	0.3	0.0	0.0
Турција	0.5	0.0	0.0

Tabela broj 3: Dozvoleni promili na alkohol vo krvta vo različni zemji od 2022god

Država	Vozači na avtomobili	Komercijalni – profesionalni vozači	Vozači početnici
Makedonija	0.5	0.09	0.09
Avstrija	0.05	0.01	0.1
Belgija	0.05	0.05	0.05
Bugarija	0.05	0.05	0.05
Hrvatska	0.05	0.05	0.0
Kipar	0.05	0.05	0.05
Češka	0.0	0.0	0.0
Danska	0.05	0.05	0.05
Estonija	0.02	0.02	0.02
Finska	0.05	0.05	0.05
Francija	0.05	0.05 (0.08 za vozači na avtobus)	0.02
Germanija	0.05	0.05	0.0
Grcija	0.05	0.05	0.02
Ungarija	0.0	0.0	0.0
Irska	0.05	0.05	0.02
Italija	0.05	0.05	0.0
Latvija	0.05	0.05	0.02
Litvanija	0.04	0.04	0.0
Luksemburg	0.05	0.02	0.02
Malta	0.08	0.05	0.0
Holandija	0.05	0.0	0.0
Polska	0.2	0.2	0.2
Portugalija	0.5	0.2	0.2
Romanija	0.0	0.0	0.0
Slovačka	0.0	0.0	0.0
Slovenija	0.5	0.0	0.0
Španija	0.5	0.3	0.3
Švedska	0.2	0.2	0.2
Anglija	0.8	0.8	0.8
Švajcarija	0.5	0.1	0.2
Škotska	0.5	0.5	0.5
Srbija	0.3	0.0	0.0
Albanija	0.01	0.01	0.01
Crna Gora	0.3	0.0	0.0
Bosna	0.3	0.0	0.0
Turcija	0.5	0.0	0.0

Zaključok:

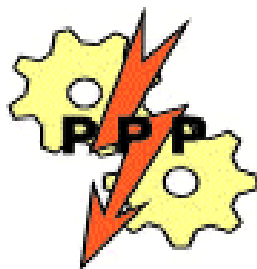
Vo posledno vreme se počesto slušame deka „svetot e edno globalno selo”. Toa znači deka se ni e relativno blisku i relativno tuka. Site nie sme del od toa globalno selo. No zošto ne se čuvstvuvame kako ramnopravni členovi na nego? Zošto ne sme komotni koga stanuva zbor za meğunarodniot soobraќaj? Zošto imame potreba da se prilagudevame na različni zakoni koi se doneseni za edna ista rabota? I na kraj...zošto vo edno globalno selo vladeat različni zakonski regulative za ista rabota i za isti učesnici? I dali sega ova globalno selo nam na site podednakvo ni e dostapno? Nešto očigledno nee kako što treba da bide. Edno od tie nešta e I zakonskata regulative vo soobraќajot na поголема територија, затоа што сите сме согласни дека сообраќајот nemože da se zatvori vo nacionalni granici.

Znaeme deka mladite generacii denes se sepoveќe mobilni. Akcentot go stavam na niv zatoa što spored SZO, vo Evropskiot region, soobraќajnite nezgodirezultiraat so 120 000 smrtni sluќai, 2,4 miljoni povredeni i golem ekonomski tovar, koj može da se izdigne I do 3% od bruto domašniot proizvod na edna zemja od ovoj region. Dokolku se vkalkuliraat ovie trošoci vo bezbednosnata soobraќajna politika, benefitot bi bil očigleden i na zadovolstvo na site nas.

So iznesuvanje na ovie fakti možeme da go zakluќime slednoto:

1. Soobraќajnite nezgodi se prisutni vo našeto sekojdnevnie, a site učesnici vo soobraќajot se podednakvo zasegnati;
2. Sekoj učesnik vo soobraќajot podednakvo e svesen za posledicite od soobraќajnite nezgodi i e potencijalen priќtel ili učesnik vo niv;
3. Vo postoeќiot praven poredok postojat zakonski odredbi rasporedeni vo poveќe zakoni koi gi reguliraat odredenite oblasti za bezbednosta na soobraќajot na patištata;
4. Vo postoeќiot praven sistem postojat različni institucii koi gi sproveduvaat ovie odredbi od zakonot i koi se odnesuvaat na bezbednosta vo patniot soobraќaj;
5. NEŠTO NEDOSTASUVA: nedostasuva interinstitucionalna koordinacija so interinstitucijalna zakonska regulativa.

Postojanoto sledenje od strana na ovie koordinatori i so strateško planiranje na soobraќajot, a pri toa soodvetno razmenuvanje na iskustva od različni zemji vo opkružuvanje, sostojbata na patištata ќе se smeni na podobro.



S. O. U. RISTE RISTESKI RIČKO –
PRILEP

Author:

Traffic engineer – Sekuloska Violeta

18. LEGISLATION FOR ROAD TRAFFIC

Abstract:

Traffic as an economy branch is undoubtedly an industry that we all actively use. No matter what type of traffic it is, we mostly use it as direct participants in it, but we often use it indirectly without being aware that we have used it.

We are able to bring food to our homes daily thanks to the traffic mostly as indirect traffic participants. The entire assembly of traffic branches with their different vehicles, different infrastructure, rules and regulations, make a complex system called a traffic system. We, traffic users as direct or indirect participants in it, are only one small but significant part of that system. If each participant in this system behaves according to their free will, the traffic system would become chaotic with undoubtedly severe consequences both for human health and life, as well as material goods, nature, the animals, even the air and the atmosphere. This claim may sound cruel, but it is still the painful truth that everybody knows but does not want to admit it.

Therefore, appropriate and serious traffic legislation is needed both locally and globally.

Road traffic is one of the most common types of traffic and thus the most commonly used. For the majority of people, this type of traffic is the most acceptable but also accessible. On the other hand road traffic has its own dark side, which is a lot of accidents. If compared to other types of traffic, road traffic is undoubtedly in the first place according to the number of traffic accidents. It is irrefutable evidence obtained as relevant data from the WHO (World Health Organization).

Keywords: Traffic; System; Users; Participants; Consequences;

Main part:

The modern man cannot imagine his daily life without traffic. He is not only using traffic, he is its component, and he also creates traffic.

So, it is the man who forms the traffic in every part of the traffic chain.

The dynamics in modern people's lives are constantly increasing and more present in all 24 hours of the day. The bigger the need for traffic the more dangerous it becomes. Traffic accidents slowly but surely climb the list, becoming the main cause of mortality in the world. The black statistics are growing, the victims' numbers grow, and it seems like the drivers blinded by their everyday activities do not care about their safety at all. In most cases they do not only disobey the rules and regulations, but they even break them on purpose. The world's statistics of human mortality show that traffic accidents are the eleventh most common reason for mortality all over the world. The most important fact is that traffic accidents are the number one reason for mortality where young people are concerned. Globally, the highest number of traffic accidents is in low and medium developed countries because in these countries there is a little investment in building and reconstruction of roads and the healthcare on the roads. It should also be noted here that the older vehicles owned by the inhabitants of these countries with all the shortcomings that these vehicles would have because some of these vehicles do not meet the basic standards for safe traffic.

Not to forget, the citizens of these countries because of the economic situation decide to use other alternatives instead, like bicycles or motorbikes, or electric scooters nowadays. Sad, but true, this type of transport is intermingled with the motor traffic, which is due to the poor infrastructural solution for bicycle lanes.

Because of these stated facts and many more reasons, this category of traffic participants is classified as a vulnerable category.



Figure 1: Alternative traffic

This is only a small part of the facts which are common causes of traffic accidents. Moreover, there are many who change the place of the classification list in different countries.

The causes of the considerable number of traffic accidents are numerous because different causative factors are ahead at various times. The most common causes are listed as follows:

1. Speeding;
2. Driving under the influence of alcohol and psychotropic substances;
3. Non-compliance with rules and regulations;
4. Driving experience;
5. Using mobile phones;
6. Fatigue;
7. Distracted driving and defocusing;
8. Technical defect of the vehicle;
9. Traffic jam;
10. Maladaptation to weather conditions and road conditions, etc.

All these previously mentioned causes, but also those not mentioned, need to be analyzed and properly treated, but still statistically, some of them are more intense, more common, and occupy greater territory of action. As top 5 causes, however, are the following:

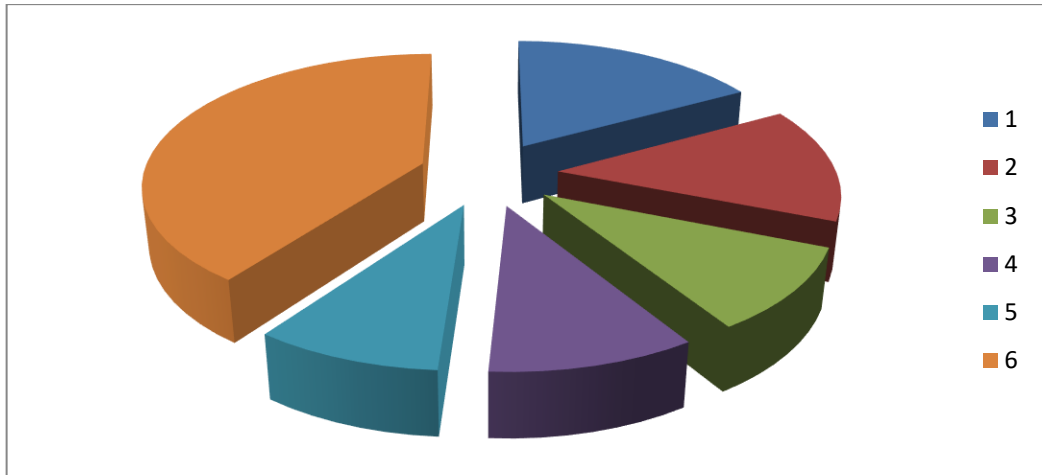
1. Speeding;
2. Driving under the influence of alcohol and psychotropic substances;
3. Non-compliance with rules and regulations;
4. Driving experience;
5. Using mobile phones;

The percentage of the presence of these causes changes over the years, it could even vary throughout the year, so the data we have received of their current presence is approximately as follows:

Table 1: Percentage of the appearance of the most common causes

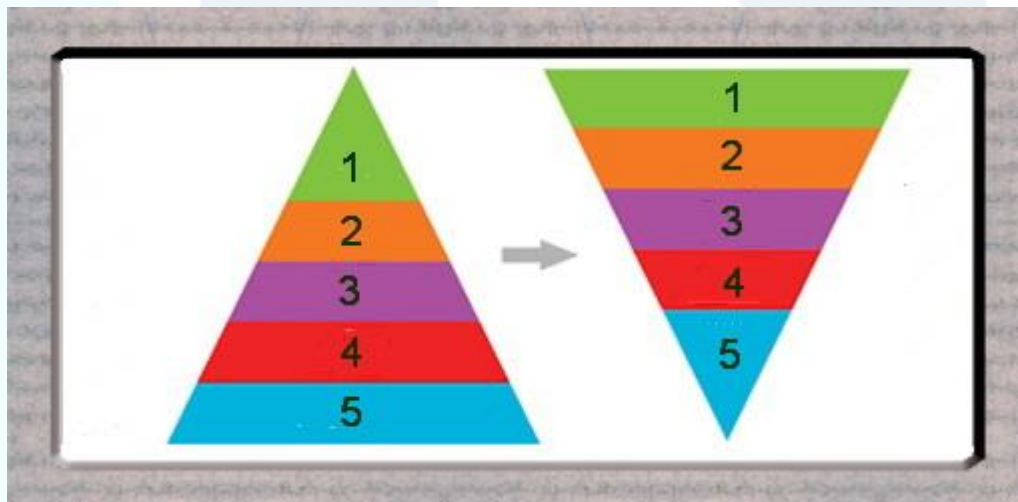
Causes	In %
1.Speeding	17%
2.Non-compliance with rules	14%
3.Driving under the influence of alcohol	10%
4.Using mobile phones	10%
5.Driving experience	9%
6.Other factors (causes)	40%

Diagram 1: Procentage of the appearance of the causes

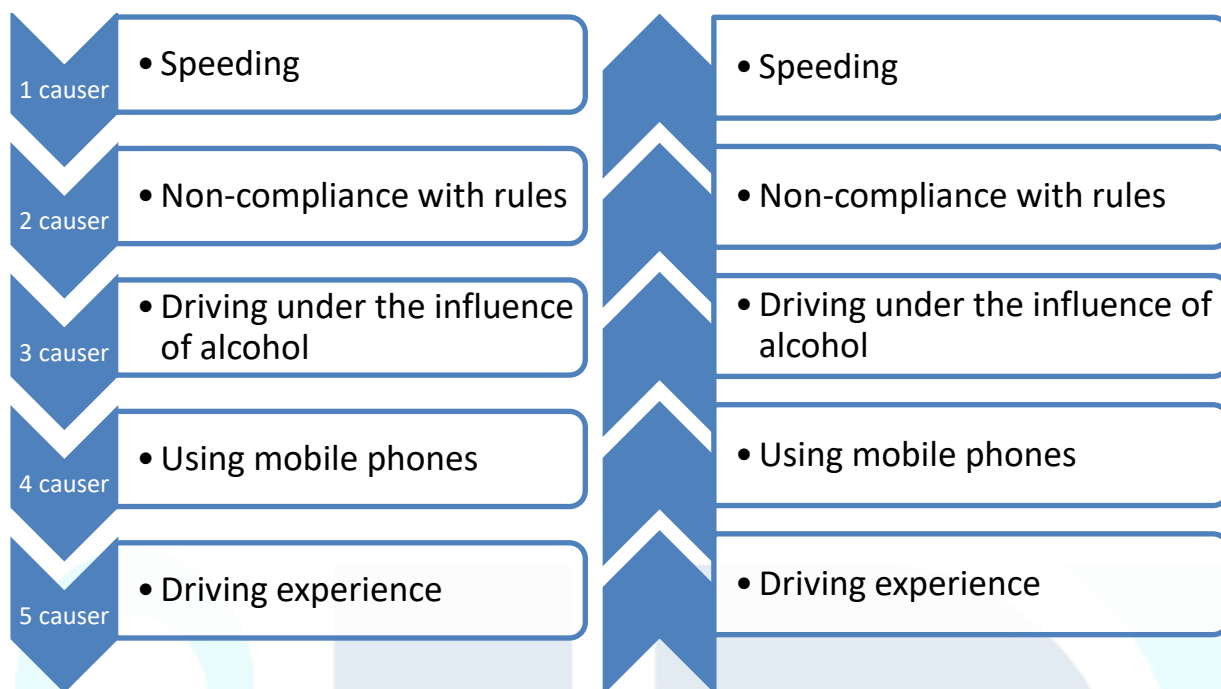


Statistics show that these 5 causes are not only present in different percentages, but often change their order on the causative scale, and thus are equally important for analysis, but also for processing when discussing the overall traffic picture.

Diagram 2: Changing of the order of the causes



1. Speeding
2. Non-compliance with rules
3. Driving under the influence of alcohol
4. Using mobile phones
5. Driving experience



This analysis shows that these 5 causes must be treated together if we want satisfactory results in improving the traffic image. But we cannot treat them 'enclosed' within the borders of one country as well. The fact itself that the modern man is travelling more often, not only throughout his own country but also out of it, gives us the right to say that these 5 main causes are not only our problem, but they are also problem on the Balkan's, Europe's and World's level.

Our credentials may not go further but it is worth trying to make a more secure Balkan traffic and make our own contribution towards the improvement of the entire traffic picture. By means of such meetings, we can achieve this. We should organize properly and present ourselves properly but at the right time and in the right place.

The organizing should start with the smallest member in the traffic system that would play an appropriate role, which is the municipal council for road safety, which would continue with the Republic's road safety councils. Each representative of the Republic Councils, according to the drafted statute, should have full membership at a higher level of association. Whether these representatives would be called international traffic coordinators, or an international transport agency would be formed, it is not so important. To obtain a proper role, that organization should be registered not only as an advisory body but as a body that can propose laws, i.e., members of the law or alliances and views of the article of law, even to have the authorization to change the existing law if it is no longer legally necessary.

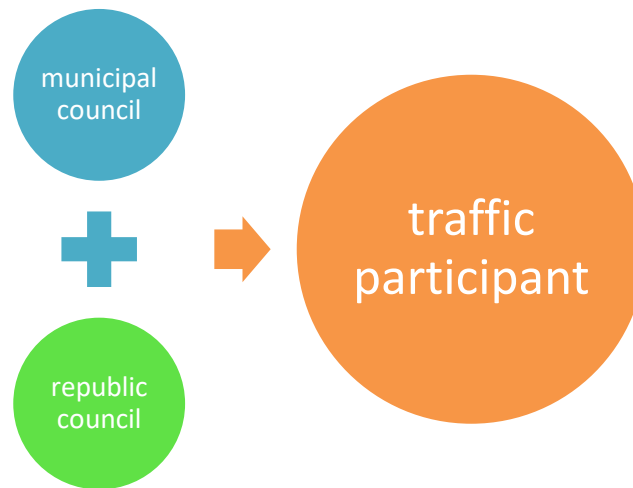


Figure 2: Connections in traffic

If the law that regulates these 5 causes and more is implemented, from the safety aspect of view according to the large number of traffic accidents, it is certain that on international level desired goals will be reached. Effects will be useful for all direct or indirect traffic participants and that is the exact event that can be initial for further implementing of this idea.

The legislation must obligate each country in its parliamentary composition to have persons competent to adopt legal acts in the field of traffic to indicate whether and how appropriate they are at a certain time and in a particular place. When passing an amendment as a proposal for a solution, it is obliged to have a competent body as an advisory body in the field of traffic. This body will be able to make arguments and bring forward facts in front of people who will vote and pass a proposal for a law that would apply to traffic.

On the other side, if the laws that are enacted relating to traffic “come out,” from the borders of a country and become international, then every participant in traffic will not need to adapt on the laws or regulations that apply in that, for the participant, foreign country. International participant in the traffic in this case will feel as if he were a participant in his country's traffic because certain laws that are vital to traffic would apply throughout the Balkan Peninsula and furthermore. As an example, I would point to the adoption of a law on the unreserved non-use of a mobile phone while steering a vehicle, but that it would be unreserved for the entire international territory.

Investigating this data, I noted that all the countries in the Balkans allow the use of a mobile phone while steering a vehicle, only if they have a phone handle, on the principle "hands free", (nand free). All the countries had brought a unified decision. Based on the same principle all the countries should be makingsimilar decisions about the other problems or causes of car accidents.

For example, I would mention the age data as a condition for gaining the right to take the driving test, which in the region ranges between the ages of 17 and 18, which I personally consider to be low, and which has a profound impact on safe traffic, including the process of a beginner driver who is also treated differently in our neighbourhood, both in terms of the

permitted percentage of alcohol in the blood and in terms of the allowed speed of movement, and also in terms of the power of the engine of the vehicle that the beginner driver controls. Here I would mention the younger population again because they are most often inexperienced drivers, and they are the ones who have been international traffic participants lately.

If the data on the large number of traffic accidents in which young people are the causes or participants is added to this, it leads us to the fact that this part of the legal regulation must be made on an international level.

The amount of penalties for violation of rules in different countries is different and depends on the type of offence the driver has committed and refers to the failure to comply with traffic rules, which of course deserve appropriate analysis in order to ensure that they are treated the same in as large a territory as possible.

Driving experience is also such a major element for security in traffic; we can bring it with legal regulation that would be valid at the level of huge territories such as continents for example. The legislation would apply to appropriate restrictions on vehicle steering in certain weather conditions or traffic situations and would apply to drivers with lack of driving experience, and that data could be obtained by the number of kilometers travelled, which would be loaded with individual driver's cards that would be mandatory for each driver.

When it comes to speeding as the most sensitive problem not only in our country but all over the world, the measures are not appropriate, according to my opinion: somewhere quite high, which leads to side-effects, and thus making more offences and traffic accidents. So the effect of increasing penalties would not be obtained, on the contrary we have situations of manipulation of the penalties themselves as avoiding radar control, which in itself carries a lot of risks. In this case, the legislation would be directed towards education, but properly drafted and implemented by relevant subjects and compulsory, without the right to deviate. If the same violation is prolonged further, the driver's license should be taken away within a certain time period, even permanently if it fails. Only a few cases would be treated this way.

The percentage of alcohol allowed in the blood of a driver is different in our surroundings and beyond.

Only then will these 5 top causes reduce their aggressive influence on traffic participants, but also on the environment, and we as professional fella will only then be able to be part of the team that assures safe traffic.

XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

Table 2: Permissible blood alcohol per mille in different countries from 2016 year

Country	Drivers of motor vehicles	Commercial – professional drivers	Novice drivers
Macedonia	0,5	0,09	0,09
Austria	0,5	0,1	0,1
Belgium	0,5	0,2	0,5(0,2 December 2015)
Bulgaria	0,5	0,5	0,5
Croatia	0,5	0,0	0,0
Cyprus	0,2	0,2	0,2
Czech Republic	0,0	0,0	0,0
Denmark	0,5	0,5	0,5
Estonia	0,2	0,2	0,2
Finland	0,5	0,5	0,5
France	0,5	0,5(0,2 for bus drivers)	0,2
Germany	0,5	0,0	0,0
Greece	0,5	0,2	0,2
Hungary	0,0	0,0	0,0
Ireland	0,5	0,2	0,2
Italy	0,5	0,0	0,0
Latvia	0,5	0,5	0,2
Lithuania	0,4	0,0	0,0
Luxemburg	0,5	0,2	0,2
Malta	0,8	0,8	0,8
Netherlands	0,5	0,5	0,2
Poland	0,2	0,2	0,2
Portugal	0,5	0,2	0,2
Romania	0,0	0,0	0,0
Slovakia	0,0	0,0	0,0
Slovenia	0,5	0,0	0,0
Spain	0,5	0,3	0,3
Sweden	0,2	0,2	0,2
England	0,8	0,8	0,8
Switzerland	0,5	0,1	0,1
Schotland	0,5	0,5	0,5
Serbia	0,3	0,0	0,0
Albania	0,01	0,01	0,01
Montenegro	0,3	0,0	0,0
Bosnia	0,3	0,0	0,0
Turkey	0,5	0,0	0,0

Table.2: Permissible blood alcohol per mille in different countries from 2022 year

Country	Drivers of motor vehicles	Commercial – professional drivers	Novice drivers
Macedonia	0.5	0.09	0.09
Austria	0.05	0.01	0.1
Belgium	0.05	0.05	0.05
Bulgaria	0.05	0.05	0.05
Croatia	0.05	0.05	0.0
Cyprus	0.05	0.05	0.05
Czech Republic	0.0	0.0	0.0
Denmark	0.05	0.05	0.05
Estonia	0.02	0.02	0.02
Finland	0.05	0.05	0.05
France	0.05	0.05 (0.08 for bus drivers)	0.02
Germany	0.05	0.05	0.0
Greece	0.05	0.05	0.02
Hungary	0.0	0.0	0.0
Ireland	0.05	0.05	0.02
Italy	0.05	0.05	0.0
Latvia	0.05	0.05	0.02
Lithuania	0.04	0.04	0.0
Luxemburg	0.05	0.02	0.02
Malta	0.08	0.05	0.0
Netherlands	0.05	0.0	0.0
Poland	0.2	0.2	0.2
Portugal	0.5	0.2	0.2
Romania	0.0	0.0	0.0
Slovakia	0.0	0.0	0.0
Slovenia	0.5	0.0	0.0
Spain	0.5	0.3	0.3
Sweden	0.2	0.2	0.2
England	0.8	0.8	0.8
Switzerland	0.5	0.1	0.2
Schotland	0.5	0.5	0.5
Serbia	0.3	0.0	0.0
Albania	0.01	0.01	0.01
Montenegro	0.3	0.0	0.0
Bosnia	0.3	0.0	0.0
Turkey	0.5	0.0	0.0

Conclusion:

Lately, we are hearing more often that "the world is a global village". That means everything is here and close to us. But why don't we feel like we are equal members in it? Why are we not comfortable when it comes to international traffic? Why do we need to adapt to different laws all of which are passed for one and the same thing? Why are there different legislations for the same thing and identical participants in that global village? Is this global village equally available for all of us? Some things obviously don't look right. One of these things is the law that regulates traffic on wider territory, because all of us would agree that traffic cannot be locked within our national borders.

We are all aware of the mobility of today's youth. I put the accent on them because according to WHO, in the Europe region, accidents result in 120 000 death cases; 2,4 million injured and heavy economic loads, that could reach up to 3% from the gross domestic product of one country from the European region. If these expenditures are calculated into the Safety traffic politics, the benefit would be obvious and all of us would be satisfied.

By bringing out these facts we can conclude the following:

Traffic accidents are present in our everyday lives and all the traffic participants are equally affected;

Each traffic participant is equally aware of the consequences of the traffic accidents and is a potential cause or participant in them.

In the existing legal order, there are legal provisions deployed in several laws governing certain road safety areas.

There are various institutions in the existing legal system that implements these provisions of the law relating to road safety.

Something is missing: Interinstitutional coordination is missing with interinstitutional regulation.

Constant monitoring by these coordinators and by strategic traffic planning, while properly exchanging experiences from different countries in the neighbourhood will change the state of the roads for the better.



Sigurna cesta



STROJARSKA I
PROMETNA ŠKOLA
Varaždin

UDRUGA ZA PROMETNU
PREVENTIVU MLADIH, ZAGREB

STROJARSKA I PROMETNA ŠKOLA,
VARAŽDIN, REPUBLIKA HRVATSKA

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19. VRŠNJAČKO NASILJE HOĆE LI BITI POSLJEDICA PO SIGURNOST PROMETA?

Sažetak

Vršnjačko nasilje u osnovnim i srednjim školama činjenica je i društveno neprihvatljiva pojava koja se nezaustavljivo širi. Kako ga suzbiti, pitanje je svih pitanja onih koji se bave odgojem i obrazovanjem, ali i u odgovornim institucijama, ne samo u Hrvatskoj već i u europskim i izvan europskim državama. Zabrinjavajuća je učestala izloženost djece i mladih, ali ne samo njih, izravnom vršnjačkom nasilju, uznemiravanju, fizičkom nasilju, verbalnom nasilju, zlostavljanju u obitelji i školama, nasilju u medijima, na društvenim mrežama, cyberbullyingu, bullyingu, bossingu, mobingu, kulturalnom, strukturalnom nasilju ... i tko zna kakvoj još sve vrsti nasilja ili uznemiravanja! Povezujući ovaj sada već javnozdravstveni problem kod djece i mladih, koji su u najosjetljivijim godinama formiranja stavova i ponašanja za život ali i za sudjelovanje u prometu, ne možemo a da ne postavimo posve realno pitanje: Hoće li u skoroj budućnosti biti posljedica po sigurnost prometa zbog rastućeg vršnjačkog nasilja i uključivanja u prometni sustav upravo te mladeži?

Ključne riječi

VRŠNJAČKO NASILJE, SIGURNOST PROMETA, AGRESIVNO, OBIJESNO I NASILNO PONAŠANJE U PROMETU

1. UVOD

Sigurnost prometa na cestama je kompleksno, interdisciplinarno pitanje koje je determinirano interakcijom mnogobrojnih i različitih varijabli koje igraju važnu ulogu, a pri tome međusobno značajno utječu jedne na druge. Poželjna vizija sigurnosti prometa trebala biti stanje ravnoteže u sustavu koje podrazumijeva društveno prihvatljivo i odgovorno ponašanje svih pojedinaca - sudionika prometa te odvijanje prometa bez nastupanja štetnih učinaka: prometnih nesreća, ugrožavanja zdravlja ili života sudionika prometa ili okoliša. Ključnim čimbenikom u ovome složenom sustavu smatra se vozač koji na sigurnost prometa izravno utječe svojim ponašanjem, iskustvom, psihofizičkim sposobnostima, navikama, rutinama, znanjima o prometu i vještinama upravljanja vozilom.

Nesporno je da su ponašanje vozača u prometu i njegovi stavovi o prometu važan, ako ne i ključan čimbenik sigurnosti prometa, pa je realno, konkretno i legitimno pitanje to s kakvim stavovima i ponašanjima mladi postaju vozači i uključuju se u promet? Zabrinjavajuća, društveno neprihvatljiva pojava, koja već dulje vrijeme egzistira u našem (ali ne samo u našem) društvu i predstavlja javno zdravstveni problem, vršnjačko je nasilje. Izloženost djece i mladih vršnjačkom nasilju i različitim oblicima agresije, zlostavljanja, nasilja i uznemiravanja gotovo je svakodnevna pojava.

Stalna ili povremena izloženost djece i mladih različitim oblicima nasilja nedvojbeno će utjecati na formiranje budućih stavova i ponašanja, kako djece nasilnika tako i djece koja su izložena bilo kojem obliku nasilja ili uznemiravanja. Ako je ta pojava danas u našem okruženju premisa – logičan sud iz kojeg se izvodi zaključak, razumno je postaviti i pitanje: Ima li već ili hoće li u skoroj budućnosti zbog rastućeg vršnjačkog nasilja i uključivanja upravo te mladeži u prometni sustav biti posljedica po sigurnost prometa?

2. PONAŠANJA, NASILNA, OBIJESNA I AGRESIVNA PONAŠANJA

Ljudsko se ponašanje, zbog svoje složenosti i niza varijabli i okolnosti koje na njega utječu, ne da nikada posve objasniti, a kamoli egzaktno prikazati matematičkom formulom. Neki etolozi i francuski psiholog M. Reuchlin (1976. *Les méthodes en psychologie*, Paris) su i to pokušali. Autor je ustvrdio kako je ponašanje (R) funkcija osobnosti, urođenih čimbenika (ili personalité = P) i sredine (S) odnosno okruženja, vanjskih čimbenika i okolnosti. Prikazano matematičkom formulom ljudsko ponašanje se može definirati kao $R = f(P, S)$.

Budući da je čovjek prije svega etičko biće, njegovim bi ponašanjem morali upravljati ponajprije moralni kriteriji i obrasci. No, ponašanje je u prvome redu određeno činjenicom koliko pojedinac može vladati samim sobom te koliko se može nositi sa sve većim izazovima, zahtjevima i problemima u okolnome svijetu i naposljetku, na koji to način pokazuje prema van, odnosno prema drugima. Agresivne situacije u društvu, krizna vremena, stresno okruženje i slično, mogu generirati kod ljudi interaktivne događaje kao što su agresija na radnome mjestu, u obitelji, a možda najviše u prometu na cesti, stvarajući još veći stres koji generira još veće sukobe.

Ponašanja vozača u prometu plod su složene interakcije stavova, iskustava, osobina, odgoja, poticaja i utjecaja iz okruženja, znanja, sposobnosti, vještina, dobi, spola, ali i niza drugih varijabli, sve do kulturnog kruga u kojem pojedinac funkcionira i civilizacijske razine kojoj vozač pripada. Sve te varijable izravno determiniraju vozačeva ponašanja u prometu. Navike, rutine, načini i stil vožnje, pogotovo u urbanim sredinama, posljedica su socio-kulturnih promjena u društvu i bivaju spontano usvojeni od strane sadašnje generacije, poglavito mladih (tinejdžera), ali ne baš i tako mladih vozača. Individualizam i konkurencija, taština i častoljublje, precjenjivanje svojih sposobnosti i mogućnosti uporno i nenametljivo se uvlače u svaku poru ponašanja vozača i dovode do toga da su neki vozači postali agresivni, nasilni, obijesni i neprijateljski raspoloženi prema ostalim korisnicima cesta. To su, ukratko, asocijalni, nasilni i ratoborni tipovi koji se teško samokontroliraju i svladavaju.

Oni markantno pridonose problemima i nesigurnosti u prometu na cestama i predstavljaju ozbiljnu opasnost za sebe i druge sudionike prometa. Ima li među njima i koliko onih koji su bili inicijatori, žrtve ili promatrači međuvršnjačkog nasilja u svom okruženju? Lako je pretpostaviti da ima!

3. NASILJE I VRŠNJAČKO NASILJE

Kao društveno neprihvatljiva pojava, nasilje se definira na različite načine pa tako postoje i različite definicije nasilja i zlostavljanja. U Svjetskom izvješću o nasilju i zdravlju (2002.) Svjetska zdravstvena organizacija nasilje dijeli u tri velike skupine koje se dalje granaju kako slijedi: 1. nasilje prema samome sebi, koje uključuje samoozljeđivanje i samoubojstvo; 2. međuljudsko nasilje koje se odnosi na nasilje u obitelji (nasilje nad djecom, nasilje nad partnerom i nasilje nad starijom osobom) i nasilje unutar zajednice (nasilje prema osobama koje nasilnik poznaje i nasilje prema osobama koje nasilnik ne poznaje); 3. kolektivno nasilje je uglavnom organizirano i usmjereno od jedne grupe prema drugoj u svrhu ostvarenja političkih, ekonomskih i socijalnih ciljeva. Prema prirodi nasilnog čina nasilje dijeli na: fizičko – primjena sile bez obzira je li ili nije nastupila tjelesna ozljeda (guranje, udaranje, pritiskanje, fizičko sprječavanje kretanja, gađanje predmetima, uništavanje stvari po kući i sl.); seksualno – bilo koji seksualni čin (pokušaj ostvarivanja seksualnog čina, neželjeni seksualni komentar i sl.) i psihičko nasilje (odnosno primjena psihičke prisile koja je uzrokovala osjećaj straha, ugroženosti, povrede dostojanstva, verbalno nasilje, psovanje, zanemarivanje svojim sredstvima komunikacije i sl.).

Prema Protokolu o postupanju u slučaju nasilja među djecom i mladima (2004. MOBMS) nasiljem među djecom i mladima se smatra svako namjerno fizičko ili psihičko nasilno ponašanje usmjereno prema djeci i mladima od strane njihovih vršnjaka učinjeno s ciljem povrjeđivanja, a koje se, neovisno o mjestu izvršenja, može razlikovati po obliku, težini, intenzitetu i vremenskom trajanju i koje uključuje ponavljanje istog obrasca i održava neravnotežan odnos snaga (jači protiv slabijih ili grupa protiv pojedinca).

U Hrvatskoj enciklopediji (2021.) nasilje u užem smislu definira se kao uporaba sredstava fizičke prisile radi nanošenja štete i prisiljavanja na određeno ponašanje. U širem smislu obuhvaća i uporabu sredstava psihičke prisile radi nanošenja štete, povrjeđivanja ili zastrašivanja osobe.

3.1. Vrste nasilje

Bilo da se radi o nasilju, zlostavljanju ili uznemiravanju ono implicira superiornost jedne i inferiornost druge strane. Kod nasilja uvijek postoji nasilnik i žrtva. Izravno ili direktno nasilje kod kojega je akter (nasilnik) poznat. U pravilu nasilje je jednostrano, no može biti i obostrano kao i grupno.

Prema Olweus-u i Solberg-u (1998. *Bullying among children and young people*) razlikujemo verbalno nasilje, emocionalno ili psihičko, fizičko, seksualno, ekonomsko nasilje i izrabljivanje. Nasilje može biti strukturalno i kulturalno (Galtung, 1975.). Nasilje se može događati u obitelji. Nasilje nad djecom i mladima može biti od strane roditelja ili rodbine, ili kao generalno nasilje odraslih nad djecom i mladeži, kao nasilje od strane susjeda, nasilje u dječjim vrtićima, osnovnim i srednjim školama, visokoškolskim ustanovama, nasilje među kolegama na radnome mjestu, nasilje od strane nadređenih (*mobing*), nasilje u različitim institucijama, na javnim površinama, teretanama, sportskim terenima i klubovima, na zabavama, u emocionalnim vezama adolescenata, kao i na mnogim drugim mjestima i događanjima. Nasilje se može ogledati i u izolaciji drugih osoba, nečinjenju ili propuštanju činjenja. Poznavanje vrsta nasilja i njihova složenost preduvjet su za prevenciju toga nasilja.

3.2. Vršnjačko nasilje - *Bullyng*

U Priručniku za stručnjake Helena Križan (2018.) navodi da je vršnjačko nasilje odnosno bullying među djecom i mladima, jedan je od najznačajnijih socijalnih rizika kojemu su izložena djeca i mladi. Da bi određeno nasilničko ponašanje bilo kvalificirano kao zlostavljanje, ono mora biti usmjereno prema jednom učeniku minimalno dva-tri puta mjesečno (Pregrad, 2010.).

Vršnjačko (međuvršnjačko) je nasilje, kao obrazac ponašanja, jednog djeteta prema drugome s ciljem preuzimanja kontrole i uspostavljanja moći nad tim djetetom. Prva asocijacija kod većine ljudi je fizičko zlostavljanje, koje ostavlja vidljive tragove, no vršnjačko nasilje se može (prema Olweusu 1998.) manifestirati kao verbalno (zadirkivanje, vrijeđanje, ismijavanje, ruganje, zastrašivanje, prijetnje), socijalno (klevetanje, sramoćenje, ogovaranje, tračanje, izoliranje), psihološko (praćenje) i tjelesno (naguravanje, pljuskanje, tučnjava, ozljeđivanje). Vršnjačko zlostavljanje je skup namjernih negativnih postupaka koji su dugotrajni, usmjereni prema jednom učeniku od strane drugog učenika ili više njih i uvijek popraćeni nerazmjerom snaga.

Dostupni izvori i podatci UNICEF-a (2022. *Peer violence. Bullying is a reality for a significant proportion of students worldwide*), za bilo koju zemlju u svijetu, primjetni su neželjeni trendovi i porast nasilja, bilo među djecom osnovnoškolskog uzrasta ili među adolescentima. Nažalost, zlostavljanje i vršnjačko nasilje je stvarnost za značajan dio djece i mladih diljem svijeta.

Vrlo su zabrinjavajući i podatci o vršnjačkom nasilju među tinejdžerima prikazani u istraživanju Youth Endowment Found-a (London 2022.) o iskustvima nasilja mladih ljudi u kojem su se istražili načini na koje nasilje i strah od nasilja – oblikuju živote djece. Istraživanje je provedeno u razdoblju od 12 mjeseci. Obuhvatilo je 2.025 djece i mladih i pokazalo sljedeće: 14% djece tinejdžerske dobi bilo je žrtva nasilja; 39% tinejdžera bilo je žrtva ili svjedok nasilja; 55% tinejdžera reklo je da su bili izloženi nasilju u stvarnom životu i na društvenim mrežama; 24% je reklo da su vidjeli djecu kako nose, promoviraju ili koriste oružje; 65% tinejdžera reklo je da su promijenili svoje ponašanje kako bi se zaštitili od nasilja; 14% je izostalo iz škole zbog straha, a 14% je reklo da im je strah uzrokovao gubitak koncentracije; 16% izbjegavalo je zbog straha odlazak na društveni događaj, a čak 2% je reklo da ih je strah doveo do toga da nose oružje; 26% izjavljuje da želi vidjeti promjene u policijskom radu kako bi se riješilo nasilje (kao što je više patrola uz klubove ili mjesta aktivnosti za mlade (15%) te na mjestima rasparčavanja droga i alkohola (10%).

Podatci za našu zemlju nisu posebno drugačiji u usporedbi s drugim zemljama. U istraživanju Hrvatskog zavoda za javno zdravstvo (2018.) o zdravstvenom ponašanju učenika a povodom Nacionalnog dana borbe protiv vršnjačkog nasilja navodi se da je 8 % dječaka i 5 % djevojčica u dobi od 11 godina, 11 % dječaka i 8 % djevojčica u dobi od 13 godina te 7 % dječaka i 8 % djevojčica u dobi od 15 godina izjavilo da su bili zlostavljani najmanje dvaput unazad nekoliko mjeseci. Da su zlostavljali druge najmanje dvaput unatrag nekoliko mjeseci izjavljuje oko 5 % dječaka i 2 % djevojčica u dobi od 11 godina, 12 % dječaka i 5 % djevojčica u dobi od 13 godina te 10 % dječaka i 4 % djevojčica u dobi od 15 godina. Prema tom istraživanju Hrvatska se smjestila u donjoj polovici ljestvice zemalja uključenih u istraživanje. Na vrhu ljestvice s najvećim udjelom zlostavljača su u sve tri dobi Latvija i Litva. Na dnu ljestvice su Švedska i Island.

U Izvješću o radu pravobraniteljice za djecu 2022. i postupanju u slučaju nasilja nad djecom

(2023.) vidi se da nasilje nad djecom i mladima raste već nekoliko godina za redom. Najveći broj prijava nasilja odnosi se na nasilje u odgojno-obrazovnim ustanovama što je porast od gotovo 100 % u odnosu na 2021. Slijedi nasilje u obitelji (70) te ostala nasilja (48) koje se odnosi na nasilje na drugim mjestima i na internetu.

Prema podacima iz Godišnjeg statističkog izvješća Ministarstva rada, mirovinskog sustava, obitelji i socijalne politike (2021.) prijavljeno je 1.469 djece zbog iskazanog vršnjačkog nasilja, a od toga su gotovo polovicu obavijesti poslane škole sukladno Protokolu o postupanju u slučaju nasilja među djecom i mladima. U dvije pandemijske godine i online nastave, primljen je manji broj pritužbi za vršnjačko nasilje u školama. No, 2022. bilježi se porast pritužbi od 100 % u odnosu na prošlu pandemijsku godinu.

Zabrinjavajući je podatak Zavoda za socijalni rad Varaždinske županije prema kojem je do 2013. međuvršnjačko nasilje bilo karakteristično za adolescente i tinejdžere u srednjim školama, a nakon toga trend pokazuje da se dobna granica spušta prema osnovnoškolskom uzrastu!

3.3. Internetsko nasilje i zlostavljanje (*Cyberbullying*)

Sveprisutna informacijska i komunikacijska tehnologija alat je za informiranje, učenje, zabavu i druženje u virtualnom svijetu. Uz sve prednosti lakodostupne tehnologije (mobitela, tableta) i informacijskih platformi (interneta, elektroničke pošte) korisnici - najčešće mladi, susreću se s negativnom stranom svoje medijske izloženosti – elektroničkom zlostavljanju i nasilju, koje se može odvijati na društvenim medijima, platformama za razmjenu poruka, platformama za igre i mobilnim telefonima. Ovakva ponašanja imaju za cilj zastrašiti, povrijediti, razljutiti, uznemiriti ili posramiti druge.

Cyberbullying je u porastu diljem svijeta, jer internet omogućuje zlostavljačima da se sakriju iza maske anonimnosti. O statistici, trendovima i činjenicama internetskog zlostavljanja govori globalno međunarodno istraživanje (*Cyberbullying Facts and Statistics 2018-2023*, Ipsos Group S.A. Paris) provedeno među roditeljima u 28 zemalja svijeta. Tijekom 2018. provedeno je ukupno 20.793 intervju od SAD-a, Kanade preko Europe do Rusije, Indije i Japana. Rezultati otkrivaju sve veći broj roditelja čija su djeca doživjela neki oblik internetskog nasilja. Na prikazu je vidljiv postotak roditelja čija su djeca izjavila da su bila zlostavljana tijekom 2019. Najviše zlostavljanja se dogodilo u školama. 19,2% roditelja izjavilo je da se zlostavljanje dogodilo putem stranica i aplikacija društvenih medija. Daljnjih 11% navelo je da se zlostavljanje dogodilo putem tekstualnih poruka, dok je 7,9% identificiralo videoigre kao izvor. 6,8% je prijavilo da se zlostavljanje dogodilo na web stranicama koje nisu društvene mreže, dok je 3,3% navelo da se zlostavljanje dogodilo putem e-pošte.

Dostupni podatci Hrabrog telefona iz Hrvatske govore da čak 95% djece između 11 i 18 godina posjeduje računalo, a njih 91% se koristi internetom. Pojavom „pametnih“ telefona (*smartphone*) internetske usluge i sadržaji dostupni su im gotovo u svakome trenutku.

3.4. Razlike između klasičnog i elektroničkog nasilja

Razlika između klasičnog, izravnog nasilja i elektroničkog nasilja je u identitetu zlostavljača. Klasično vršnjačko nasilje najčešće se događa tijekom boravka u školi ili na putu prema kući. U takvom slučaju nasilja „licem u lice“ identitet počinitelja je poznat. Nasilje nad žrtvom se provodi u ograničenom prostornom i vremenskom okviru. U ovakvom slučaju žrtvi je moguće pružiti pomoć i zaštitu od nasilnika. Počinitelji elektroničkog nasilja često su anonimni. Okružje u kojem djeluju pruža im mogućnost skrivanja identiteta ili predstavljanja pod lažnim imenom. U ovome slučaju zlostavljač može biti bilo tko, bez obzira na to je li fizički nadmoćniji od žrtve. Ono što je najgore, počinitelj širenjem nasilja preko elektroničkih medija može dobiti i potporu grupe (!?).

3.5. Vršnjačko nasilje - sociološki problem

Ovaj javnozdravstveni, ali prije svega sociološki problem uočavaju i na njega upozoravaju stručnjaci. Nagomilavanje slučajeva nasilja među mladima utječe na izmjenu trendova, nažalost na lošije. Sociolozi (Marcelić, 2021. Intervju tjedna, N1 TV) upozoravaju na činjenicu da blagost sudske prakse stvara određenu toleranciju prema nasilju, a to pomaže tome da tinejdžeri ne percipiraju nasilje kao problem. To pokazuje gubitak empatije prema žrtvama nasilja i zlostavljanja kod mladih.

4. VRŠNJAČKO NASILJE, HOĆE LI BITI POSLJEDICA PO SIGURNOST PROMETA?

Mladi i djeca danas sve više vremena provode u sjenovitim područjima računalnog svijeta, virtualnog svijeta u kojemu je sve prednji plan, i u kojem nema nikakve pozadine (dvodimenzionalnost). Postavlja se pitanje, kako na primjer, na mladu osobu, tinejdžera u razdoblju odrastanja i sazrijevanja te u razdoblju formiranja stavova bitnih za proces sazrijevanja i prihvaćanja odgovornosti u životu (prometu) utječe ono što svakodnevno gleda na televiziji, u medijima, na raznim portalima, u virtualnoj stvarnosti i video igricama pretrpanim akcijom, agresijom, pucanjem i ubijanjem? Kako djeluju spoznaje da u virtualnome svijetu imamo puno života? Utječu li i koliko igrice i sveraširena *gaming* kultura na formiranje mišljenja, percepciju, ponašanje u prometu, nekritičnost prema stradavanju?

Dovedemo li sva ova promišljana u korelaciju, postavlja se pitanje kakva će se buduća ponašanja u prometu formirati kod djece i mladih koji su bili izloženi međuvršnjačkom nasilju ili su bili nasilnici, odnosno koji su u dužem razdoblju igre i sazrijevanja bili izloženi raznim oblicima nasilja u virtualnom svijetu? Kako će se formirati osobnost i sazrijevanje mladih („jakih“, „slabih“ ili mentalno labilnih) u moru nasilja kojemu su izloženi?

Kakve će stavove formirati mlade osobe gledajući sumnjive uzore i sulude vožnje na mrežama ili na TikTok izazovima? Kako će se mladi nositi s frustracijama, stresom, nesigurnošću gledajući svoje nedostižne uzore na mrežama? Kako će se nositi s ulogom žrtve? Kako će se sutra u stvarnom prometu nositi s promjenama raspoloženja i teškoćama u ponašanju?

4.1. Ponašanja i ponašanja u prometu

Arhitektura sustava sigurnosti prometa (u užem smislu) počiva na odgovornom i sigurnom ponašanju njegovih participanata (sudionika – prije svega vozača). Sigurno i odgovorno ponašanje vozača u prometu proizlazi iz potrebe i očekivanja da će vozač usvojiti i primjenjivati sigurnosne procedure, što ima izravan utjecaj na smanjenje rizika, opasnosti i ugroze u prometnim situacijama.

Kod mladih se ponašanja kao i ponašanja u prometu, formiraju temeljem usvojenih stavova. Stavovi se pak formiraju temeljem iskustava i procesom učenja, a očituju se u reagiranju na objekte, osobe i situacije s kojima se dolazi u interakciju (Arnson i dr. 2005. *Social psychology*). Dakle ponašanja su funkcija usvojenih stavova. Isto tako ponašanje može u nekim slučajevima utjecati na promjenu, prilagođavanje ili formiranje novih stavova. Ponašanje vozača u prometu temelji se na primanju informacija iz okruženja, točnoj procjeni svoga stanja i sposobnosti, stalnoj procjeni trenutne prometne situacije, okruženja i ponašanja drugih sudionika.

Dijete ili mlada osoba u procesu odrastanja i mentalnog sazrijevanja formira prve stavove i uči obrasce ponašanja u roditeljskom domu, a neki i u procesu socijalizacije u dječjem vrtiću. Doba mladosti (adolescencije) između kraja puberteta (oko 14. god.) i početka zrelosti (rane 20. god.: *teenage*) odlikuje se promjenama na emocionalnom i kognitivnom planu. To je razdoblje psihološkog sazrijevanja tijekom kojeg osoba traži svoj identitet i postupno prihvaća ulogu i odgovornosti odrasle osobe. Naročito je izražena težnja za osamostaljivanjem i neovisnošću, zbog čega adolescent može doći u sukob sa svojom sredinom, osobito s roditeljima.

Osim pozitivnih iskustava djeca i mladi upijaju i negativne, nasilne signale iz okoline i s lako dostupnih platformi koji mogu ostaviti privremene ili trajne posljedice na njihovo ponašanje. Pomalo pandemija nasilja, izazovi na društvenim mrežama ostavljaju traga na brojne aspekte života kao i na komunikaciju i ponašanja u prometu. Često mladi u prometu zaboravljaju da ne sjede u udobnoj stolici pred ekranom računala, *smartfona* ili *tableta*. Zaboravljaju faktor kretanja, brzine, sila koje djeluju na vozilo, izmjene zahtjevnih informacija za procesuiranje i rješavanje, neophodnost predviđanja – a oni to primaju površno kao što i pregledavaju informacije na računalu. Nisu svjesni da mozak može ozbiljno istraživati samo jedan zadatak, a upravo sudjelovanje u prometu predstavlja jedan od najzahtjevnijih zadataka. Takve negativne obrasce ponašanja stekli su u nasilnim igricama u kojima su (prometne) nesreće normalan i poželjan događaj i u kojima se bodovi dobivaju na stradalima, dok pri tomu izostaje svjesno djelovanje na izbor ponašanja.

Za predviđanje i izbjegavanje prometnih nesreća potrebna je učinkovita povezanost i skladnost u primjeni propisa, odgovornog ponašanja, smirenosti i iskustva. Mladi ili neiskusni vozači su tu hendikepirani. Karakterizira ih rasipanje pažnje. Brzina ove generacije, ali ne nužno samo mladih, dijelom je posljedica izloženosti tehnologiji i diktaturi hitrosti. Oni sve žele odmah, žurno, nestrpljivi su, površno procesuiraju informacije, ugroženi su im metakognitivni procesi (Rijevec, 2018. Y i Z generacija). Informacije ova *net* generacija prima površno (kao da „*skrolaju*“ na internetu). Pouzdaju se u svoje „*multitasking* vještine“, a to za promet nije dobro.

Mladi često puta u svom sigurnom okružju iz udobnosti igrače fotelje pred računalom ne shvaćaju da sudjelovanje u prometu nije igra. Fascinirani gledaju sulude vožnje automobilima nerealno velikim brzinama, „izazove“ prolaska raskrižjem dok je prolaz zabranjen crvenim svjetlom i sl. što će možda sutra i sami pokušati. U nasilnim igricama jurnjave u nekom od virtualnih okružja bodovi i nagrade se dobivaju pri naletu na pješaka, rušenjem prometnih znakova, udaranjem u automobile kako bi ih se izbacilo sa ceste i iz igre, pucanjem u ostale „igrače“ i na još kojekakve bizarne i agresivne načine.

Ovi društveno neprihvatljivi uzori iskrivljuju stavove o tome što je opasno, i postižu kod djece da se nasilje i agresivnost prihvaćaju kao nešto normalno, a to povećava u bližoj ili daljnjoj budućnosti rizik u prometu za svakoga. Zapravo, promet može biti igra, ali igra koja se igra mudro, strpljivo, bez jurnjave i prema strogim pravilima.

4.2. Nasilna, objesna i agresivna ponašanja u prometu

Ako usporedimo do sada citirane definicije nasilja, nasilnog ponašanja, zlostavljanja i vršnjačkog nasilja s definicijom agresivnog ponašanja, prepoznaje se velika sličnost. Agresija kao emocionalna reakcija, štetno je ponašanje, ponašanje koje u osnovi također ima namjeru nanošenja štete, fizičke ili psihičke povrede (*Wikipedija*). Agresija ne mora biti nužno nasilje, ali svako nasilje predstavlja agresiju!

Bez obzira kojim se imenom nazove nasilno ponašanje, agresivno ponašanje ili divljanje na cesti, takva ponašanja gotovo su svakodnevna pojava, doživljaj i percepcija sudionika prometa. Posljedica društveno neprihvatljivoga ponašanja sudionika prometa materijalizira se nesigurnošću prometa, materijalnim štetama, ozljedama ili stradavanjima u prometu na cestama. Prema podacima MUP-a u 2022. u RH (Statistički pregled temeljnih sigurnosnih pokazatelja i rezultata rada u 2022.) evidentirana je 32.561 prometna nesreća. U tim je nesrećama poginulo 275 osoba, 2.910 osoba je teško ozlijeđeno, a 10.419 osoba lakše je ozlijeđeno. U odnosu na podatke za isto prošlogodišnje razdoblje, prometnih nesreća više je za 3,5 posto (za 1.108 prometnih nesreća više), poginulih osoba manje je za 5,8 posto (17 osoba manje), lakše ozlijeđenih više je za 11,9 posto (1.111 osoba više) i teško ozlijeđenih osoba više je za 11,5 posto (300 osoba više).

Prema ovim podacima promet zasigurno nije sigurno okružje. Jesu li današnji prekršaji u prometu, materijalne štete, povrijeđeni, poginuli, obijesna vožnja, agresivna ponašanja, ini poremećaji u ponašanju, frustracije, ... generirani dijelom iz vršnjačkog nasilja? Koliko je onih s neprilagođenim ili nepropisnim ponašanjem koji nisu registrirani u statistici MUP-a? Čine li dio statistike i oni čije je ponašanje posljedica stečenih stavova kao rezultat vršnjačkog nasilja? Da ne govorimo o javnome redu i miru ili sl. Ozbiljnost ovoga problema očito nije dovoljno ozbiljno shvaćena i prepoznata kod svih institucija koje bi o ovome problemu trebale skrbiti. U Zakonu o sigurnosti na cestama koji je donesen 2004. godine po prvi se puta stvari pokušavaju nazvati pravim imenom i uvode se termini ometanje i ugrožavanje prometa.

Kaznenim zakonom RH tek 2011. godine definira se pojam obijesne vožnje: „Sudionik u cestovnom prometu koji iz obijesti teško krši propise o sigurnosti prometa vozeći u stanju nesposobnosti za vožnju izazvanoj trošenjem alkohola uz koncentraciju od najmanje 1,50 g/kg alkohola u krvi, ili droge ili psihoaktivnih lijekova, ili vozeći u zabranjenom smjeru, ili pretječući na nepreglednom mjestu kolonu vozila, ili vozeći brzinom koja prelazi pedeset km/h iznad dopuštene u naseljenom mjestu ili području s naznačenim ograničenjem brzine, izazove opasnost za život ili tijelo ljudi, kaznit će se kaznom zatvora do tri godine“.

4.3. Nasilje u prometu

Egzaktni podatci o tome koliko akteri međuvršnjačkog nasilja utječu na sigurnost prometa na cestama i koliko „participiraju“ u statistici o prometnim prekršajima ili prometnim nesrećama – nepoznata je. Ali pitanja za one koji istražuju neprihvatljivo međuvršnjačko nasilje, postoje: Koliko smo puta bili izloženi obijesnom, agresivnom, bahatom ili nasilničkom ponašanju kao sudionik prometa? Dinamika prometa i interakcije među različitim sudionicima prometa mogu utjecati na pojavu takvih ponašanja i maltretiranja od strane pojedinih vozača (i ne samo vozača). To sustav čini toksičnim i štetnim. Hoće li u budućnosti nasilje i strah od nasilja i obijesti u prometu oblikovati sve više neprihvatljivog ponašanja? Postaje li obijesno, bahato, nasilničko ponašanje naša prometna stvarnost? Generiraju li takva ponašanja razvoj prometne nekulture i kulture nesigurnosti?

Kolika je razina obijesnog, nasilnog ili agresivnog ponašanja u naizgled banalnom prometnom slučaju? Nije li bahato, opasno, nesigurno, ugrožavajuće, nepropisno, nekulturno, agresivno, nasilno, obijesno ... skretanje velikog broja vozača na raskrižjima, pri pretjecanjima, obilaženjima ili promjenama prometnih traka ... bez uključivanja odgovarajućih pokazivača smjera? A tome smo izloženi svakodnevno u prometu!

Podatci iz ranije spomenutog istraživanja (*Youth Endowment Found-a*, London, o iskustvima nasilja mladih ljudi, 2022.) da je 24% mladih izjavilo da su vidjeli djecu kako nose, promoviraju ili koriste oružje; a čak 2% je reklo da ih je strah doveo do toga da i sami nose oružje. Kakve reperkusije tako usvojena ponašanja mladih imaju na njihovo buduće uključivanje u svijet vozača i u prometni sustav?

Istraživanja provedena na stranicama Sigurno-voziti.net (Zuber i dr. 2017.) temeljem anketa gotovo 22.000 ispitanika dobiveni su po sigurnost u prometu zabrinjavajući rezultati. Stupanj agresivnosti vozača koji su ispunili anketu pomaknut je prema agresivnom, neprijateljskom i ratnom ponašanju. Neprijateljsko i ratničko ponašanje iskazalo je 26% anketiranih, agresivno ponašanje njih 45% a tek 29% je pokazalo neagresivno i prihvatljivo agresivno ponašanje.

Neprijateljsko, nasilničko, ekstremno agresivno, gotovo ratničko ponašanje iskazalo je 7,72% anketiranih (ili 1.694 vozača) izjavivši da u prometu na cesti često: „Nasrćem vozilom na osobu čiji me postupak iznervirao“; 8,39% anketiranih vozača (ili njih 1.840) izjavilo je da često: „Spreman sam pucati u drugog vozača“; čak 14,75% (ili njih 3.234) često: „U autu imam polugu, oružje ili nešto slično kako bih mogao reagirati u svakoj situaciji“; 6,88% (ili njih 1.509) često: „Pokušavam izgurati drugo vozilo s ceste kako bih kaznio vozača“; 6,48%

(ili njih 1.421) često: „Izlazim iz automobila i udaram drugi automobil ili bacim na njega nešto“.

Raspon odgovora u istraživanju ide sve do manje agresivnih i neizravno nasilnih ponašanja vozača. 7,84% anketiranih vozača izjavilo je da često: „Izlazim iz automobila i upuštam se u glasnu prepirku s drugim sudionicima prometa“; čak 33,27% (ili njih 7.297) često: „Ismijavam i kritiziram druge vozače pred suputnicima“. Dakle tipično nasilno ponašanje vozača.

Ovi podatci o nasilju i agresiji nad drugim sudionicima prometa, s obzirom na reprezentativnost uzorka, ukazuju na to da je promet na cesti zaista opasno okružje u kojemu smo vrlo često izloženi nasilju drugih vozača koji imaju problem s negativnim stavovima, kontrolom stečenog neprihvatljivog ponašanja, međusobnim razumijevanjem i tolerancijom među sudionicima prometa (koliko je među njima onih iz „kategorije“ nasilnika vršnjačkog nasilja ili onih koji u udobnosti svoga doma pred računalom u igrama nasilja grade pogrešne stavove i usvajaju neprihvatljiva ponašanja?)

Nasilna, obijesna ili agresivna vožnja može proizvesti domino efekt (lančani učinak). Takva vožnja može naljutiti ostale vozače pa oni iskaljuju svoju ljutnju na drugim sudionicima prometa i time izazivaju opasnost čime se smanjuje zajednička sigurnost u prometnom sustavu. Činjenica jest da većinu stavova i ponašanja vozača u prometu na cesti oblikuju zajedničko – grupno društveno ponašanje. Promatrači koji ne reaguju, već se pasivno povlače, svjesno prešutno doprinose kulturi nesigurnosti u prometu.

ZAKLJUČAK

Vozači u pravilu čine pogreške u vožnji zbog ponašanja, a ne zbog neznanja ili manjkavosti u tehnici vožnje. Mladi vozači su općenito učestalije izloženi riziku, ne samo zbog manjeg vozačkog iskustva već i zato što su manje sposobni kontrolirati svoje osjećaje. Sve to narušava i ugrožava arhitekturu sustava sigurnosti prometa.

Veći dio stavova i ponašanja usvaja se u najranijoj mladosti, a poglavito u mladenačkoj dobi. Dio i temeljem negativnih utjecaja lako dostupnih novih tehnologija, mreža, velikog izbora neprovjerenih (upitnih) informacija i izloženosti nasilnim sadržajima u virtualnom svijetu. Osim toga, u školama i drugim oblicima odgojno obrazovnih institucija, ali ne samo u njima, događa se i prevalencija međuvršnjačkog nasilja. Nasilje je u porastu, sve je okrutnije, a posljedice zabrinjavaju roditelje, stručnjake i institucije. Danas je vršnjačko nasilje i zlostavljanje među djecom, adolescentima i tinejdžerima - globalni problem koji zaista treba ozbiljno sagledati i promptno rješavati. Izostanak odgoja i promicanja kulture sigurnosti lako može dovesti do neželjenog utjecaja na društvo, a kakav će zaista biti u skoroj budućnosti - teško je predvidjeti. Stručni svijet zanimaju odgovori na pitanja: Ima li veze vršnjačko nasilje s agresivnim i obijesnim ponašanjem u prometu? Hoće li u skoroj budućnosti biti posljedica po sigurnost prometa zbog rastućeg vršnjačkog nasilja i uključivanja u prometni sustav upravo te mladeži? Hoće li se osjećaj premoći i snage nad žrtvom usvojiti kao buduće ponašanje premoći i snage u prometu?

Ovaj je rad pokušao dati neke poveznice na temelju podataka i činjenica te ponuditi neizravne odgovore. Nasilno, agresivno i obijesno ponašanje u prometu ne smiju postati usvojeni načini ponašanja. To je opasno za prometni sustav, sigurnost i zaštitu od stradavanja. Promicanje kulture sigurnosti mora uključivati i borbu protiv nasilja u prometu.



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STROJARSKA I
PROMETNA ŠKOLA
Varaždin

SAFE ROADS, ASSOCIATION FOR
YOUTH TRAFFIC SAFETY, ZAGREB

MECHANICAL AND TRAFFIC SCHOOL,
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19. PEER VIOLENCE WILL THERE BE A CONSEQUENCE FOR TRAFFIC SAFETY?

Abstract

Peer violence in primary and secondary schools is a fact and a socially unacceptable phenomenon that is spreading unstoppably. How to suppress it, is the question of all those who deal with upbringing and education, but also in responsible institutions, not only in Croatia but also in European and non-European countries. The frequent exposure of children and young people, but not only them, to direct peer violence, harassment, physical violence, verbal violence, abuse in the family and schools, violence in the media, on social networks, cyberbullying, bullying, bossing, mobbing, cultural, structural violence ... and who knows what other types of violence or harassment! Connecting this already public health problem for children and young people, who are in the most sensitive years of forming attitudes and behaviour with the formation of attitudes and behaviour in traffic, we cannot help but ask completely realistic questions: Will there be consequences for traffic safety in the near future due to growing peer pressure? Violence and inclusion in the traffic system of those youth?

Keywords

PEER VIOLENCE, TRAFFIC SAFETY, AGGRESSIVE, RECKLESS AND VIOLENT BEHAVIOR IN TRAFFIC

1. INTRODUCTION

Road traffic safety is a complex, interdisciplinary issue that is determined by the interaction of numerous and different variables that play an important role, and at the same time significantly influence each other. The desirable vision of traffic safety should be a state of balance in the system, which implies socially acceptable and responsible behaviour of all individuals - traffic participants, and the development of traffic without the occurrence of harmful effects: traffic accidents, endangering the health or life of traffic participants or the environment. The key factor in this complex system is the driver, who directly affects traffic safety through his behaviour, experience, psychophysical abilities, habits, routines, traffic knowledge and vehicle driving skills.

It is indisputable that the driver's behaviour in traffic and his attitudes about traffic are an important, if not a key factor in traffic safety, so the real, concrete and legitimate question is, with what attitudes and behaviours do young people become drivers and get involved in traffic? Peer violence is a worrying, socially unacceptable phenomenon that has existed in our (but not only in our) society for a long time and represents a public health problem. Exposure of children and young people to peer violence and various forms of aggression, abuse, violence and harassment is an almost everyday occurrence.

Constant or occasional exposure of children and young people to different forms of violence will undoubtedly influence the formation of future attitudes and behaviour, both of children who are bullies and of children who are exposed to any form of violence or harassment. If this phenomenon today in our environment is a premise - a logical judgment from which a conclusion is drawn, it is reasonable to ask the question: Is there already or will there be consequences for traffic safety due to the growing peer violence and the inclusion of this very youth in the traffic system in the near future?

2. BEHAVIOUR, VIOLENT, RAMPANT AND AGGRESSIVE BEHAVIOUR

Human behaviour, due to its complexity and a series of variables and circumstances that influence it, can never be fully explained, let alone accurately represented by a mathematical formula. Some ethologists and the French psychologist M. Reuchlin (1976. *Les méthodes en psychologie*, Paris) also tried this. The author asserted that behaviour (R) is a function of personality, innate factors (or *personality* = P) and environment (S), i.e. environment, external factors and circumstances. Represented by a mathematical formula, human behaviour can be defined as $R = f(P, S)$.

Since man is above all an ethical being, his behaviour should be governed primarily by moral criteria and patterns. However, behaviour is primarily determined by the fact that how well an individual can control himself and how well he can deal with increasing challenges, demands and problems in the surrounding world and, ultimately, how he shows this to the outside, that is, to others. Aggressive situations in society, times of crisis, stressful environment and the like can generate interactive events in people such as aggression at the workplace, in the family, and perhaps most of all in traffic on the road, creating even greater stress that generates even greater conflicts.

The behaviour of drivers in traffic is the result of a complex interaction of attitudes, experiences, traits, upbringing, incentives and influences from the environment, knowledge, abilities, skills, age, gender, but also a number of other variables, up to the cultural circle in which the individual functions and the level of civilization to which the driver belongs. All these variables directly determine the driver's behaviour in traffic. Habits, routines, ways and style of driving, especially in urban areas, are the result of socio-cultural changes in society and are spontaneously adopted by the current generation, especially young (teenagers), but not so young drivers. Individualism and competition, vanity and favouritism, overestimating one's abilities and possibilities persistently and unobtrusively creep into every pore of

driver's behaviour and lead to the fact that some drivers have become aggressive, violent, reckless and hostile towards other road users. These are, in short, antisocial, violent and warlike types who have difficulty in self-control and self-control. They significantly contribute to problems and insecurity in road traffic and pose a serious danger to themselves and other road users. Are there among them and how many were initiators, victims or observers of peer violence in their environment? It is easy to assume that there is!

3. VIOLENCE AND PEER VIOLENCE

As a socially unacceptable phenomenon, violence is defined in different ways, so there are different definitions of violence and abuse. In the World Report on Violence and Health (2002), the World Health Organization divides violence into three major groups that further branch as follows: 1. violence against oneself, which includes self-harm and suicide; 2. interpersonal violence related to violence in the family (violence against children, violence against a partner and violence against an elderly person) and violence within the community (violence towards people the abuser knows and violence towards people the abuser does not know); 3. collective violence is mostly organized and directed from one group to another in order to achieve political, economic and social goals. According to the nature of the violent act, violence is divided into: physical - use of force regardless of whether or not physical injury has occurred (pushing, hitting, pressing, physically preventing movement, throwing objects, destroying things around the house, etc.); sexual - any sexual act (an attempt to perform a sexual act, an unwanted sexual comment, etc.) and psychological violence (that is, the application of psychological coercion that caused a feeling of fear, threat, violation of dignity, verbal violence, cursing, neglect by means of communication, etc.).

According to the Protocol on Handling Violence among Children and Young People (2004 MOBMS), violence among children and young people is considered to be any intentional physical or psychological violent behaviour directed towards children and young people by their peers with the aim of injuring them, which, regardless of place of execution, can differ in form, severity, intensity and time duration and which includes the repetition of the same pattern and maintains an unequal relationship of power (stronger against weaker or group against individual).

In the Croatian encyclopaedia (2021), violence in the narrower sense is defined as the use of means of physical coercion in order to cause harm and force a certain behaviour. In a broader sense, it also includes the use of means of psychological coercion for the purpose of causing damage, injury or intimidation of a person.

3.1. Types of violence

Whether it is violence, abuse or harassment, it implies the superiority of one side and the inferiority of the other. In violence, there is always a bully and a victim. Direct or direct violence where the actor (thug) is known. As a rule, violence is unilateral, but it can be mutual as well as group.

According to Olweus and Solberg (1998 *Bullying among children and young people*), we distinguish verbal violence, emotional or psychological, physical, sexual, economic violence and exploitation. Violence can be structural and cultural (Galtung, 1975). Violence can happen in the family. Violence against children and young people can be by parents or relatives, or as general violence by adults against children and young people, as violence by neighbours, violence in kindergartens, primary and secondary schools, higher education institutions, violence between colleagues in the workplace, violence by superiors (mobbing), violence in various institutions, in public areas, gyms, sports fields and clubs, at parties, in emotional relationships of adolescents, as well as in many other places and events. Violence

can also be reflected in the isolation of other persons, inaction or failure to act. Knowing the types of violence and their complexity is a prerequisite for the prevention of this violence.

3.2. Peer violence – Bullying

In the Handbook for Experts, Helena Križan (2018) states that peer violence or bullying among children and young people is one of the most significant social risks to which children and young people are exposed. In order for certain violent behaviour to be qualified as bullying, it must be directed towards one student at least two or three times a month (Pregrad, 2010).

Peer (inter-peer) violence is, as a pattern of behaviour, one child towards another with the aim of taking control and establishing power over that child. The first association for most people is physical abuse, which leaves visible traces, but peer violence can (according to Olweus 1998) manifest itself as verbal (teasing, insulting, mocking, mocking, intimidation, threats), social (slandering, shaming, gossiping, gossiping, isolation), psychological (following) and physical (pushing, slapping, fighting, injuring). Peer bullying is a set of intentional negative actions that are long-lasting, directed at one student by another student or more, and always accompanied by an imbalance of power.

Available sources and data from UNICEF (2022 *Peer violence. Bullying is a reality for a significant proportion of students worldwide*), for any country in the world, there are noticeable unwanted trends and an increase in violence, whether among children of primary school age or among adolescents. Unfortunately, bullying and peer violence is a reality for a significant number of children and young people around the world.

The data on peer violence among teenagers is also very worrying, presented in a study by the Youth Endowment Found (London 2022) on the experiences of violence among young people, in which the ways in which violence and the fear of violence shape the lives of children were investigated. The research was conducted over a period of 12 months. It included 2,025 children and young people and showed the following: 14% of teenage children were victims of violence; 39% of teenagers were victims or witnesses of violence; 55% of teenagers said they were exposed to violence in real life and on social networks; 24% said they saw children carrying, promoting or using weapons; 65% of teenagers said they changed their behaviour to protect themselves from violence; 14% missed school because of fear, and 14% said that fear caused them to lose concentration; 16% avoided going to a social event due to fear, and even 2% said that fear led them to carry a weapon; 26% say they want to see changes in policing to tackle violence (such as more patrols near clubs or youth activity venues (15%) and at drug and alcohol dispersal sites (10%).

The data for our country is not particularly different compared to other countries. In the research of the Croatian Institute of Public Health (2018) on the health behaviour of students and on the occasion of the National Day against peer violence, it is stated that 8% of boys and 5% of girls aged 11, 11% of boys and 8% of girls aged 13 years and 7% of boys and 8% of girls at the age of 15 stated that they had been abused at least twice in the past few months. About 5% of boys and 2% of girls at the age of 11, 12% of boys and 5% of girls at the age of 13, and 10% of boys and 4% of girls at the age of 15 state that they abused others at least twice a few months ago. According to that research, Croatia is placed in the lower half of the ranking of the countries included in the research. At the top of the list with the highest share of abusers in all three ages are Latvia and Lithuania. At the bottom of the ranking are Sweden and Iceland.

In the Report on the work of the ombudsman for children in 2022 and actions in the case of violence against children (2023) shows that violence against children and young people has been increasing for several years in a row. The largest number of reports of violence refers to violence in educational institutions, which is an increase of almost 100%

compared to 2021. It is followed by violence in the family (70) and other violence (48), which refers to violence in other places and on the Internet.

According to the data from the Annual Statistical Report of the Ministry of Labour, Pension System, Family and Social Policy (2021), 1,469 children were reported for perceived peer violence, and almost half of these reports were sent by schools in accordance with the Protocol on dealing with violence among children and young people. In the two years of the pandemic and online classes, fewer complaints about peer violence were received in schools. However, in 2022 there is a 100% increase in complaints compared to the last pandemic year.

The data of the Institute for Social Work of Varaždin County is worrying, according to which until 2013, peer violence was characteristic of adolescents and teenagers in secondary schools, and after that the trend shows that the age limit is lowered towards primary school age!

3.3. Cyberbullying

Ubiquitous information and communication technology is a tool for information, learning, entertainment and socializing in the virtual world. With all the advantages of easily accessible technology (mobile phones, tablets) and information platforms (internet, e-mail), users - most often young people, encounter the negative side of their media exposure - electronic abuse and violence, which can take place on social media, exchange platforms messaging, game platforms and mobile phones. These behaviours are intended to intimidate, hurt, anger, upset or embarrass others.

Cyberbullying is on the rise worldwide, as the Internet allows bullies to hide behind a mask of anonymity. A global international survey (*Cyberbullying Facts and Statistics 2018-2023*, Ipsos Group S.A. Paris) conducted among parents in 28 countries of the world talks about the statistics, trends and facts of cyberbullying. During 2018, a total of 20,793 interviews were conducted from the USA, Canada through Europe to Russia, India and Japan. The results reveal an increasing number of parents whose children have experienced some form of online violence. The display shows the percentage of parents whose children stated that they were bullied during 2019. Most of the bullying happened in schools. 19.2% of parents reported that bullying occurred through social media sites and apps. A further 11% indicated that the abuse occurred via text messages, while 7.9% identified video games as the source. 6.8% reported that the abuse occurred on websites other than social media, while 3.3% reported that the abuse occurred via e-mail.

Available data from Hrabri telefon from Croatia show that as many as 95% of children between the ages of 11 and 18 own a computer, and 91% of them use the Internet. With the advent of smartphones, internet services and content are available to them almost at any time.

3.4. Differences between classic and electronic violence

The difference between classic, direct violence and electronic violence is in the identity of the abuser. Classic peer violence most often occurs while at school or on the way home. In such a case of face-to-face violence, the identity of the perpetrator is known. Violence against the victim is carried out in a limited space and time frame. In such a case, it is possible to provide the victim with help and protection from the abuser. Perpetrators of electronic violence are often anonymous. The environment in which they operate gives them the opportunity to hide their identity or present themselves under a false name. In this case, the abuser can be anyone, regardless of whether he is physically stronger than the victim. What's worse, by spreading violence through electronic media, the perpetrator can get the support of the group (!?).

3.5. Peer violence - a sociological problem

This public health, but above all sociological problem is noticed and warned about by experts. Accumulation of cases of violence among young people affects the change of trends, unfortunately for the worse. Sociologists (Marcelić, 2021. Interview of the week, N1 TV) warn of the fact that the mildness of court practice creates a certain tolerance towards violence, and this helps teenagers not perceive violence as a problem. This shows the loss of empathy towards victims of violence and abuse among young people.

4. PEER VIOLENCE, WILL THERE BE A CONSEQUENCE FOR TRAFFIC SAFETY?

Young people and children today spend more and more time in the shadowy areas of the computer world, a virtual world in which everything is the foreground, and in which there is no background (two-dimensionality). The question arises, how, for example, a young person, a teenager in the period of growing up and maturing and in the period of forming the attitudes essential for the process of maturing and accepting responsibility in life (traffic) is affected by what he watches every day on television, in the media, on various portals, in virtual reality and video games full of action, aggression, shooting and killing? How does the realization that we have a lot of life in the virtual world work? How much do games and widespread gaming culture influence the formation of opinions, perception, behaviour in traffic, uncriticalness towards suffering?

If we bring all these considerations into correlation, the question arises as to what future behaviour in traffic will be formed in children and young people who were exposed to peer violence or were bullies, that is, who were exposed to various forms of violence in the virtual environment during a longer period of play and maturation. the world? How will the personality and maturation of young people ("strong", "weak" or mentally unstable) be formed in the sea of violence to which they are exposed?

What attitudes will young people form when they see dubious role models and crazy rides on networks or on TikTok challenges? How will young people cope with frustration, stress, insecurity by looking at their unattainable role models on the networks? How will he cope with the role of victim? How will he deal with mood swings and behavioural difficulties in real traffic tomorrow?

4.1. Behaviours and behaviours in traffic

The architecture of the traffic safety system (in the narrower sense) rests on the responsible and safe behaviour of its participants (participants – primarily drivers). The safe and responsible behaviour of drivers in traffic results from the need and expectation that the driver will adopt and apply safety procedures, which has a direct impact on reducing risks, dangers and threats in traffic situations.

Behaviours of young people, as well as behaviour in traffic, are formed on the basis of adopted attitudes. Attitudes are formed based on experiences and the learning process, and are manifested in reactions to objects, persons and situations with which one interacts (Arnson et al. 2005. Social psychology). Therefore, behaviours are a function of adopted attitudes. Likewise, behaviour can in some cases influence change, adaptation or formation of new attitudes. The driver's behaviour in traffic is based on receiving information from the environment, accurate assessment of his condition and abilities, constant assessment of the current traffic situation, the environment and the behaviour of other participants.

A child or a young person in the process of growing up and mentally maturing forms the first attitudes and learns patterns of behaviour in the parental home, and some also in the process of socialization in kindergarten. The period of youth (adolescence) between the end of puberty (around the age of 14) and the beginning of maturity (early 20s: teenage) is

characterized by emotional and cognitive changes. It is a period of psychological maturation during which a person searches for his identity and gradually accepts the role and responsibilities of an adult. The desire for independence and independence is especially pronounced, which is why the adolescent can come into conflict with his environment, especially with his parents.

In addition to positive experiences, children and young people also absorb negative, violent signals from the environment and from easily accessible platforms that can have temporary or permanent consequences on their behaviour. Somewhat of a pandemic of violence, challenges on social networks leave their mark on many aspects of life as well as on communication and behaviour in traffic. Often, young people in traffic forget that they are not sitting in a comfortable chair in front of a computer, smartphone or tablet screen. They forget the factor of movement, speed, forces acting on the vehicle, changes in demanding information to process and solve, the necessity of prediction - and they receive it superficially, just as they view information on a computer. They are not aware that the brain can seriously investigate only one task, and participating in traffic is one of the most demanding tasks. They acquired such negative patterns of behaviour in violent games in which (traffic) accidents are a normal and desirable event and in which points are gained for the victims, while there is no conscious action on the choice of behaviour.

Anticipating and avoiding traffic accidents requires effective communication and compliance in the application of regulations, responsible behaviour, calmness and experience. Young or inexperienced drivers are handicapped here. They are characterized by distraction. The speed of this generation, but not necessarily only the youth, is partly due to exposure to technology and the dictatorship of speed. They want everything immediately, in a hurry, they are impatient, they process information superficially, and their metacognitive processes are at risk (Rijevec, 2018. Generation Y and Z). This net generation receives information superficially (as if "scrolling" on the Internet). They rely on their "multitasking skills", which is not good for traffic.

Young people often play in their safe environment from the comfort of their armchairs in front of the computer, not realizing that participating in traffic is not a game. Fascinated, they watch crazy car drives at unrealistically high speeds, the "challenges" of passing through an intersection while passing through is prohibited by a red light, etc., which maybe they will try themselves tomorrow. In violent chase games in one of the virtual environments, points and rewards are obtained by running into pedestrians, knocking down traffic signs, hitting cars to throw them off the road and out of the game, shooting other "players" and some other bizarre and aggressive ways.

These socially unacceptable role models distort attitudes about what is dangerous, and achieve in children that violence and aggressiveness are accepted as something normal, and this increases the risk in traffic for everyone in the near or distant future. In fact, traffic can be a game, but a game that is played wisely, patiently, without rushing and according to strict rules

4.2. Violent, reckless and aggressive behaviour in traffic

If we compare the definitions of violence, violent behaviour, bullying and peer violence cited so far with the definition of aggressive behaviour, we can see a great similarity. Aggression, as an emotional reaction, is harmful behaviour, behaviour that basically also has the intention of causing harm, physical or psychological injury (Wikipedia). Aggression does not necessarily have to be violence, but all violence represents aggression!

No matter what name violent behaviour, aggressive behaviour or rampage on the road is called, such behaviours are an almost everyday occurrence, experience and perception of traffic participants. The consequence of socially unacceptable behaviour of traffic participants is materialized by unsafe traffic, material damages, injuries or casualties in road

traffic. According to the data of the Ministry of Interior in 2022 in the Republic of Croatia (Statistical review of basic safety indicators and work results in 2022), 32,561 traffic accidents were recorded. In these accidents, 275 people died, 2,910 people were seriously injured, and 10,419 people were slightly injured. Compared to the data for the same period last year, there were 3.5 percent more traffic accidents (1,108 more traffic accidents), 5.8 percent fewer fatalities (17 fewer people), 11.9 percent more minor injuries. (1,111 people more) and seriously injured people are 11.5 percent more (300 people more).

According to these data, traffic is certainly not a safe environment. Are today's traffic violations, property damage, injuries, deaths, impaired driving, aggressive behaviour, other behavioural disorders, frustrations, etc. generated in part from peer violence? How many of those with maladjusted or improper behaviour are not registered in the MUP statistics? Do those whose behaviour is a consequence of acquired attitudes as a result of peer violence also form part of the statistics? Let's not talk about public order and peace or the like. The seriousness of this problem is obviously not taken seriously enough and recognized by all the institutions that should take care of this problem. In the Road Safety Act, which was adopted in 2004, for the first time, an attempt is made to call things by their right names and introduce the terms obstructing and endangering traffic.

The Criminal Code of the Republic of Croatia only defined the concept of reckless driving in 2011: "A road traffic participant who is severely intoxicated violates traffic safety regulations by driving in a state of incapacity for driving caused by alcohol consumption with a concentration of at least 1.50 g/kg of alcohol in the blood, or drugs or psychoactive drugs, or by driving in a prohibited direction, or by overtaking a line of vehicles in an unobservable place, or by driving at a speed exceeding fifty km/h above the permitted speed limit in a populated place or area with an indicated speed limit, causes danger to the life or body of people, shall be punished shall be punished by imprisonment for up to three years".

4.3. Traffic violence

Exact data on how much the actors of peer violence affect the safety of traffic on the roads and how much they "participate" in statistics on traffic violations or traffic accidents - is unknown. But there are questions for those who research unacceptable peer-to-peer violence: How many times have we been exposed to aggressive, aggressive, arrogant or violent behaviour as a traffic participant? Traffic dynamics and interactions between different traffic participants can influence the occurrence of such behaviours and mistreatment by individual drivers (and not only drivers). This makes the system toxic and harmful. In the future, will violence and fear of violence and abuse in traffic shape more and more unacceptable behaviour? Is drunken, arrogant, violent behaviour becoming our traffic reality? Do such behaviours generate the development of traffic non-culture and culture of insecurity?

What is the level of reckless, violent or aggressive behaviour in a seemingly banal traffic incident? Isn't it arrogant, dangerous, unsafe, threatening, illegal, uncivilized, aggressive, violent, reckless ... turning a large number of drivers at intersections, when overtaking, going around or changing lanes ... without turning on the appropriate direction indicators? And we are exposed to that every day in traffic!

Data from the previously mentioned survey (Youth Endowment Founda, London, On experiences of violence among young people, 2022) that 24% of young people stated that they saw children carrying, promoting or using weapons; and as many as 2% said that fear led them to carry weapons themselves. What repercussions do young people's adopted behaviours have on their future inclusion in the world of drivers and in the transport system?

Research conducted on the Sigurno-voziti.net website (Zuber et al. 2017) based on surveys of almost 22,000 respondents yielded worrying results regarding traffic safety. The

degree of aggressiveness of the drivers who completed the survey was shifted towards aggressive, hostile and warlike behaviour. Hostile and warlike behaviour was expressed by 26% of those surveyed, aggressive behaviour by 45%, and only 29% showed non-aggressive and acceptable aggressive behaviour.

Hostile, violent, extremely aggressive, almost warlike behaviour was expressed by 7.72% of the respondents (or 1,694 drivers), stating that in traffic on the road they often: "I attack a person whose behaviour annoyed me"; 8.39% of the surveyed drivers (or 1,840 of them) stated that they often: "I am ready to shoot another driver"; as many as 14.75% (or 3,234 of them) often: "I have a lever, a weapon or something similar in the car so that I can react in any situation"; 6.88% (or 1,509 of them) often: "I try to push another vehicle off the road to punish the driver"; 6.48% (or 1,421 of them) often: "I get out of the car and hit another car or throw something at it".

The range of answers in the research goes all the way to less aggressive and indirectly violent driver behaviours. 7.84% of the surveyed drivers stated that they often: "I get out of the car and get into a loud argument with other road users"; as many as 33.27% (or 7,297 of them) often: "I make fun of and criticize other drivers in front of my fellow passengers." So typical violent behaviour of drivers.

These data on violence and aggression against other traffic participants, considering the representativeness of the sample, indicate that road traffic is a really dangerous environment in which we are very often exposed to violence from other drivers who have a problem with negative attitudes, control of acquired unacceptable behaviour, mutual understanding and tolerance among traffic participants (how many of them are from the "category" of bullies of peer violence or those who in the comfort of their homes in front of the computer in games of violence build wrong attitudes and adopt unacceptable behaviours?).

Violent, reckless or aggressive driving can produce a domino effect (chain effect). Such driving can make other drivers angry, so they take out their anger on other road users and thus cause danger, which reduces common safety in the traffic system. The fact is that most of the attitudes and behaviour of drivers in road traffic are shaped by common - group social behaviour. Bystanders who do not react, but passively retreat, knowingly and silently contribute to the culture of traffic insecurity.

CONCLUSION

As a rule, drivers make driving mistakes because of their behaviour, not because of ignorance or deficiencies in driving technique. Young drivers are generally more often exposed to risk, not only because of less driving experience but also because they are less able to control their emotions. All this disrupts and endangers the architecture of the traffic safety system.

Most of the attitudes and behaviour are adopted at a very young age, especially in adolescence. Part of and based on the negative impacts of easily accessible new technologies, networks, a large selection of unverified (questionable) information and exposure to violent content in the virtual world. In addition, the prevalence of peer violence occurs in schools and other forms of educational institutions, but not only in them. Violence is on the rise, it is getting crueller, and the consequences worry parents, experts and institutions. Today, peer violence and abuse among children, adolescents and teenagers is a global problem that really needs to be looked at seriously and solved promptly. The absence of education and promotion of safety culture can easily lead to an unwanted impact on society, and what it will really be like in the near future - it is difficult to predict. The professional world is interested in answers to the questions: Does peer violence have anything to do with aggressive and aggressive behaviour in traffic? Will there be consequences for traffic safety in the near future due to the growing peer violence and the

inclusion of this very youth in the traffic system? Will the feeling of superiority and strength over the victim be adopted as future behaviour of superiority and strength in traffic?

This paper has attempted to provide some links based on data and facts and offer indirect answers. Violent, aggressive and reckless behaviour in traffic must not become accepted ways of behaving. This is dangerous for the traffic system, safety and protection against injuries. Promoting a culture of safety must also include the fight against traffic violence





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20.2035 PREPOVED PRODAJE VOZIL Z NOTRANJIM ZGOREVANJEM

POVZETEK

Evropski svet je sprejel uredbo iz svežnja ukrepov „Pripravljeni na 55“, ki med drugim določa zmanjšanje emisij CO₂ v avtomobilski industriji. Uredba predvideva zmanjšanje emisij CO₂ za 55 % pri novih avtomobilih in 50 % pri novih kombiniranih vozilih v obdobju med letoma 2030 in 2034 v primerjavi z ravnmi iz leta 2021. To prinaša številne prednosti v smislu zmanjševanja onesnaževanja okolja. Vendar pa ta zaveza postavlja Evropsko unijo pred številne izzive. Slovenija ima zelo nizek delež kombiniranih in električnih vozil v svojem voznem parku, zato bo prehod zahteven tudi pri nas. Najpomembnejši stroški bodo povezani z nakupom novih električnih vozil ter prenovo električne infrastrukture. V članku je prikazano trenutno številčno stanje električnih vozil, trg in trendi prodaje električnih vozil. Osvetljene so težave, ki nastopajo s spremembo pogona vozil. Problematika polnilne infrastrukture, nekatere prednosti in slabosti električno gnanih vozil. Predstavljena je tematika električnih vozil, obstajajo pa še druge opcije pogona, ki pa niso množično zastopane. Sprejeta uredba predstavlja priložnost za družbo, saj bo prispevala k zmanjšanju izpustov toplogrednih plinov, vendar bo za njeno uresničitev potrebnih mnogo premišljenih ukrepov.

KLJUČNE BESEDE: električna vozila, električna infrastruktura, hibridna vozila, vozila z notranjim zgorevanjem

1. UVOD

Evropski parlament je februarja 2023 potrdil prepoved prodaje avtomobilov in lahkih gospodarskih vozil z bencinskim ali dizelskim motorjem od leta 2035, s čimer je odpravljena še zadnja ovira v zakonodajnem postopku. Vmesna cilja do leta 2030 sta zmanjšanje izpustov avtomobilov za 55 odstotkov in lahkih gospodarskih vozil za 50 odstotkov. Dolgoročni cilj ukrepov je podnebna nevtralnost do leta 2050. Zato sprejema ukrepe za zmanjševanje izpustov avtomobilov, saj cestni promet predstavlja petino vseh izpustov toplogrednega plina, ogljikovega dioksida (CO₂), ki jih proizvede EU. Ukrep imenujemo „Pripravljeni na 55“. Slovenija, ki ima le 5% delež prodaje električnih avtomobilov, odstotek popolnoma električnih osebnih vozil pa približno en odstotek. Razlogov za to je kar nekaj, med njimi je zagotovo tudi pomanjkanje cenovno ugodnejših (manjših) električnih avtomobilov, s katerimi bi lahko nadomestili tretji ali drugi avtomobil v družini. Po drugi strani je veliko ljudi še negotovih glede dosega električnih vozil, ki v hladnih dneh resda le pri redkih avtomobilih preseže 300 kilometrov, a je to še vedno dovolj za nekajdnevno vožnjo po vsakodnevnih opravkih, med katero povprečni Slovenec prevozi približno 50 kilometrov. Dokončno postavljen datum prehoda na ničelne izpuste prinaša kar nekaj izzivov, ki jih bo Evropska unija morala premagati, saj se bodo sicer številne države soočile z mobilnostno revščino ali pa postale odpad za rabljene avtomobile na bencinski oziroma dizelski pogon iz razvitejših (bogatejših) držav. V prispevku, se bom dotaknil nekaterih dejstev, ki jih prinaša uporaba električnih vozil in povzel različne vidike sprejetja zakona o prepovedi prodaje vozil na notranje zgorevanje po letu 2035.

2. TRENUTNO STANJE

Po podatkih statističnega urada 2022, je bilo lani v Sloveniji med registriranimi cestnimi motornimi vozili 1,2 milijona (74 %) osebnih avtomobilov, kar je za dva odstotka več kot predlani. To pomeni 572 registriranih osebnih avtomobilov na 1000 prebivalcev. Povečala se je tudi stopnja motorizacije za osem osebnih avtomobilov na 1000 prebivalcev oz. za 1,5 odstotka. Med prvič registriranimi novimi osebnimi avtomobili je bila petina hibridov, povprečna starost osebnih avtomobilov pa je bila 10,9 leta. Stopnja obnavljanja voznega parka osebnih vozil je bila najnižja doslej.

Polovica registriranih osebnih avtomobilov v letu 2022 je vozila na dizelsko, 46 % pa na bencinsko gorivo. Njunu število se je povečalo za odstotek glede na leto pred tem. Število avtomobilov na hibridni pogon se je povečalo za 54 % na okoli 24.800, kar predstavlja dva odstotka vseh registriranih osebnih avtomobilov. Število električnih osebnih avtomobilov se je povečalo za 47 % na okoli 8000, kar je skupno 0,7 % vseh registriranih osebnih avtomobilov.

Razmerja med prvič registriranimi novimi osebnimi avtomobili glede na vrsto pogona in goriva pa se razlikujejo od že predhodno registriranih osebnih avtomobilov. Med vsemi novimi, prvič registriranimi osebnimi avtomobili, je bilo lani 20 % hibridnih in 5 % električnih. Število osebnih avtomobilov na hibridni pogon se je povečalo za desetino, na električni pogon pa za skoraj tretjino.

3. PREHOD BO DRAG V VSEH POGLEDIH

Preoblikovanje voznega parka države je povezano z velikimi stroški, pri čemer se ocenjuje, da bo za spodbujanje števila električnih vozil potrebno vložiti 243 milijonov evrov javnih sredstev. V zadnjih 12 letih smo za subvencije porabili 37,7 milijona evrov. V prihodnjih 8 letih bomo tako davkoplachevalci za subvencije nakupov e-avtov namenili 171 milijonov evrov oziroma v povprečju 21,3 milijona evrov na leto, kar pomeni več kot trikratno vsoto na leto kot doslej. Del predvidenega denarja bo prišel iz državnega in občinskih proračunov, del pa očitno iz dviga dajatve za uporabo vozil v cestnem prometu. Ni še znano, kakšen ta dvig bo, predviden pa je za junij naslednje leto. Glavni strošek elektrifikacije mobilnosti ter družbe nasploh pa bo seveda nujna prenova energetskih distribucijskih omrežij. Tukaj pa poznavalci govorijo o milijardah evrov.

3.1 Trg električnih vozil v EU v marcu 2023

Leta 2022 je število registracij novih baterijskih električnih vozil (BEV) še naprej naraščalo, kljub splošnemu upadu avtomobilskega trga v EU. Posledično se je tržni delež baterijskih električnih vozil povečal na 12,1 %, kar je izboljšanje za 3 odstotne točke v primerjavi z letom 2021. Leto je bilo uspešno tudi za hibridne avtomobile, ki so dosegli 22,6 % tržni delež. Posledično avtomobili na bencinski in dizelski pogon še naprej izgubljajo tržni delež. Kljub temu pa so ti leta 2022 skupaj še vedno predstavljali več kot polovico prodaje avtomobilov v EU. Med državami članicami EU sta le Nizozemska in Švedska na dobri poti do zastavljenih ciljev prehoda na EV. Po izračunih organizacije The Economist Intelligence Unit (EIU) imata le ti dve državi znotraj EU dovolj visoko stopnjo uvajanja električnih vozil, da bi lahko do leta 2035 prepovedali prodajo novih bencinskih in dizelskih avtomobilov v skladu s pravili EU, ki jih je Evropski parlament potrdil 25.3.2023. Predlog zakona mora sicer potrditi še Evropski svet, ratificirati pa ga morajo še posamezne države članice. Glede na trenutno stopnjo prodaje in registracije EV pri večini držav članic pa bo ta rok po vsej verjetnosti prestavljen.

4. PREDNOSTI IN SLABOSTI UPORABE ELEKTRIČNIH VOZIL

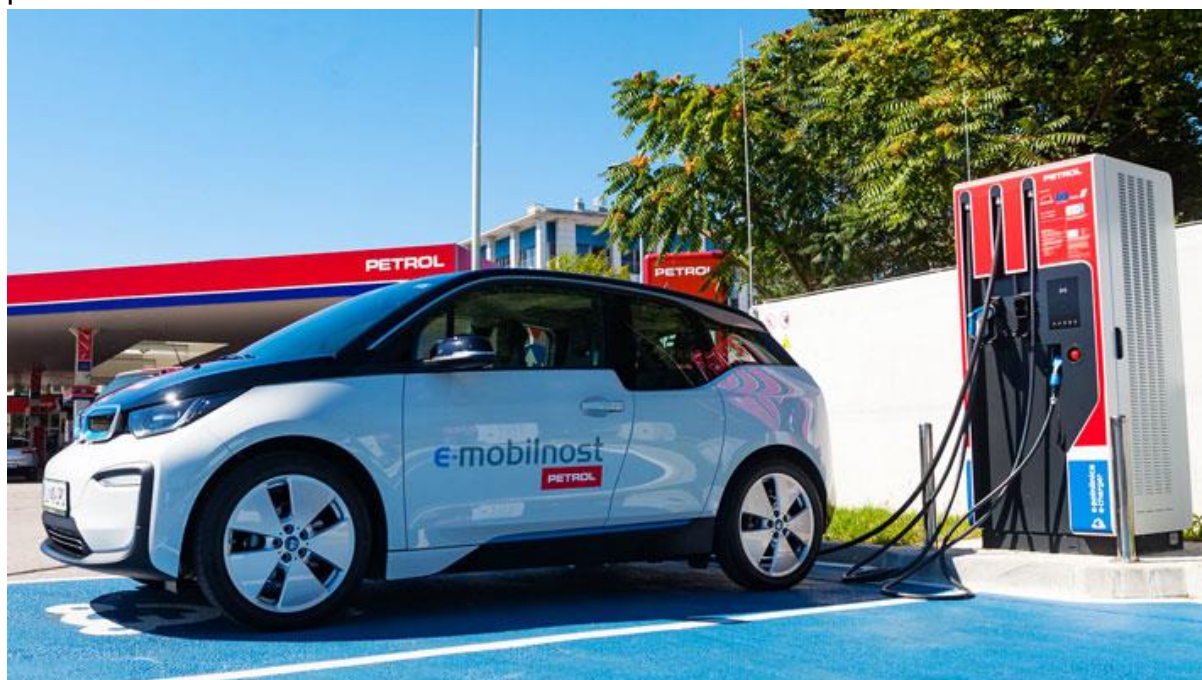
Cena električnih vozil

Trenutno je povprečna cena električnih vozil višja od cene povprečnega avtomobila z motorjem z notranjim izgorevanjem, a bodo cene srednjeročno močno padle zaradi velikega porasta prodaje. Poleg tega so skupni stroški lastništva električnih vozil na splošno nižji ob upoštevanju trenutne cene električne energije in predpostavkah, da EV polnimo na domačem priključku.

Število polnilnic za EV

Ponekod že primanjkuje ustrezne polnilne infrastrukture za električna vozila, predvsem vzdolž cestnih omrežij, kar predstavlja omejitev v večini držav EU že danes. Po podatkih Evropskega združenja proizvajalcev avtomobilov (ACEA), 6 držav EU nima niti enega polnilnega mesta na 100 km ceste. 17 držav ima manj kot 5 polnilnih mest na 100 km ceste, le 5 pa jih ima več kot 10 polnilnic na vsakih 100 km cest (tabela 1). Prav tako je velika razlika med državami z največ polnilnicami na 100 km ceste in tistimi z najmanj.

Na Nizozemskem je na primer ena polnilnica na vsakih 1,5 km ceste, medtem ko ima Poljska, ki je osemkrat večja, samo eno polnilnico na vsakih 150 km. Slovenija ima 3,3 polnilnice na 100 km ceste.



Slika 3: Petrol Hitre polnilnice (DC 50 kW/AC 43 kW)

Vir: <https://www.petrol.si/znanje-in-podpora/2019/clanki/poslovni-najem-elektricnega-avtomobila-preprosto-in-brezktrbno.html>

Ločimo dve vrsti polnjenja.

Polnjenje z izmeničnim tokom (AC), pri katerem usmernik, ki je vgrajen v vozilu, pretvarja tok iz javnega omrežja z izmeničnim tokom v potrebni enosmerni tok.

Polnjenje z enosmernim tokom (DC), pri drugi vrsti polnjenja, polnjenju z enosmernim tokom, se izmenični tok pretvarja v enosmerni tok zunaj vozila – npr. v polnilni postaji. Prednost tega je, da je pri polnjenju npr. na avtocestah mogoča večja moč in postopek polnjenja se avtomatsko skrajša4.4..

Tabela 1: Države EU z največjim številom polnilnic za električna vozila na 100 km ceste EU.

Države z največ polnilnicami	Število el. polnilnic na 100 km cest	Države z največ polnilnicami	Število el. polnilnic na 100 km cest
Nizozemska	64,3	Litva	0,2
Luksemburg	57,9	Ciper	0,4
Nemčija	25,8	Grčija	0,4
Portugalska	24,9	Estonija	0,6
Švedska	12,2	Poljska	0,7
Slovenija		3,3	

Vir: <https://www.izvoznookno.si/aktualno/trg-elektricnih-vozil-v-eu/>

Preobrazba industrije proizvodnje avtomobilov

Prehod na električna vozila bo povzročil obsežno industrijsko preobrazbo, zlasti v srednji in vzhodni Evropi, ki je središče evropske proizvodnje avtomobilov. Med proizvajalci vozil v Evropi vlada tudi strah, da bodo proizvodnjo prevzela azijska podjetja, predvsem kitajska. V sklopu industrije na začetnem delu verige z več tisoč podjetij, ki proizvajajo na stotine komponent, potrebnih za motorje z notranjim zgorevanjem, bo manj naročil, saj električna vozila potrebujejo manj delov. Istočasno bodo prikrajšani proizvajalci industrije na končnem delu verige, ki so odvisni od avtomobilov z motorjem z notranjim zgorevanjem, ki zahtevajo več vzdrževanja.

Že sedaj pa smo lahko priča ogromnim naložbam za razširitev proizvodnje električnih vozil in električnih baterij. Med takšne naložbe sodita na primer zaveza južnokorejske družbe LG Chem (Koreja) na Poljskem. LG Chem, ki je za Samsungom vodilni svetovni dobavitelj litij-ionskih baterij, je zgradil tovarno pri poljskem Wroclavu. Letno bo lahko tovarna izdelala (sestavila) 100 tisoč baterij in naložba CEZ, energetskega podjetja v državni lasti na Češkem, proizvodnja baterij za električna vozila znamk Skupine Volkswagen, zasnovanih na platformi MEB, poteka na novi proizvodni liniji Škodinega osrednjega proizvodnega obrata Mladá Boleslav. V nove proizvodne kapacitete, namenjene izdelavi baterij, so, na novi proizvodni liniji sestavilo več kot 380.000 baterijskih paketov, namenjenih električnim modelom znamk Škoda, Volkswagen, Audi in Seat oziroma Cupra. Gigatovarna Tesla (ZDA) v Nemčiji in Northvolt na Švedskem, ostajata največja proizvajalca baterij.



Slika 4 : Tovarna baterij za električna vozila Shanghai (sodelovanje Tesla - Panasonic)

Vir: <https://electrek.co/2019/11/27/panasonic-partner-tesla-gigafactory-3-battery-production/>

Ali bo prehod na električna vozila povzročil neto izgubo ali ustvarjanje delovnih mest, bo odvisno od moči industrijskih naložbenih programov za prekvalificiranje delavcev in ohranitev čim večjega deleža dobavne verige proizvodnje električnih vozil v Evropi. Globalna konkurenca bo na trgu električnih vozil zelo močna. Več kot deset kitajskih avtomobilskih znamk je že objavilo načrte za izvoz električnih vozil v Evropo in verjetno se bodo uveljavile na evropskem trgu zaradi prednosti Kitajske pri proizvodnji in uvajanju električnih vozil.

5. ZAKLJUČEK

Iz navedenih podatkov lahko razberemo, da nas v prihodnosti čakajo na področju mobilnosti velike spremembe, ki so posledica sprejetja ukrepa prepovedi prodaje vozil na notranje zgorevanje. Verjetno nas čaka sprememba cen električne energije, ki bo posledica obdavčitve električne energije kot pogonskega energenta, na podoben način kot trenutne trošarine na pogonska goriva. Električno gnana vozila bodo v primeru napak zahtevala popravilo pri pooblaščenem serviserju, kar pomeni konec poceni servisiranja pri zasebnikih. V medijih se je razbrati, da je tehnologija baterij Li-ion neverjetno napredovala, vendar ni. Tehnologija je večinoma enaka in ima iste omejitve, njena cena pa se niža. Posledično se bodo baterije električnih vozil še vedno praznile na mestu (2–5 % na dan), starale (sploh v vročih poletjih) in kvarile. Trenutno je na baterijo zagotovljenih osem let garancije, ki pa potrošniku niso v pomoč, če baterija kmalu po tem zahteva zamenjavo. Poleg tega bodo potrebne velike količine kobalta in litija za izdelavo novih električnih vozil. Še vedno ostaja vprašanje kdo bo rudaril za enormne dodatne količine kobalta in litija, ki trenutno temelji na izkoriščanju poceni delovne sile in na račun slabe zaščite teh delavcev.

Ostaja tudi vprašanje dometa vozil, ki se v toplejših in hladnih dnevih močno zmanjša. Elektro stroka izpostavlja vprašanje pridobivanja tako velike količine električne energije in njeno distribucijo na polnilna mesta.

Pojavljajo se še dodatni pomisleki prehoda na električna vozila. Evropska unija (EU) z vidika pridobivanja električne energije prehaja na vire obnovljive energije, ki so pogosto manj zanesljivi in zmanjšajo energijsko neodvisnost. Prehod na električna vozila predstavlja ogromno število dodatnih porabnikov električne energije, ki jim je potrebno zadostiti za uspešen prehod. Kljub temu trenutno električno omrežje tega ne premore in se že sedaj sooča s pomanjkljivostmi, po uresničitvi uredbe pa bo teh še več. Pomembno vprašanje je, kako bomo v prihodnje reševali morebitne izpade električne energije. Ti bi lahko vodili v omejeno mobilnost prebivalcev in s tem prekinitev delovnih procesov. To občutno poslabšanje kakovosti našega življenja pa ne bo bistveno vplivalo na izboljšanje globalnih izpustov CO₂, dokler bomo poleg obnovljivih virov uporabljali tudi premog in dokler se bo v Indiji in Tajski vozila milijarda dvotaktnih avto rikš "tuktuk", v Afriki pa flote Peugeotov 504 iz let 1970 do 1980.

Evropa si zasluži pohvalo za svoje prizadevanje pri zmanjševanju izpustov in negativnega vpliva na okolje ter zagotavljanju boljše prihodnosti naslednjim generacijam. Kljub temu je treba opozoriti, da je ta ukrep lahko nekoliko nepremišljen in težje izvedljiv v manj razvitih državah, vključno s Slovenijo. Obstaja možnost, da bi postali država, ki se zanaša na rabljena vozila, saj preprosto ne bomo mogli zagotoviti ustrezne infrastrukture za električna vozila. Zato se tako Evropa kot Slovenija morata intenzivno prizadevati, da bi ta predlog postal izvedljiv in resnično prinesel vse prednosti, ki smo jih pričakovali. Le tako bomo lahko uresničili svoje okoljske cilje in hkrati ohranili gospodarsko ravnotežje ter mobilnost v manj razvitih državah.

20. 2035 BAN ON THE SALE OF INTERNAL COMBUSTION VEHICLES

SUMMARY

The European Council adopted a regulation from the package of measures "Prepared for 55", which, among other things, determines the reduction of CO₂ emissions in the automotive industry. The regulation envisages a 55% reduction in CO₂ emissions for new cars and 50% for new combination vehicles between 2030 and 2034 compared to 2021 levels. This brings many benefits in terms of reducing environmental pollution. However, this commitment presents the European Union with many challenges. Slovenia has a very low share of combined and electric vehicles in its vehicle fleet, so the transition will be challenging here as well. The most important costs will be related to the purchase of new electric vehicles and the renovation of the electrical infrastructure. The article presents the current numerical status of electric vehicles, the market and trends of electric vehicles. The problems that occur with the change of vehicle drive are highlighted. The issue of charging infrastructure, some advantages and disadvantages of electric vehicles. I mostly touch on electric vehicles, but there are other drive options that are not widely represented. The adopted regulation represents an opportunity for society, as it will contribute to the reduction of greenhouse gas emissions, but its realization will require many deliberate measures.

KEY WORDS: electric vehicles, electric infrastructure, hybrid vehicles, internal combustion vehicles

1. INTRODUCTION

In February 2023, the European Parliament approved a ban on the sale of cars and light commercial vehicles with petrol or diesel engines from 2035, clearing the last hurdle in the legislative process. The intermediate targets by 2030 are to reduce car emissions by 55 percent and light commercial vehicles by 50 percent. The long-term goal of the measures is climate neutrality by 2050. That is why it is taking measures to reduce car emissions, as road transport accounts for a fifth of all emissions of the greenhouse gas, carbon dioxide (CO₂), produced by the EU. We call the measure "Ready for 55". Slovenia, which only has a 5% share of electric car sales, and the percentage of fully electric passenger cars is about one percent. There are quite a few reasons for this, one of which is certainly the lack of more affordable (smaller) electric cars that could replace the third or second car in the family. On the other hand, many people are still uncertain about the range of electric vehicles, which, admittedly, rarely exceeds 300 kilometers on cold days, but this is still enough for a few days of daily errands, during which the average Slovenian travels about 50 kilometers. The definitively set date for the transition to zero emissions brings quite a few challenges that the European Union will have to overcome, as otherwise many countries will face mobility poverty or become waste for used petrol or diesel cars from more developed (richer) countries. In the article, I will touch on some of the facts that come with the use of electric vehicles and summarize various aspects of the adoption of the law banning the sale of internal combustion vehicles after 2035.

2. CURRENT STATUS

According to the data of the Statistical Office 2022, 1.2 million (74%) of registered road motor vehicles in Slovenia last year were passenger cars, which is two percent more than the year before. This means 572 registered passenger cars per 1,000 inhabitants. The rate of motorization also increased by eight passenger cars per 1,000 inhabitants, or by 1.5 percent. Among new passenger cars registered for the first time, a fifth were hybrids, and the average age of passenger cars was 10.9 years. The renewal rate of the fleet of passenger vehicles was the lowest ever.

Half of the registered passenger cars in 2022 ran on diesel, and 46% on gasoline. Their number increased by one percent compared to the previous year. The number of hybrid-powered cars increased by 54% to around 24,800, which represents two percent of all registered passenger cars. The number of electric passenger cars increased by 47% to around 8,000, which is a total of 0.7% of all registered passenger cars.

The ratios between new passenger cars registered for the first time, depending on the type of drive and fuel, differ from previously registered passenger cars. Among all new passenger cars registered for the first time last year, 20% were hybrids and 5% were electric. The number of hybrid-powered passenger cars increased by a tenth, and electric-powered cars by almost a third.

3. THE TRANSITION WILL BE EXPENSIVE IN ALL ASPECTS

The transformation of the country's vehicle fleet is associated with large costs, and it is estimated that 243 million euros of public funds will be needed to promote the number of

electric vehicles. In the last 12 years, we have spent 37.7 million euros on subsidies. Over the next 8 years, taxpayers will allocate 171 million euros for subsidies for the purchase of e-cars, or an average of 21.3 million euros per year, which means more than three times the sum per year than before. Part of the planned money will come from the state and municipal budgets, and part will obviously come from an increase in the tax for the use of vehicles in road traffic. It is not yet known what this increase will be, but it is planned for June next year. The main cost of the electrification of mobility and society in general will, of course, be the necessary renovation of energy distribution networks. Here, experts are talking about billions of euros.

3.1 Electric vehicle market in the EU in March 2023

In 2022, the number of new battery electric vehicle (BEV) registrations continued to increase, despite the overall decline in the EU car market. As a result, the market share of battery electric vehicles increased to 12.1%, an improvement of 3 percentage points compared to 2021. The year was also successful for hybrid cars, which achieved a 22.6% market share. As a result, petrol and diesel cars continue to lose market share. Nevertheless, in 2022, these together still accounted for more than half of car sales in the EU. Among the EU member states, only the Netherlands and Sweden are well on their way to achieving the set goals of switching to EVs.

According to calculations by The Economist Intelligence Unit (EIU), only these two countries within the EU have a sufficiently high rate of introduction of electric vehicles to be able to ban the sale of new petrol and diesel cars by 2035 in accordance with EU rules approved by the European Parliament on 25.3. .2023.

The draft law must be approved by the European Council and ratified by individual member states. However, given the current level of EV sales and registration in most Member States, this deadline will most likely be postponed.

4. ADVANTAGES AND DISADVANTAGES OF USING ELECTRIC VEHICLES

The price of electric vehicles

Currently, the average price of electric vehicles is higher than the price of the average car with an internal combustion engine, but in the medium term prices will fall significantly due to a large increase in sales. In addition, the total cost of ownership of electric vehicles is generally lower when taking into account the current price of electricity and the assumptions that we charge the EV at home.

Number of charging stations for EVs

In some places, there is already a lack of adequate charging infrastructure for electric vehicles, especially along road networks, which is already a limitation in most EU countries today. According to the European Automobile Manufacturers Association (ACEA), 6 EU countries do not have a single charging point per 100 km of road. 17 countries have less than 5 charging points per 100 km of road, and only 5 have more than 10 charging points per 100 km of road (Table 1). There is also a big difference between the countries with the

most charging stations per 100 km of road and those with the fewest. In the Netherlands, for example, there is one charging station for every 1.5 km of road, while Poland, which is eight times the size, has only one charging station for every 150 km. Slovenia has 3.3 charging stations per 100 km of road.

We distinguish two types of charging.

(AC) charging, where a rectifier installed in the vehicle converts current from the public AC network into the necessary direct current.



Picture 5: Petrol Fast chargers (DC 50 kW/AC 43 kW)

Source: <https://www.petrol.si/znanje-in-podpora/2019/clanki/poslovni-najem-elektricnega-avtomobila-preprosto-in-brezskrbno.html>

Direct current (DC) charging

Charging with direct current, the alternating current is converted into direct current outside the vehicle - e.g. in the charging station. The advantage of this is that when charging e.g. more power is possible on highways and the charging process is automatically shortened.

Table 1: EU countries with the largest number of charging stations for electric vehicles per 100 km of EU road.

Countries with the most charging stations	The number of electrical charging stations on 100 km of roads	Countries with the fewest charging stations	The number of electrical charging stations on 100 km of roads
Netherland	64,3	Lithuania	0,2
Luxembourg	57,9	Cyprus	0,4
Germany	25,8	Greece	0,4
Portugal	24,9	Estonia	0,6
Švedska	12,2	Poland	0,7
Slovenia		3,3	

Source: <https://www.izvoznookno.si/aktualno/trg-elektricnih-vozil-v-eu/>

The transformation of the car manufacturing industry

The transition to electric vehicles will cause a large-scale industrial transformation, especially in Central and Eastern Europe, which is the center of European car production. There is also a fear among vehicle manufacturers in Europe that Asian companies, especially Chinese ones, will take over production. Within the upstream industry, with thousands of companies producing the hundreds of components needed for internal combustion engines, there will be fewer orders as electric vehicles require fewer parts. At the same time, downstream manufacturers that depend on high-maintenance internal combustion engine cars will be disadvantaged.

We can already witness huge investments to expand the production of electric vehicles and electric batteries. Such investments include, for example, the commitment of the South Korean company LG Chem Korea) in Poland. LG Chem, the world's leading supplier of lithium-ion batteries after Samsung, has built a factory near Wroclaw, Poland.

Annually, the factory will be able to produce (assemble) 100 thousand batteries and the investment of CEZ, a state-owned energy company in the Czech Republic, the production of batteries for electric vehicles of Volkswagen Group brands, designed on the MEB platform, takes place on the new production line of Škoda's central production plant in Mladá Boleslav.

More than 380,000 battery packs for electric models of Škoda, Volkswagen, Audi and Seat and Cupra brands were assembled on the new production line in the new production capacities for the production of batteries. Gigatovarna Tesla (USA) in Germany and Northvolt in Sweden remain the largest battery manufacturer.



Picture 6 : Shanghai Electric Vehicle Battery Factory (Tesla Panasonic Cooperation)

Source: <https://electrek.co/2019/11/27/panasonic-partner-tesla-gigafactory-3-battery-production/>

Whether the transition to electric vehicles results in a net loss or job creation will depend on the strength of industry investment programs to reskill workers and maintain as much of the supply chain as possible for electric vehicle manufacturing in Europe. Global competition in

the electric vehicle market will be very strong. More than ten Chinese car brands have already announced plans to export electric vehicles to Europe and are likely to establish themselves in the European market due to China's advantage in the production and deployment of electric vehicles.

5. CONCLUSION

From the above data, we can see that in the future we are in for big changes in the field of mobility, which are the result of the adoption of a measure banning the sale of internal combustion vehicles. We are probably in for a change in electricity prices, which will be the result of the taxation of electricity as a driving energy source, in a similar way to the current excise duties on driving fuels. In case of faults, electrically driven vehicles will require repair at an authorized repairer, which means the end of cheap servicing by private individuals. The media makes it clear that Li-ion battery technology has advanced incredibly, but it hasn't. The technology is mostly the same and has the same limitations, but its price is coming down. As a result, EV batteries will continue to discharge in place (2-5% per day), age (especially in hot summers) and fail.

Currently, the battery is guaranteed for eight years, but this does not help the consumer if the battery needs to be replaced soon after. In addition, large quantities of cobalt and lithium will be needed to make new electric vehicles. The question still remains as to who will mine the enormous additional quantities of cobalt and lithium, currently based on the exploitation of cheap labor and at the expense of poor protection for these workers.

There is also the issue of vehicle range, which is greatly reduced on warmer and colder days. The electrical industry highlights the issue of obtaining such a large amount of electricity and its distribution to charging points.

There are additional concerns of the transition to electric vehicles. In terms of electricity generation, the European Union (EU) is switching to renewable energy sources, which are often less reliable and reduce energy independence. The transition to electric vehicles represents a huge number of additional consumers of electricity, which must be met for a successful transition. Nevertheless, the current electricity network is not capable of this and is already facing shortcomings, and there will be even more of them after the implementation of the regulation. An important question is how we will solve potential power outages in the future. These could lead to limited mobility of residents and thus interruption of work processes. This significant deterioration in the quality of our lives will not significantly affect the improvement of global CO₂ emissions as long as we use coal in addition to renewable sources and as long as there are a billion two-stroke auto rickshaws "tuk tuks" in India and Thailand, and in Africa fleets of Peugeot 504s from years 1970 to 1980.

Considering the many limitations of the transition to electric vehicles as foreseen by the regulation of the European Council, we can conclude that the set date may be unrealizable. The advantage of the measures is a greater investment in this area, which will enable the advancement of technology and knowledge.

Optimistically, this would mean that new knowledge will be able to overcome the current barriers of electric vehicles and enable the implementation of the proposed measures. Nevertheless, we have to be critical about it. Because of the many changes, it is likely that in the end the consequences will be felt most by individuals. Especially the less affluent,

who will not be able to afford or maintain the required cars, which will mean a limitation of their mobile freedom, as they will have to use public transport, which does not shine. Mobile freedom is generally very important in Slovenia for a quality life, and if the transition to electric vehicles significantly limits it, it will suffer a lot of resistance. Therefore, it is important that the EU and individual countries approach the implementation of measures in a very deliberate and long-term manner. We need to upgrade the generation of electricity in a renewable or clean way, modernize the electricity grid, add many electric charging stations and make many other changes. The adoption of a proposal to ban the sale of new vehicles with internal combustion engines in the European Union after 2035, included in Europe's "Ready for 55" climate package, which aims to achieve a 55% reduction in net greenhouse gas emissions by 2030, represents an important step in the right direction. Europe deserves praise for its efforts in reducing emissions and negative impact on the environment and ensuring a better future for future generations. Nevertheless, it should be noted that this measure can be somewhat imprudent and more difficult to implement in less developed countries, including Slovenia.

There is a possibility that we could become a country that relies on used vehicles, as we simply will not be able to provide adequate infrastructure for electric vehicles. Therefore, both Europe and Slovenia must make intensive efforts to make this proposal feasible and truly bring all the advantages we expected. Only in this way will we be able to achieve our environmental goals and at the same time maintain economic balance and mobility in less developed countries.



Škola za cestovni promet

ŠKOLA ZA CESTOVNI PROMET,
ZAGREB

Autori:

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izvršna savjetnica

Ivana Čorić, mag. psych., nastavnik mentor

21.KAKO POVEĆATI SIGURNOST MLADIH BIKIKLISTA U PROMETU?

Sažetak rada

Škola za cestovni promet u Zagrebu je kroz izbornu nastavu Prometne psihologije u školskoj godini 2022/2023 osmislila i provela istraživanje o sigurnosti biciklista u prometu. Istraživanje je provedeno na učenicima naše škole, a s ciljem utvrđivanja osobne percepcije sigurnosti biciklista u prometu.

Istraživanje je provedeno upotrebom upitnika o sigurnosti biciklista u prometu koji su osmislili sami učenici uz pomoć svojih nastavnika Prometne psihologije.

Nakon što je upitnik osmišljen, učenici izborne nastave su upitnikom ispitali druge učenike te tako prikupili podatke.

Navedeno su povezali i sa svojim iskustvom sa stručne prakse koju su proveli u Njemačkoj, Sloveniji i Portugalu kroz ERASMUS programe koje provodimo u našoj školi.

Kroz ovaj projekt željeli smo ostvariti nekoliko ciljeva:

1. Upoznati učenike s mogućnostima i vrstama istraživanja u području prometne psihologije
2. Upoznati učenike s mogućnostima koje nam pruža interdisciplinarnost područja
3. Djelovati društveno odgovorno - kao jedina škola u glavnom gradu Hrvatske u području cestovnog prometa, vjerujemo da naša uloga nije samo obrazovna i odgojna prema našim učenicima već i prema društvu u cjelini
4. Djelovati preventivno - kroz ovaj projekt pružaju nam se mogućnosti kreiranja preventivnih programa u području cestovne sigurnosti, a na temelju rezultata dobivenih primjenom ovog upitnika.

Ključne riječi: uočljivost biciklista, sigurnost biciklista, prometna psihologija, interdisciplinarnost

Uvod

Iako čine važne dionike prometa, biciklisti često ostaju na margini kako stručne i znanstvene literature tako i javnih rasprava koje nisu vezane uz, primjerice, lokalne ili državne izbore, odnosno politiku. Unatoč tome, Zakon o sigurnosti prometa na cestama ipak biciklistima daje važan prostor i regulira njihova prava i obveze.

O samom ponašanju u prometu, pravima, obvezama i samoj prometnoj kulturi, biciklisti uče daleko prije nego nauče voziti bicikl – u Republici Hrvatskoj u čitavoj obrazovnoj vertikali djeca i mladi imaju priliku učiti o ponašanju pješaka i biciklista u prometu kroz različite preventivne programe, kako u vrtiću i nižim razredima osnovne škole, tako i u višim razredima osnovne škole. Neke srednje škole su u posljednjih nekoliko godina uvele i program naziva „BUŠ“ (kolokvijalni izraz za „budem“), koji je ujedno i akronim za „Biciklom u školu“ čime se učenike želi potaknuti na češće korištenje bicikla kao prijevoznog sredstva do škole.

U Hrvatskoj postoji nekoliko prometnih škola (u Osijeku, Rijeci, Šibeniku, Splitu, Varaždinu, Zagrebu) te nekoliko škola koje nisu usko specijalizirane za promet no imaju neki od prometnih smjerova (npr. Srednja škola Čazma).

Iako prometne, u svim školama se nastava izvodi prema kurikulumu objavljenom u Narodnim novinama, u kojem je vidljivo kako ne postoji predmet koji bi se isključivo bavio biciklizmom i biciklistima, već se navedena tematika provlači kroz različite strukovne predmete, iako i dalje u značajno manjoj količini od one koju autorice ovog rada smatraju adekvatnom. Stoga smo u školskoj godini 2022/2023 u sklopu fakultativne nastave iz Prometne psihologije zajedno s učenicima koji su pohađali navedeno provele projekt koji je uključivao istraživanje kojim smo željeli dobiti određene informacije o navikama mladih biciklista koje mogu utjecati na njihovu sigurnost u prometu.

Ciljevi istraživanja

Osim što smo željeli izraditi upitnik kojim ćemo doznati kako mladi vode brigu o sigurnosti u prometu prilikom vožnje biciklom, kroz sam proces izrade upitnika željeli smo ostvariti nekoliko ciljeva:

1. Upoznati učenike s mogućnostima i vrstama istraživanja u području prometne psihologije
2. Upoznati učenike s mogućnostima koje nam pruža interdisciplinarnost područja
3. Djelovati društveno odgovorno - kao jedina škola u glavnom gradu Hrvatske u području cestovnog prometa, vjerujemo da naša uloga nije samo obrazovna i odgojna prema našim učenicima već i prema društvu u cjelini
4. Djelovati preventivno - kroz ovaj projekt pružaju nam se mogućnosti kreiranja preventivnih programa u području cestovne sigurnosti, a na temelju rezultata dobivenih primjenom ovog upitnika.

Prvi cilj smo ostvarili kroz samu fakultativnu nastavu upoznavajući učenike s različitim vrstama istraživanja u prometnoj psihologiji i društvenim znanostima općenito, kao i različitim načinima prikupljanja podataka. U svrhu provedbe ovog projekta i istraživanja,

odlučili smo se za anketu koju su učenici radili uz mentorstvo svojih nastavnica, a koju su potom proveli online među učenicima naše škole.

Kroz sam proces izrade ankete učenici su se susreli s informacijama iz područja psihologije, prometa, informatike, statistike i sl. Kroz dobivene rezultate pružila nam se mogućnost donošenja određenih zaključaka koji kao implikaciju mogu imati izradu određenih preventivnih programa u području cestovne sigurnosti. U tom svjetlu, možemo smatrati kako ovaj projekt predstavlja određenu analizu potreba kada je u pitanju sigurnost učenika naše škole u cestovnom prometu u svojstvu biciklista, a vjerujemo da zbog veličine broja ispitanika može izvršiti i određenu generalizaciju i na ostale skupine učenika srednjih škola u Republici Hrvatskoj (ili makar samo u Zagrebu).

Anketa se može naći na slijedećem linku: [ANKETA - BIKIKLISTI](#)

Metodologija

Kako je ranije spomenuto, u svrhu istraživanja učenici su kreirali anketu putem Google obrasca. Sama anketa ima 28 dijelova koji sadrže sociodemografska pitanja poput dobi i spola, mjesta boravišta i radnog statusa (učenici su zamislili da se ova anketa može koristiti na cjelokupnoj populaciji, a ne samo na populaciji učenika). Zatim slijede pitanja vezana uz poznavanje upravljanja biciklom te učestalost upravljanja istim, kao i osnovne informacije o biciklu kojim ispitanici upravljaju, a potom slijede pitanja vezana uz određene navike biciklista prilikom upravljanja biciklom, koje su učenici procijenili na temelju opće kulture, poznavanja cestovnih propisa kao i samog Zakona o sigurnosti prometa kao one koje ugrožavaju sigurnost prometa na cestama ili pak doprinose sigurnosti u cestovnom prometu.

Anketa je sastavljena od pitanja različitog tipa: da/ne pitanja; skale likertovog tipa, pitanja višestrukog izbora.

Nakon što su učenici kompletirali pitanja za anketu te ih složili redoslijedom koji su smatrali logičnim, njome su ispitali 284 ispitanika. Ispitanice su činile četvrtinu ispitanih, dok su ispitanici činili tri četvrtine ispitanih, što ne čudi budući da je ovaj upitnik primijenjen na učenicima Škole za cestovni promet u Zagrebu, koju većim dijelom pohađaju osobe muškog spola.

Nakon prikupljanja podataka, pristupili smo deskriptivnoj statistici, dok druge razine statistike poput određenih statističkih analiza tipa t-testa ili ANOVE ostavljamo za neka daljnja i složenija istraživanja.

Rezultati

Rezultati deskriptivne statistike ove ankete koje ćemo ovdje izdvojiti su sljedeći:

- 97.2% ispitanika čine učenici Škole za cestovni promet u Zagrebu do 19. godina.
- Ispitanici najvećim dijelom dolaze iz područja Grada Zagreba i Zagrebačke županije iako ih ima iz čitave Hrvatske (budući da je riječ o učenicima koji su u tom slučaju smješteni u obližnjem učeničkom domu, pa imamo ispitanike i iz Splita ili pak Podravine)
- 98.6% ispitanika zna upravljati biciklom. Zanimljivo je kako 1.4% ispitanika (4 učenika) ne znaju upravljati biciklom iako pohađaju Školu za cestovni promet.
- 85.9% ispitanika smatra kako su upoznati s osnovnim pravilima za bicikliste

- Iako 88.7% ispitanika koristi sigurnosnu opremu za vrijeme upravljanja biciklom, zabrinjava podatak da njih 11.3% istu opremu ne koristi. Pretvoreno u brojke, riječ je o 32 ispitanika, odnosno gotovo jednom cijelom razredu.
- Od opreme ispitanici najviše koriste uređaje za osvjetljavanje i zvono na biciklu. Samo 9.9% učenika koristi kacigu. Tek 9.5% ispitanika koristi reflektirajuću odjeću prilikom upravljanja biciklom.
- Učenici prilikom vožnje bicikla najviše koriste tenisice i čizme. No, njih 10.6% koristi papuče, a njih 8.8% japanke.
- 50% učenika prilikom vožnje bicikla koristi uređaje poput mobitela ili slušalica.
- 52.5% učenika nikad ili rijetko pregledava bicikl prije vožnje.
- Unatoč navedenim podacima iz kojih je vidljivo kako se ispitanici ne pridržavaju propisa namijenjenih vozačima bicikla, njih 77.8% smatra kako se biciklisti trebaju pridržavati istih pravila kao i vozači automobila.

Drugi dio ankete pokazuje stavove koje ispitanici imaju prema određenim oblicima ponašanja u prometu koja doprinose sigurnosti prometa:

- Najveći broj ispitanika smatra kako je korištenje reflektirajućih materijala na odjeći važno za sigurnu vožnju biciklom
- Najveći broj ispitanika smatra kako je potrebno imati upaljeno svjetlo na biciklu tijekom noćne vožnje ili u uvjetima smanjene vidljivosti
- Ispitanici pokazuju osviještenost o važnosti rane edukacije sigurnog upravljanja biciklom u cestovnom prometu

Kako možemo vidjeti iz navedenih rezultata, postoji velika diskrepancija između stvarnog ponašanja ispitanika prilikom upravljanja biciklom u cestovnom prometu i njihovih stavova/uvjerenja o istome, što svakako upućuje na potrebu za konkretnim potezima koji će ići u smjeru smanjenja spomenute diskrepancije.

Implikacije

Rezultati ove ankete možda nisu iznenađujući, budući da već i samim promatranjem ponašanja biciklista u svakodnevnom cestovnom prometu uočavamo rizične oblike ponašanja koji su navedeni i u ovoj anketi, a koji značajno ugrožavaju sigurnost cestovnog prometa i svakako odudaraju od prometnih propisa predviđenih Zakonom o sigurnosti prometa na cestama. (posebno članak 112., 113. i 114.)

Kako nam rezultati ove ankete pokazuju, postoji diskrepanca između stvarnog ponašanja mladih biciklista u prometu i njihovih stavova o sigurnosnim ponašajnim obrascima biciklista koja su poželjna i koja bi trebalo slijediti. S obzirom na to, jedna od implikacija svakako bi trebala uključivati preventivne programe kojima bi se u budućnosti navedena diskrepanca smanjila u smjeru povećanja sigurnosnih ponašanja biciklista. Kako smo naveli na početku ovog rada, u obrazovnoj vertikali u Republici Hrvatskoj pridaje se veliki značaj edukaciji djece o sigurnoj vožnji, no čini se kako se ta edukacija smanjuje na višim obrazovnim razinama te vertikale, pa bi bilo potrebno razmotriti daljnje edukativne programe/radionice i na tim razinama (srednje škole).

Ovdje upravo škole iz prometnog sektora vidimo kao ključne karike, budući da u srednjoškolskoj dobi na adolescente veliki utjecaj imaju upravo drugi adolescenti, pa bi bilo zanimljivo razmisliti o vršnjačkoj edukaciji na ovu temu.

Također, smatramo kako bi škole, a posebno škole iz prometnog sektora, trebale iskoristiti mogućnost (ukoliko navedena postoji u obrazovnom sustavu neke od država

sudionica ovog simpozija) organiziranja aktivnosti za učenike u kojima bi se promoviralo sigurnosno ponašanje biciklista u prometu (kroz izvannastavne aktivnosti, fakultativnu ili izbornu nastavu i sl.).

Zaključak

U ovom radu prikazali smo rezultate istraživanja koji su nastali u sklopu fakultativne nastave iz Prometne psihologije u Cestovnoj školi u Zagrebu. Osim što smo učenike upoznali s različitim mogućnostima primjene psihologije u prometu, podučili smo ih izradi ankete i primijeni iste na ispitanicima. Rezultati su nam pokazali kako postoji značajna diskrepanca između ponašanja biciklista u prometu koja smanjuju sigurnost cestovnog prometa i njihovih stavova i uvjerenja o tome kako bi se biciklisti doista trebali ponašati u prometu.

Iz navedenog proizlazi kako je potrebno pokušati utjecati na smanjenje navedene diskrepance, a autorice ovog rada za to predlažu nekoliko mogućih načina: vršnjačku edukaciju, osmišljavanje i provedbu preventivnih programa u svrhu povećanja sigurnosti biciklista u prometu te osmišljavanje i provedbu školskih aktivnosti s istom svrhom, i to kroz aktivnosti poput izborne ili fakultativne nastave ili pak izvannastavnih aktivnosti.



Škola za cestovni promet

ŠKOLA ZA CESTOVNI PROMET, ZAGREB

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21. HOW TO INCREASE THE SAFETY OF YOUNG CYCLISTS IN TRAFFIC?

ABSTRACT

Škola za cestovni promet (High Road School) in Zagreb designed and conducted research on the safety of cyclists in traffic through the optional Traffic Psychology course in the 2022/2023 school year. The research was conducted on the students of our school, with the aim of determining the personal perception of the safety of cyclists in traffic.

The research was conducted using a questionnaire about the safety of cyclists in traffic, which was designed by the students themselves with the help of their course teachers.

After the questionnaire was designed, the students of the optional class used the questionnaire to examine other students and thus collected data.

They connected the above with their experience from professional practice that they spent in Germany, Slovenia and Portugal through the ERASMUS programs that we implement in our school.

Through this project, we wanted to achieve several goals:

1. To acquaint students with the possibilities and types of research in the field of traffic psychology
2. To acquaint students with the possibilities offered by the interdisciplinary nature of the field
3. To act socially responsible - as the only school in the capital of Croatia in the field of road traffic, we believe that our role is not only educational towards our students but also towards society as a whole
4. Act preventively - through this project, we are given the opportunity to create preventive programs in the field of road safety, based on the results obtained from the application of this questionnaire.

Key words: visibility of cyclists, safety of cyclists, traffic psychology, interdisciplinarity

Introduction

Although they are important traffic stakeholders, cyclists often remain on the margins of professional and scientific literature as well as public debates that are not related to, for example, local or state elections, or politics in general. Despite this, the Road Traffic Safety Act still gives cyclists an important space and regulates their rights and obligations.

Cyclists learn about behavior in traffic, rights, obligations and traffic culture itself long before they learn to ride a bicycle - in the Republic of Croatia, in the entire educational vertical, children and young people have the opportunity to learn about the behavior of pedestrians and cyclists in traffic through various preventive programs, as in kindergarten and lower grades of primary school, as well as in higher grades of primary school. In the last few years, some high schools have also introduced a program called "BUŠ" (colloquial expression for the verb „to be“ in one of the future tenses), which is also a croatian acronym for "with a bicycle to school", which aims to encourage students to use bicycles more often as a means of transport to school.

In Croatia, there are several high road schools (in Osijek, Rijeka, Šibenik, Split, Varaždin, Zagreb) and several schools that are not narrowly specialized in traffic, but have traffic courses (e.g. High School in Čazma).

Although all of these schools are in the traffic field, in all of them classes are conducted according to the curriculum published in the Narodne novine (Official Gazette), in which it is evident that there is no subject that exclusively deals with cycling and cyclists, but that the mentioned topic is woven through various vocational subjects, although still in a significantly smaller amount than the one that the authors of this paper consider adequate. Therefore, in the 2022/2023 school year, as part of an optional class in Traffic Psychology, together with the students who attended the course, we conducted a project that included research, with which we wanted to obtain certain information about the habits of young cyclists that can affect their safety in traffic.

Research objectives

In addition to the fact that we wanted to create a questionnaire to find out how young people take care of traffic safety when riding a bicycle, we wanted to achieve several goals through the process of creating the questionnaire itself:

1. To acquaint students with the possibilities and types of research in the field of Traffic psychology
2. To acquaint students with the possibilities offered by the interdisciplinary nature of the field
3. To act socially responsible - as the only school in the capital of Croatia in the field of road traffic, we believe that our role is not only educational towards our students but also towards society as a whole

4. Act preventively - through this project, we are given the opportunity to create preventive programs in the field of road safety, based on the results obtained from the application of this questionnaire.

We achieved the first goal through the optional teaching itself, introducing students to different types of research in traffic psychology and social sciences in general, as well as different methods of data collection. In order to implement this project and research, we decided on a survey that the students did with the mentorship of their teachers, and which they then conducted online among the students of our school.

Through the process of creating the survey, the students encountered information from the fields of psychology, traffic, informatics, statistics, etc. Through the obtained results, we were given the opportunity to draw certain conclusions, which as an implication may have the creation of certain preventive programs in the field of road safety. In this light, we can consider that this project represents a certain needs analysis when it comes to the safety of the students of our school in road traffic as cyclists, and we believe that due to the size of the number of respondents, it can also make a certain generalization to other groups of high school students in the Republic of Croatia (or at least in Zagreb).

The survey can be found at the following link: [SURVEY - CYCLISTS](#)

Methodology

As mentioned earlier, for the purpose of research, the students created a survey using a Google form. The survey itself has 28 parts that contain sociodemographic questions such as age and gender, place of residence and work status (the students imagined that this survey could be used on the entire population, not just on the student population). This is followed by questions related to knowledge of how to operate a bicycle and how often it is operated, as well as basic information about the bicycle that the respondents are operating, followed by questions related to certain habits of cyclists when operating a bicycle, which the students assessed based on general culture, knowledge of road regulations as well as of the Traffic Safety Act itself. The informations collected with questionnaire were marked as those that threaten road traffic safety or contribute to road traffic safety.

The survey is composed of questions of different types: yes/no questions; likert-type scales, multiple-choice questions.

After the students completed the questions for the survey and arranged them in the order they considered logical, they examined 284 respondents. Female respondents made up a quarter of the respondents, while male respondents made up three quarters of the respondents, which is not surprising since this questionnaire was applied to students of the Škola za cestovni promet (High Road School) in Zagreb, which is mostly attended by male students.

After collecting the data, we approached descriptive statistics, while we leave other levels of statistics such as certain statistical analyzes of the t-test type or ANOVA for some further and more complex research.

The results

The results of the descriptive statistics of this survey, which we will highlight here, are as follows:

- 97.2% of respondents are students of the Škola za cestovni promet (High Road School) in Zagreb up to the age of 19.
- Most of the respondents come from the area of the City of Zagreb and Zagreb County, although there are some from all over Croatia (since in this case we are talking about students who are housed in a nearby student dormitory, so we also have respondents from Split or Podravina)
- 98.6% of respondents know how to drive a bicycle. It is interesting that 1.4% of respondents (4 students) do not know how to operate a bicycle, even though they attend the High Road School.
- 85.9% of respondents think that they are familiar with the basic rules for cyclists
- Although 88.7% of respondents use safety equipment while driving a bicycle, the fact that 11.3% of them do not use the same equipment is worrying. Converted into numbers, we are talking about 32 respondents, that is, almost one whole class.
- Of the equipment, the respondents mostly use devices for lighting and the bell on the bicycle. Only 9.9% of students use a helmet and only 9.5% of respondents use reflective clothing when driving a bicycle.
- Students mostly use tennis shoes and boots when riding a bicycle. However, 10.6% of them use slippers, and 8.8% of them use flip-flops.
- 50% of students use devices such as mobile phones or headphones while riding a bicycle.
- 52.5% of students never or rarely inspect the bicycle before riding.
- Despite the mentioned data, which shows that the respondents do not comply with the regulations intended for bicycle drivers, 77.8% of them believe that cyclists should comply with the same rules as car drivers.

The second part of the survey shows the attitudes that respondents have towards certain forms of traffic behavior that contribute to traffic safety:

- The majority of respondents believe that the use of reflective materials on clothing is important for safe cycling
- The majority of respondents believe that it is necessary to have a light on the bicycle during night riding or in conditions of reduced visibility
- Respondents show awareness of the importance of early education in safe bicycle handling in road traffic

As we can see from the above results, there is a large discrepancy between the actual behavior of the respondents when driving a bicycle in road traffic and their attitudes/beliefs about the same, which certainly points to the need for concrete moves that will go in the direction of reducing the mentioned discrepancy.

Implications

The results of this survey are perhaps not surprising, since even by observing the behavior of cyclists in everyday road traffic, we notice risky forms of behavior that are also listed in this survey, which significantly endanger road traffic safety and certainly deviate from the traffic regulations provided for in the Law on Road Traffic Safety (especially articles 112, 113 and 114).

As the results of this survey show us, there is a discrepancy between the actual behavior of young cyclists in traffic and their attitudes about the safety behavior patterns of cyclists that are desirable and should be followed. In view of this, one of the implications should definitely include preventive programs that would reduce the mentioned discrepancy in the future in the direction of increasing the safety behavior of cyclists. As we stated at the beginning of this paper, in the educational vertical in the Republic of Croatia great importance is attached to the education of children about safe traffic behaviour, but it seems that this education is decreasing at the higher educational levels of that vertical, so it would be necessary to consider further educational programs/workshops at those levels (secondary schools).

Here, we see schools from the transport sector as key links, since in high school age adolescents are greatly influenced by other adolescents, so it would be interesting to think about peer education on this topic.

We also believe that schools, and especially schools from the transport sector, should take advantage of the possibility (if it exists in the educational system of some of the countries participating in this symposium) of organizing activities for students in which the safety behavior of cyclists in traffic would be promoted (through extracurricular activities, optional or elective classes, etc.).

Conclusion

In this paper, we have presented the results of the research that were created as part of the optional Traffic psychology course at the Škola za cestovni promet (High Road School) in Zagreb. In addition to introducing the students to the different possibilities of applying psychology in traffic, we taught them how to create a survey and apply it to the respondents. The results showed us that there is a significant discrepancy between the behavior of cyclists in traffic, which reduce road safety, and their attitudes and beliefs about how cyclists should really behave in traffic.

It follows from the above that it is necessary to try to influence the reduction of the mentioned discrepancy, and the authors of this paper propose several possible ways for this: peer education, designing and implementing preventive programs for the purpose of increasing the safety of cyclists in traffic, and designing and implementing school activities with the same purpose, and through activities such as optional or elective classes or extracurricular activities.



ŠOLSKI
CENTER
CELJE

Srednja šola za
storitvene dejavnosti in logistiko

SREDNJA ŠOLA ZA
STORITVENE DEJAVNOSTI IN
LOGISTIKO

Avtor:

Matic Turnšek, univ. dipl. inž.

22. LASTNOSTI PNEVMATIKE V ODVISNOSTI OD TLAKA

POVZETEK

Na Srednji šoli za storitvene dejavnosti in logistiko v Celju, smo v okviru raziskovalnega dela, izvedli raziskovalno nalogo, v kateri smo spremljali spreminjanje lastnosti pnevmatike glede na različen tlak v pnevmatikah. Izvedli smo eksperimentalni del v kontroliranem okolju v šolskih delavnicah, anketo v kateri smo preverili navade ljudi pri spremljanju lastnosti pnevmatik ter ovrednotili dobljene rezultate.

1. UVOD

Tlak v pnevmatikah osebnega vozila igra izjemno ključno vlogo med vožnjo. Pnevmatika je namreč edini del vozila, ki se neposredno dotika cestišča, zato je ključno, da ustreza predpisom in je pravilno napolnjena. Pravilna napolnjenost pnevmatike omogoča optimalen oprijem pri manevriranju in zaviranju, kar je ključnega pomena za varno potovanje potnikov.

Zagotavljanje pravilnega tlaka v pnevmatikah ima neposreden vpliv na varnost in zanesljivost. Preizkusi so jasno pokazali, da pnevmatike z nepravilnim tlakom ne zagotavljajo potrebnega oprijema in s tem zmanjšujejo varnost med vožnjo. Medtem ko tlak ni edini dejavnik, ki vpliva na zmogljivost pnevmatik, pa ima nedvomno pomembno vlogo.

Naša raziskava se bo osredotočila na različne tlake v pnevmatikah in njihov vpliv na fizikalne lastnosti pnevmatike. S tem bomo dobili boljšo predstavbo o tem, kako natančno tlak vpliva na zmogljivost pnevmatike in njeno življenjsko dobo.

2. EKSPERIMENTALNI DEL

Naš cilj je bil izvedeti, kako idealen, nizek in visok tlak ter nov in obrabljen profil pnevmatik vplivajo na temperaturo, glasnost in porabo goriva. Meritve smo izvedli v delavnici. Testno vozilo je bilo Renault Megane, letnik 2014, z 1.5 dci motorjem. Nameščene pnevmatike so bile velikosti 205/55 premera 16 col. Vsaka meritev je trajala 5 minut pri konstantni hitrosti 20 km/h. Začetna temperatura pnevmatik pri vsaki meritvi je bila 18 °C. Meritve smo morali časovno omejiti na 5 min. Maksimalna možna hitrost vrtenja valjev je bila 20 km/h.

Uporabljeni pripomočki:

- infrardeči brezstični termometer TEPCEL 515,
- decibel meter Vernier LabQuest2 z merilnim senzorjem Vernier SLM-BTA,
- potovalni računalnik v vozilu za spremljanje porabe goriva,
- računalniška oprema Vernier,
- manometer.



Slika 7: Infrardeči brezstični termometer

Vir: Osebni arhiv



Slika 8: Vernier decibel meter

Vir: Osebni arhiv



Slika 9: Računalniška oprema Vernier

Vir: Osebni arhiv

3. REZULTATI EKSPERIMENTALNEGA DELA

Izvedli smo 6 meritev od tega 3 z novim profilom pnevmatike in 3 z obrabljenim profilom pnevmatike. Pri obeh pnevmatikah (z novim in z obrabljenim profilom) smo meritev izvedli 3x. Enkrat je bila pnevmatika napolnjena z optimalnim predpisanim tlakom, enkrat s prevelikim tlakom in enkrat s prenizkim tlakom.

Rezultati so bili sledeči:

- Meritev 1: Nov profil, optimalen tlak (2,3bar)

Povprečna glasnost pnevmatike: 88dB

Temperatura pnevmatike: 29°C

Povprečna poraba goriva: 4,7 l/100km

- Meritev 2: Nov profil, nizek tlak (1,8bar)

Povprečna glasnost pnevmatike: 90dB

Temperatura pnevmatike: 28,5°C

Povprečna poraba goriva: 4,6 l/100km

- Meritev 3: Nov profil, visok tlak (2,8bar)

Povprečna glasnost pnevmatike: 88dB

Temperatura pnevmatike: 29°C

Povprečna poraba goriva: 4,7 l/100km

- Meritev 4: Obrabljen profil, optimalen tlak (2,3bar)

Povprečna glasnost pnevmatike: 90dB

Temperatura pnevmatike: 29,5°C

Povprečna poraba goriva: 4,5 l/100km

- Meritev 5: Obrabljen profil, nizek tlak (1,8bar)

Povprečna glasnost pnevmatike: 89dB

Temperatura pnevmatike: 31°C

Povprečna poraba goriva: 4,5 l/100km

- Meritev 6: Obrabljen profil, visok tlak (2,8bar)

Povprečna glasnost pnevmatike: 90dB

Temperatura pnevmatike: 32°C

Povprečna poraba goriva: 4,1 l/100km

4. REZULTATI ANKETE

Anketo, ki je bila anonimna, smo izvedli preko spleta. Ustvarili smo jo s pomočjo spletnih orodij za anketiranje. Anketirali smo ljudi, ki že imajo vozniško dovoljenje. Skupaj je anketo začelo reševati 847 ljudi, celotno anketo pa sta rešila le 402 človeka, kar predstavlja dober reprezentativni vzorec.

Anketa je bila sestavljena iz sedmih vprašanj in pri vsakem izmed njih je bilo možnih več odgovorov. Zaradi tega je možno, da so nekateri izbrali več odgovorov hkrati za določeno vprašanje. Predstavljeni rezultati prikazujejo, kolikšen del anketirancev se je odločilo za določen odgovor. Pri vrednotenju rezultatov je bilo vseh odgovorov več kot 402, kar pomeni, da je več anketirancev hkrati izbralo več odgovorov na eno vprašanje. Prikazano razmerje pa prikazuje seštevek vseh odgovorov v deležu od vseh 402 anketirancev.



Grafikon 1: Tlak v pnevmatiki spremljam.



Grafikon 2: Globino profila pnevmatike spremljam:



Grafikon 3: Ko preverjam tlak v pnevmatikah, jih napolnim:



Grafikon 4: Zimske pnevmatike menjujem za letne in obratno:



Grafikon 5: Pnevmatike menjujem z novimi:



Grafikon 6: Na katere faktorje po vašem mnenju vpliva tlak v pnevmatikah?



Grafikon 7: Na katere faktorje po vašem mnenju vpliva globina profila pnevmatik?

5. RAZPRAVA

Pri preučevanju optimalnega tlaka in obrabljenega profila pnevmatik na osebnem vozilu smo ugotovili, da se pri obrabljenem profilu zvočna jakost med vrtenjem koles poveča na 88 dB, medtem ko pri optimalnem tlaku znaša 90 dB. Rezultati meritev nedvoumno kažejo na povečanje hrupa ob obrabi pnevmatik. Temperatura pnevmatik z novim profilom in pravilnim tlakom se po končanem vrtenju ustavi pri 29 °C, medtem ko se pri obrabljenem profilu dvigne še za pol stopinje. Jasno je opaziti, da se pnevmatike med obrabo tudi bolj segrevajo, kar ima neposreden vpliv na njihovo trajnost in oprijem. Vzdrževanje pravilnega termičnega cikla pnevmatik je prav tako ključno, saj pogostejše segrevanje in ohlajanje vodi do hitrejše obrabe.

Po meritvah se je poraba goriva pri optimalnem tlaku in novem profilu pnevmatik gibala pri 4,7 litra na 100 km, medtem ko je pri obrabljenem profilu znašala 4,5 litra na 100 km. Zmanjšanje porabe goriva pri obrabljenem profilu je verjetno posledica starosti pnevmatik, saj starejše gume postanejo bolj trde, manj se deformirajo med vožnjo in imajo posledično manjši kotalni upor.

Iz rezultatov ankete je razvidno, da vozniki prepoznavajo pomen globine profila pnevmatik. Pri zmanjšanju tlaka v pnevmatikah se zvočna jakost izmeri pri 89 dB, ne glede na globino profila. V primerjavi s pravilnim tlakom se pri novem profilu poveča za en decibel, pri obrabljenem profilu pa se zmanjša za en decibel. Zmanjšan tlak pnevmatik zmanjša stično površino z voziščem, kar vpliva na hrup, vendar globina profila očitno nima bistvenega vpliva na to.

Spremljanje temperature pnevmatik pri zmanjšanem tlaku pokaže, da se temperatura poveča ne glede na globino profila. Ne glede na to ali je pnevmatika nova ali obrabljena, se temperatura po vrtenju dvigne za 1,5 °C v primerjavi s pnevmatikami, napolnjenimi s pravilnim tlakom. To je posledica večjega gubanja pnevmatike med vožnjo, kjer večja deformacija vodi do večjega segrevanja.

Z večjim tlakom se poraba goriva poveča. Pri novem profilu pnevmatike se pri višjem tlaku poraba poveča na 4,6 litra na 100 km, medtem ko se pri obrabljenem profilu pri istem tlaku poraba ohrani na ravni 4,1 litra na 100 km. Ta učinek je pričakovan, saj večji tlak zmanjšuje deformacijo pnevmatik med vožnjo, kar posledično vodi do manjšega kotalnega upora in manjše porabe goriva.

Pri previsokem tlaku (nad optimalno vrednostjo) opazimo, da se zvočna jakost med vrtenjem pnevmatik pri obeh globinah profila ohrani na 90 dB. Temperatura se pri novem profilu pnevmatike ustavi pri 28,5 °C, medtem ko se pri obrabljenem profilu pri višjem tlaku dvigne na 32 °C. Pri povečanem tlaku pričakujemo nižjo temperaturo, saj se pnevmatika manj deformira med vožnjo. To velja za nove pnevmatike, medtem ko se temperatura obrabljenih pnevmatik ob povečanem tlaku dodatno poveča.

Poudariti je treba, da večji tlak zmanjša stično površino pnevmatik s cestiščem, kar vpliva na obrabo in oprijem. Celoten preučevani spekter tlakov pa jasno kaže na kompleksen odnos med tlakom, obrabo, hrupom in porabo goriva pri pnevmatikah.

6. ZAKLJUČEK

V današnjem času je pravilna skrb za tlak v pnevmatikah avtomobila postala izjemno pomembna, saj njegov vpliv sega precej globoko v različne vidike vožnje. Neposreden odnos med tlakom in kakovostjo vožnje nam narekuje, da se temu področju vse bolj posvečamo. Ob zagotavljanju optimalnega tlaka v pnevmatikah namreč omogočamo ne le najboljši možen oprijem med gumo in cestiščem, kar posledično izboljšuje stabilnost in vodljivost vozila, temveč imamo tudi pozitiven vpliv na porabo goriva.

S stalnim spremljanjem in vzdrževanjem ustrezne ravni tlaka lahko dosežemo bolj učinkovito izkoriščanje goriva med vožnjo, saj zmanjšujemo odpor med pnevmatiko in cestiščem ter s tem pripomoremo k ekonomičnejši porabi. Hkrati pa je pomembno poudariti tudi dolgoročne koristi rednega nadzora tlaka, saj se s tem zmanjšuje obraba pnevmatik. Neenakomerna obraba lahko povzroči hitrejše staranje pnevmatik, kar ima za posledico zmanjšano življenjsko dobo in manjšo učinkovitost.

Zato je skrbno spremljanje in vzdrževanje tlaka v avtomobilskih pnevmatikah več kot le dobra navada – postalo je ključno dejanje, ki vpliva na varnost, udobje, ekonomičnost ter trajnost vašega vozila.



Srednja šola za
storitvene dejavnosti in logistiko

SCHOOL CENTER CELJE
HIGH SCHOOL FOR SERVICE
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22. TIRE PROPERTIES DEPENDING ON PRESSURE

ABSTRACT

At the Secondary School for Service Activities and Logistics in Celje, as part of the research work, we carried out a research task in which we monitored the changing of tire properties according to different tire pressures. We carried out an experimental part in a controlled environment in school workshops, a survey in which we checked people's habits in monitoring tire properties and evaluated the results obtained.

1. INTRODUCTION

The pressure in the tires of a passenger car plays an extremely important role while driving. The tire is the only part of the vehicle that directly touches the road, so it is crucial that it meets the regulations and is properly inflated. Proper tire inflation enables optimal grip during maneuvering and braking, which is crucial for the safe travel of passengers.

Ensuring proper tire pressure has a direct impact on safety and reliability. Tests have clearly shown that tires with incorrect pressure do not provide the necessary grip and thus reduce driving safety. While pressure is not the only factor that affects tire performance, it undoubtedly plays an important role.

Our research will focus on different tire pressures and their effect on the physical properties of the tyre. This will give us a better idea of how exactly the pressure affects the performance of the tire and its life.

2. EXPERIMENTAL PART

Our aim was to find out how ideal, low and high pressure and new and worn tire profile affect temperature, volume and fuel consumption. The measurements were carried out in the workshop. The test vehicle was a Renault Megane, year 2014, with a 1.5 dci engine. The tires fitted were size 205/55 with a diameter of 16 inches. Each measurement lasted 5 minutes at a constant speed of 20 km/h. The starting temperature of the tires in each measurement was 18 °C. We had to limit the measurements to 5 minutes. The maximum possible speed of rotation of the cylinders was 20 km/h.

Tools used:

- infrared non-contact thermometer TECPEL 515,
- Vernier LabQuest2 decibel meter with Vernier SLM-BTA measuring sensor,
- trip computer in the vehicle to monitor fuel consumption,
- Vernier computer equipment,
- manometer.



Figure 1: Infrared non-contact thermometer

Source: Personal archive



Figure 2: Vernier decibel meter

Source: Personal archive



Figure 3: Vernier computer equipment

Source: Personal archive

3. RESULTS OF EXPERIMENTAL WORK

We performed 6 measurements, of which 3 with a new tire profile and 3 with a worn tire profile. For both tires (with new and with worn profile), we performed the measurement 3 times. Once the tire was inflated to the optimal prescribed pressure, once with too much pressure and once with too little pressure.

The results were as follows:

- Measurement 1: New profile, optimal pressure (2.3bar)

Average tire volume: 88dB

Tire temperature: 29°C

Average fuel consumption: 4.7 l/100km

- Measurement 2: New profile, low pressure (1.8bar)

Average tire volume: 90dB

Tire temperature: 28.5°C

Average fuel consumption: 4.6 l/100km

- Measurement 3: New profile, high pressure (2.8bar)

Average tire volume: 88dB

Tire temperature: 29°C

Average fuel consumption: 4.7 l/100km

- Measurement 4: Worn profile, optimal pressure (2.3bar)

Average tire volume: 90dB

Tire temperature: 29.5°C

Average fuel consumption: 4.5 l/100km

- Measurement 5: Worn profile, low pressure (1.8bar)

Average tire volume: 89dB

Tire temperature: 31°C

Average fuel consumption: 4.5 l/100km

- Measurement 6: Worn profile, high pressure (2.8bar)

Average tire volume: 90dB

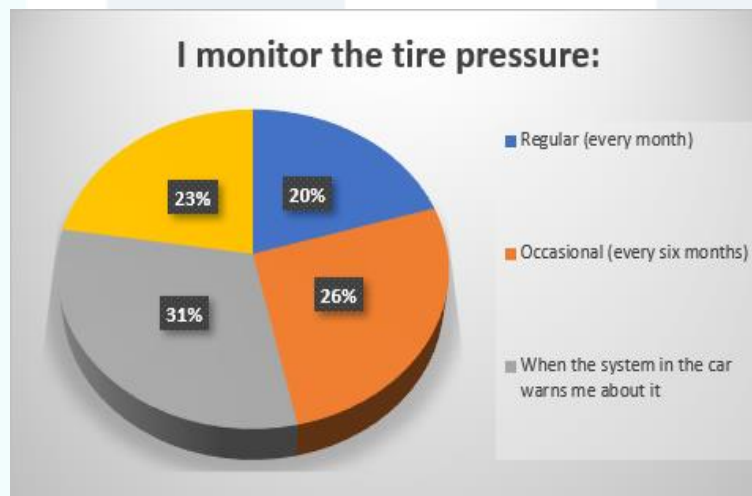
Tire temperature: 32°C

Average fuel consumption: 4.1 l/100km

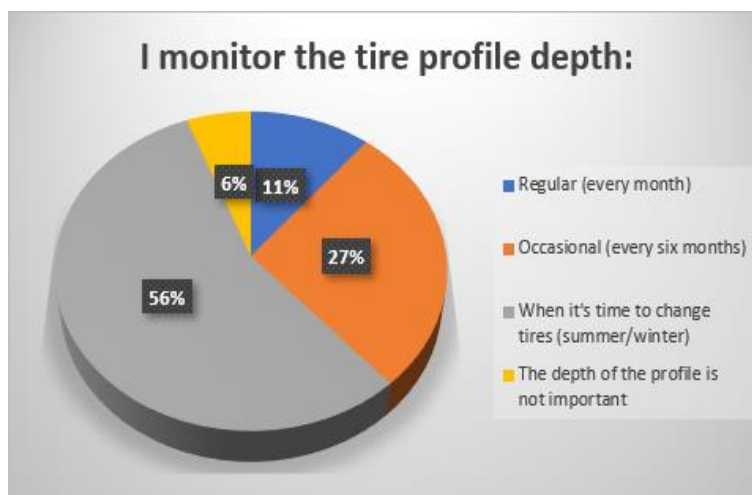
4. SURVEY RESULTS

The survey, which was anonymous, was conducted online. We created it using online survey tools. We surveyed people who already have a driver's license. In total, 847 people started to solve the survey, but only 402 people solved the entire survey, which is a good representative sample.

The survey consisted of seven questions and multiple answers were possible for each of them. Because of this, it is possible that some people chose more than one answer at the same time for a certain question. The presented results show how many respondents chose a certain answer. When evaluating the results, all answers were more than 402, which means that several respondents chose several answers to one question at the same time. The displayed ratio shows the sum of all responses as a proportion of all 402 respondents.



Graph 1: I monitor the tire pressure.



Graph 2: I monitor the depth of the tire profile:



Chart 3: When I check the tire pressure, I inflate them:

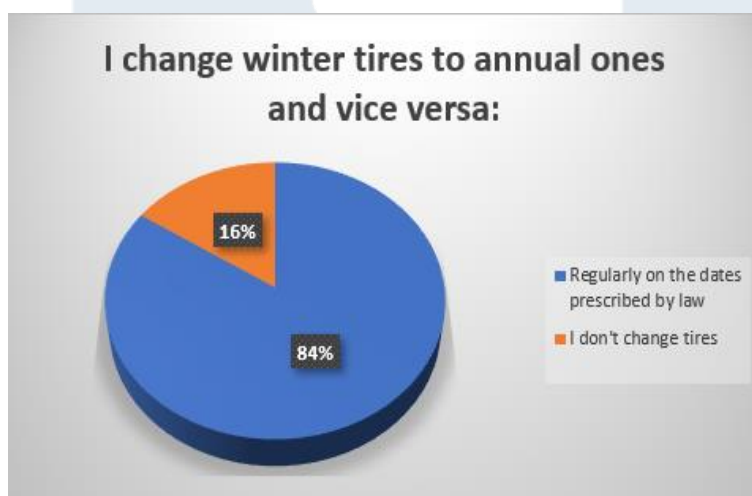


Chart 4: I change winter tires to summer tires and vice versa:



Chart 5: I replace the tires with new ones:

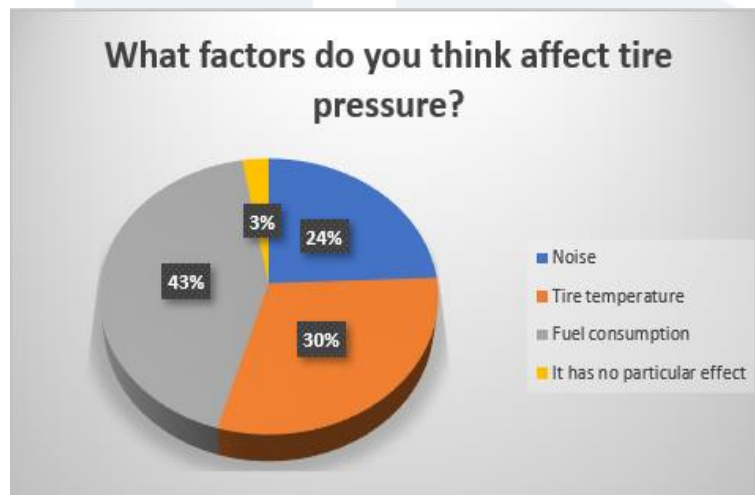


Chart 6: Which factors do you think are affected by tire pressure?

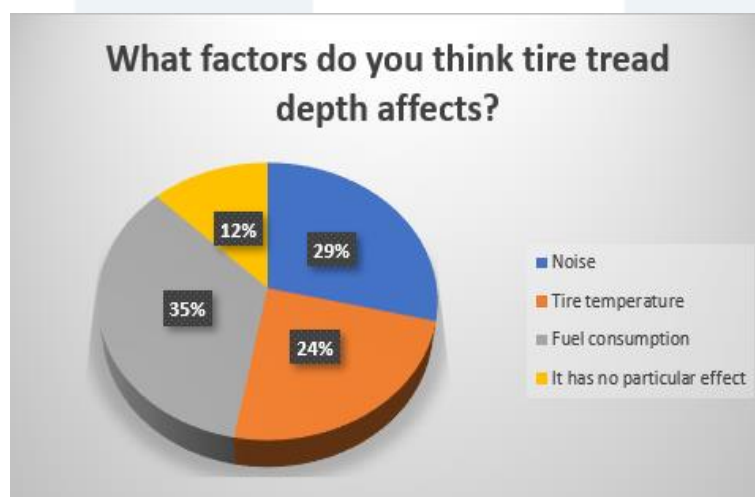


Chart 7: What factors do you think tire tread depth affects?

5. DISCUSSION

When studying the optimal pressure and worn profile of tires on a passenger vehicle, we found that with a worn profile, the sound intensity during wheel rotation increases to 88 dB, while at optimal pressure it is 90 dB. The results of the measurements unequivocally indicate an increase in noise with tire wear. The temperature of tires with a new profile and the correct pressure stops at 29 °C after the rotation is completed, while with a worn profile it rises by half a degree. It is clear to see that tires also heat up more during wear, which has a direct impact on their durability and grip. Maintaining the correct thermal cycle of the tires is also crucial, as more frequent heating and cooling leads to faster wear.

According to measurements, fuel consumption at optimal pressure and the new tire profile was 4.7 liters per 100 km, while with the worn profile it was 4.5 liters per 100 km. The reduction in fuel consumption with a worn profile is probably due to the age of the tires, as older tires become harder, deform less during driving and consequently have less rolling resistance.

The results of the survey show that drivers recognize the importance of tire profile depth. When reducing the tire pressure, the sound level is measured at 89 dB, regardless of the tread depth. Compared to the correct pressure, it increases by one decibel for a new profile and decreases by one decibel for a worn profile. Reduced tire pressure reduces the contact area with the road, which affects noise, but tread depth apparently has no significant effect on this.

Monitoring tire temperature at reduced pressure shows that temperature increases regardless of tread depth. Regardless of whether the tire is new or worn, the temperature after rotation increases by 1.5 °C compared to tires filled with the correct pressure. This is the result of greater wrinkling of the tire during driving, where greater deformation leads to greater heating.

With higher pressure, fuel consumption increases. With the new tire profile, at higher pressure, consumption increases to 4.6 liters per 100 km, while with the worn profile, consumption remains at the level of 4.1 liters per 100 km at the same pressure. This effect is expected, as higher pressure reduces tire deformation while driving, which in turn leads to lower rolling resistance and lower fuel consumption.

When the pressure is too high (above the optimal value), we notice that the sound intensity during tire rotation is maintained at 90 dB at both tread depths. The temperature stops at 28.5 °C for the new tire tread, while it rises to 32 °C for the worn tread at higher pressure. With increased pressure, we expect a lower temperature, as the tire deforms less during driving. This applies to new tires, while the temperature of worn tires increases further with increased pressure.

It should be emphasized that higher pressure reduces the contact surface of the tires with the road, which affects wear and traction. The entire pressure spectrum studied clearly shows the complex relationship between tire pressure, wear, noise and fuel consumption.

6. CONCLUSION

In today's times, proper care of car tire pressure has become extremely important, as its influence goes quite deep into various aspects of driving. The direct relationship between pressure and driving quality dictates that we devote more and more attention to this area. By providing optimal tire pressure, we not only provide the best possible grip between the tire and the road, which in turn improves the stability and handling of the vehicle, but also have a positive impact on fuel consumption.

By constantly monitoring and maintaining the appropriate pressure level, we can achieve more efficient use of fuel while driving, as we reduce the resistance between the tire and the road surface and thereby contribute to more economical consumption. At the same time, it is important to emphasize the long-term benefits of regular pressure control, as this reduces tire wear. Uneven wear can cause tires to age more quickly, resulting in reduced life and reduced performance.

Therefore, carefully monitoring and maintaining the pressure in car tires is more than just a good habit - it has become a key action that affects the safety, comfort, economy and durability of your vehicle.



СОУ „ТАКИ ДАСКАЛО“ БИТОЛА

Изработиле:

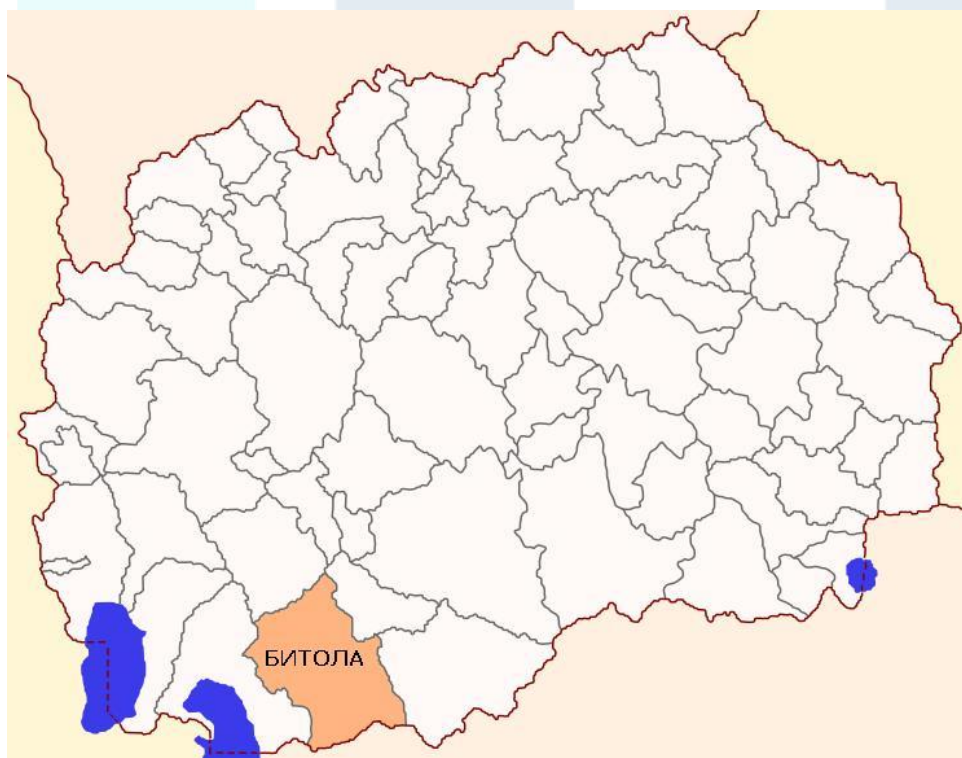
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Зоки Стојмиров.

23. ПОТРЕБА ОД КОРИСТЕЊЕ НА ЕЛЕКТРИЧЕН ТРОТИНЕТ ВО ОПШТИНА БИТОЛА

Вовед

Општина Битола е град во југозападниот дел на Македонија. Општина Битола е позната под името Градот на конзулите, бидејќи тука се наоѓале конзуларните претставништва на европските земји во времето на Отоманското Царство. Општина Битола располага со површина од 787,95 км², и вкупно население од 85,164 жители.



Општина Битола располага со добра сообраќајна инфраструктура во централното градско подрачје, и околната. Исто така има и моментална реконструкција на дел од улиците во централното градско подрачје. Сообраќајната инфраструктура во Општина Битола е богата со соодветна хоризонтална и вертикална сигнализација на улиците. Сообраќајот во општината е богат со корисници на сопствени моторни возила, но исто така има и Општински Линиски Превоз со цел задоволување на потребите на граѓаните од Општина Битола.



Општинскиот линиски превоз во општина Битола

Општинскиот линиски превоз во општина Битола се врши со околу 60 возила (автобуси, минибуси и комбиња). Во општина Битола се одржуваат 18 линии, како градски така и до селата во Општината Битола. Во градот постои современа автобуска станица во сопственост на фирмата “Патнички сообраќај – ТРАНСКОП“, АД – Битола од која поаѓаат голем број на меѓуопштински и меѓународни автобуси. Исто така, постои и помала автобуска станица од која поаѓаат автобуси кои сообраќаат до руралните места во соседните општини.

Општина Битола исто така располага и со современиот вид на транспорт, односно користење на електрични тротинети. Односно се соочува со Електромобилноста која е една од најбрзо растечките области во транспортот за што е пример на нашата држава со што овој тип на превозни средства се повеќе се применува во последните години.

Електричните тротинети и електромобилноста се нешто ново, нешто што е во тренд, нешто популарно и актуелно. Пред само една година, електричните тротинети ги гледавме како туристичка атракција во големите европски метрополи, а денес тие се веќе тука и присутни се на улиците, тротоарите, велосипедските патеки.

Нивното присуство во сообраќајот носи многу придобивки, отвара многу алтернативи за надминување на проблемот со сообраќајниот метеж, гужвата и бучавата во сообраќајот, континуираниот недостаток на паркинг места, загаденоста, итн. Но исто така и влијае на намалување на трошоците на корисниците на електричните тротинети.

Електричен тротинет може да управува лице кое навршило 14 години возраст.

Возачот на електричен тротинет е должен да го управува тротинетот по велосипедска патека или велосипедска лента, а доколку истите не се изградени, по пешачка патека, односно друга површина наменета за движење на пешаци. (се забранува движење со тротинет на коловоз).



Возачот на електричен тротинет, не смее да се движи по велосипедска патека односно лента со брзина поголема од 25 km/h. а по тротоар и пешачка патека, не смее да се движи со брзина поголема од 6 km/h.

Ако двајца или повеќе возачи на електричен тротинет се движат во група, должни се да се движат еден позади друг.





Од неодамна направеното истражување и направената анкета со граѓаните (корисници на превоз, околу 80 %) и извршена анализа, потребата од користење на Електрични тротинети во Општина Битола е голема, бидејќи со нивно користење доаѓа до замена на автомобилите, а и заштеда на време и во централното градско подрачје побрзо се совладува времето. Со користење на Електричните тротинети не доаѓа до испуштање на штетни гасови во воздухот, со што доаѓа до заштита на животната средина. Со зголемување на користење на Е-Тротинетите во централното градско подрачје доаѓа до исклучување на моторните возила од сообраќајот со што има низа предности.

- Намалена бучава од автомобилите
- Намалена загаденост
- Намалена густина на сообраќајот
- Намалена гужва од автомобили
- Доволен број на места за паркирање
- И уште многу други предности

Општина Битола има голема потреба од користење на Е-Тротинети, поради тоа што главен извор на загадувањето на воздухот во Општина Битола е всушност Рударско-енергетски комбинат односно РЕК Битола, најголемата подружница во составот на АД Електрани на Македонија, а втор извор на загадувањето се всушност моторните возила. Затоа од сите истражувања направени во изминатиот период централното градско подрачје со околните градски населби и тек како е потребно користење на Е - тротинетите. Како пример предамат од едно место во градот Битола кај студентскиот дом кој е одалечен од центарот на градот до саатот растојанието е околу 2,5 км. Да користиме градски превоз во летниот период е време околу 45 минути за да дојдеме до саканата дестинација. Тоа е така бидејќи линиите се кружни односно кружно движење.

Да користиме сопствен превоз – патнички автомобил потребни ни се околу 20 минути а и поголеми трошоци додека дојдеме, под услов да најдеме соодветно паркинг место. Да одиме пеш потребни ни се исто околу 30 минути. Со користење на Е – тротинет

потребни ни се околу 10 минути. Имаме уште многу вакви истражувања пред да ги воведеме и предложиме Е - тротинетите како алтернативно превозно средство. Зошто е тоа така. Бидејќи конфигурацијата на теренот на градот Битола и распоред на уличната мрежа е таква што сообраќајните решенија се изготвени не сразмерно со густината на жители и автомобили. Затоа во летниот период и во деновите погодни за управување на Е-тротинет се најидеално решение за патување низ градот Битола.



ПРЕДНОСТИ И НЕДОСТАТОЦИ НА ЕЛЕКТРИЧНИТЕ ТРОТИНЕТИ

Предности на електричните тротинети:

- мали димензии - лесно се пакува и носи, било до станот, било до јавниот превоз, канцеларијата... за разлика од велосипедот.
- побрз е од пешачење, а попрактичен од јавниот превоз, особено за пократки растојанија (до 10 км), освен во лоши временски услови.
- избегнување сообраќаен метеж - иако тоа може да се постигне и со велосипед, веројатно подобро.
- лесно се оди на угорница, без да се потиме, бидејќи има електричен мотор.
- поволна цена во однос на другите висококвалитетни електрични велосипеди.

Недостатоци на електричните тротинети:

- Нема рекреација, како што се возење велосипед и планинарење (иако ова може да биде предност за оние кои се занимаваат со тешка физичка работа). Само стоење - што е многу слично на седењето во однос на оштетување на 'рбетот и здравјето воопшто.
- Тркалата се многу мали, што е незгодно, дури и опасно, во случај да најдете на дупка или нерамнина на патот.
- Малите тркала го прават возењето многу непријатно.
- Ако се користат воздушни (пневматски) гуми, а не „цврсти“ гуми, заменувањето/крпенњето е исклучително макотрпна работа, во споредба со крпенјето дупната гума на велосипед. Додека употребата на „цврсти“ гуми го прави возењето многу непријатно, дури и со амортизери, во голем дел поради многу малите тркала.
- Профилот на возач кој стои, со нозете една зад друга, е прилично мал, дури и помал од профилот на велосипедист. И од напред и одзади, како и од страна. Додадете на ова поголема брзина од брзината на одење, исклучувајќи го секое движење (раце, нозе, како педали на велосипед).

Контролирањето на тротинетот е многу потешко отколку на пример да се контролира велосипед. Вртењето, особено наглото, како и понаглото сопирање, бараат висок степен на вештина и концентрација, па дури и тогаш се инфериорни во однос на (просечниот) велосипед.



Технолошки иновации во светот на електричните скутери

Во последните неколку години, електричните скутери станаа незаменливо средство за урбана мобилност ширум светот. Тие се практични, еколошки и сè попопуларни меѓу урбаната популација. Сепак, она што ги прави електричните скутери уште повозбудливи се технолошките иновации кои се влегоа во нивниот дизајн. Најновите технолошки трендови во светот на електричните скутери, вклучувајќи паметни апликации, поврзување со паметни уреди и напредни безбедносни карактеристики.

Паметни апликации за електрични скутери

Една од најзначајните иновации во светот на електричните скутери се паметните апликации кои се дизајнирани да го подобрат корисничкото искуство. Овие апликации им овозможуваат на возачите лесно да ги најдат достапните скутери во нивна близина преку GPS. Откако ќе најдат скутер, корисниците можат да го отклучат скутерот и да платат за возењето преку апликацијата. (Таков случај имаме во градот Скопје).

Покрај тоа, паметните апликации често обезбедуваат информации за брзината, преостанатата автономија на батеријата и патеката на движење. Ова им овозможува на корисниците подобро да ги планираат своите патувања и да избегнуваат непријатни изненадувања како празна батерија додека возат.

Поврзување со паметни уреди

Друг важен тренд во светот на електричните скутери е поврзувањето со паметни уреди. Многу производители на скутери сега нудат модели кои можат да се поврзат со паметни телефони преку технологијата Bluetooth. Ова им овозможува на возачите далечински да ги контролираат своите скутери преку апликации на нивните телефони.

Поврзувањето со паметни уреди обезбедува и дополнителни безбедносни карактеристики. На пример, некои скутери можат автоматски да ги заклучат тркалата кога корисникот се оддалечува од скутерот, со што ќе се спречи неовластена употреба. Оваа функција е особено корисна во урбаните средини каде што често се користат скутери за јавен превоз.

Подобрување на безбедносните карактеристики

Безбедноста е од суштинско значење во светот на електричните скутери, а новите технолошки трендови се насочени кон подобрување на безбедносните карактеристики. Некои скутери се опремени со напредни сензори кои откриваат пречки и ги предупредуваат возачите на потенцијални опасности.

Исто така, многу производители развиваат подобри сопирачки и системи за апсорпција на удари за да го намалат ризикот од повреда додека возите. Покрај тоа, некои модели на скутери имаат светлосни сигнали и рефлектори кои ја зголемуваат видливоста за време на ноќните возења.

Технолошките иновации го трансформираат светот на електричните скутери, правејќи ги попаметни, побезбедни и попрacticalни средства за урбана мобилност. Паметните апликации го олеснуваат наоѓањето и користењето на скутерот, додека поврзувањето со паметни уреди и подобрените безбедносни карактеристики го прават возењето електричен скутер уште попријатно и побезбедно. Во иднина, можеме да очекуваме дека технолошките иновации ќе продолжат да ја обликуваат оваа индустрија и да ги направат електричните скутери уште поатрактивно средство за урбана мобилност.

Максимална моќност од 600W

Mi Electric Scooter 3 може да достигне максимална брзина од 25 km/h и има капацитет за искачување од 16% градиент. 30 км со едно полнење - максимална брзина од 25 км/ч - брзо склопување за 3 секунди.

Опсег до 30 км

Системот за враќање на кинетичката енергија (KERS) може да ја врати кинетичката енергија од сопирањето и свиоците и да ја претвори во употреблива електрична енергија за дополнително да го подобри опсегот на патување. Слободно крстарете низ широките улици и тесните улички, уживајќи во прекрасната глетка на патот.

Три брзини

Едноставно притиснете го копчето за вклучување двапати за да се префрлите помеѓу трите режими. Кога патувате, притиснете S за да одите побрзо. Додека крстарете низ паркот притиснете D, и во гужва можете да го вклучите режимот за пешаци. Безбедноста на режимот на брзина е оценета од TUV Rheinland* според прописите EN17128.

Режим за пешаци 0-5 км/ч; Стандарден режим 0-20km/h (D); Спортски режим 0-25 км/ч (S).

Кога нивото на батеријата е под 30% и кога Mi Electric Scooter 3 не е вклучен околу 10 последователни дена, батеријата ќе премине во режим на мирување* за да го продолжи својот животен век. Дополнително, интелигентниот систем за управување со батерии од петтата генерација BMS ќе ја чува батеријата безбедна.

Mi Electric Scooter 3 има LED задно предупредувачко светло, големо светло на предниот рефлектор и двонасочни странични рефлектори за да ве заштити. Диск сопирачката со двојна подлога нуди ефикасно сопирање за брза реакција и го продолжува животниот век на влошките на сопирачките, правејќи го возењето побезбедно.

Брзо склопување во 3 чекори

Иновативен дизајн на преклопување оценет од TUV Rheinland* (според EN17128) за минималистички изглед, практично складирање и поголема стабилност.

Рамката е изработена од алуминиумска легура со висока цврстина од воздушната класа (класа 6) опремена со поголема удобност

ЗАКЛУЧОК

На крајот како заклучок можам да кажам дека Е-тротинетите од било кој производител и било кој тип на превозно средство може да ги користеме за потребата за патување низ градските средини доколку го овозможуваат временските услови, конфигурацијата на теренот, распоредот на уличната мрежа и финансиската можност.

АКО САКАМЕ ДА БИДЕМЕ ДЕЛ ОД ЕВРОПСКОТО СЕМЕЈСТВО, ТРЕБА ДА ЈА ЧУВАМЕ ОКОЛИНА ОД РАЗНИ ЗАГАДУВАЧИ.



SOU “TAKI DASKALO” BITOLA

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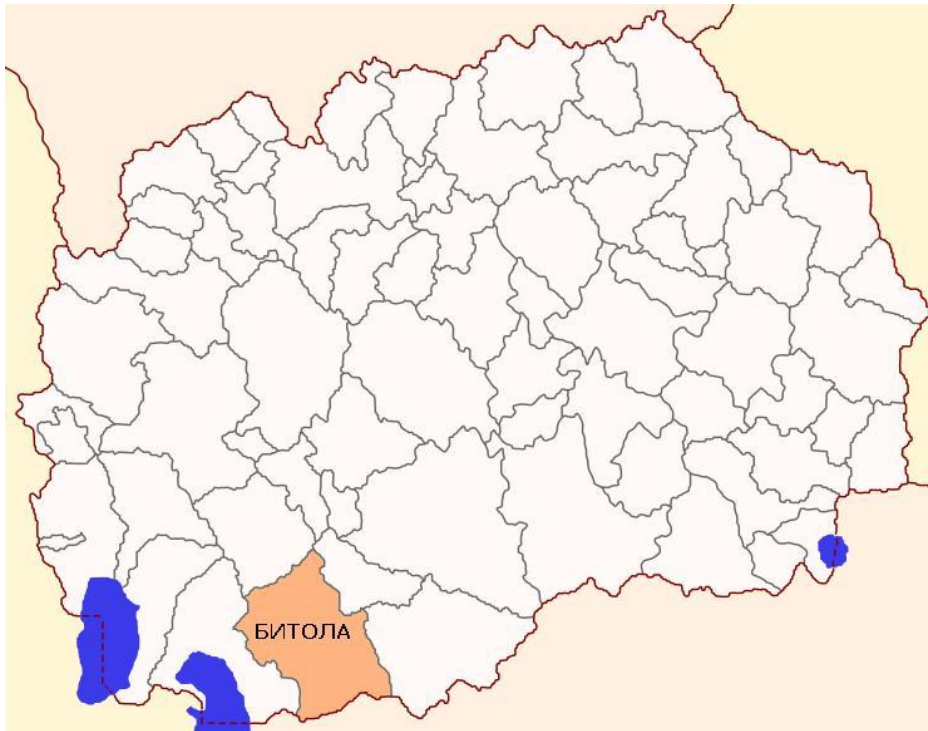
23. THE NEED OF USING ELECTRIC SCOOTERS IN THE MUNICIPALITY OF BITOLA

Introduction

The municipality of Bitola is a city in the southwestern part of Macedonia.

The municipality of Bitola is known as the City of Consuls, because the consular offices of European countries were located here during the Ottoman Empire.

The municipality of Bitola has an area of 787.95 km², and a total population of 85,164 inhabitants.



The municipality of Bitola has a good traffic infrastructure in the central city area and the surrounding area.

There is also a current reconstruction of part of the streets in the central city area.

The traffic infrastructure in the Municipality of Bitola is rich with adequate horizontal and vertical signaling on the streets.

Traffic in the municipality is rich with users of their own motor vehicles, but there is also Municipal Line Transport in order to meet the needs of the citizens of the Municipality of



The municipal line transport in the municipality of Bitola

The municipal line transportation in the municipality of Bitola is carried out with about 60 vehicles (buses, minibuses and vans). In the municipality of Bitola, 18 lines are maintained, both to the city and to the villages in the Municipality of Bitola.

In the city there is a modern bus station owned by the company "Passenger traffic - TRANSCOP", AD - Bitola, from which a large number of intermunicipal and international buses depart. There is also a smaller bus station from which buses leave for rural areas in neighboring municipalities.

The municipality of Bitola also has the modern type of transport, i.e. the use of electric scooters.

That is, it faces Electromobility, which is one of the fastest growing areas in transport, for which our country is an example, with which this type of means of transport has been increasingly used in recent years.

Electric scooters and electromobility are something new, something that is in trend, something popular and current. Just a year ago, we saw electric scooters as a tourist attraction in major European capitals, and today they are already here and present on the streets, sidewalks, the bike paths. Their presence in the traffic brings many benefits, it opens up many alternatives to overcome the problem of traffic congestion, traffic congestion and noise, continuous lack of parking spaces, pollution, etc. But it also affects the reduction of costs for users of electric scooters.

An electric scooter can be operated by a person who has reached 14 years of age.

The driver of an electric scooter is obliged to operate the scooter on a bicycle path or bicycle lane, and if they are not built, on a footpath, that is, another surface intended for pedestrian movement. (Moving with a scooter on the roadway is prohibited).



The driver of an electric scooter must not move on a bicycle path or lane at a speed greater than 25 km/h. and on sidewalks and footpaths, it must not move at a speed higher than 6 km/h.

If two or more electric scooter riders are moving in a group, they are obliged to move behind each other.





From the recent research and the survey with citizens (transportation users, about 80%) and analysis, the need for using electric scooters in Bitola municipality is great, because using them leads to the replacement of cars, as well as saving time and in the central city area the weather is faster.

Using electric scooters does not release harmful gases into the air, thus protecting the environment.

By increasing the use of E-Scooters in the central city area, motor vehicles are excluded from traffic, which has a number of advantages.

- Reduced car noise
- Reduced pollution
- Reduced traffic density
- Reduced traffic from cars
- Sufficient number of parking spaces
- And many other advantages

The Municipality of Bitola has a great need for the use of E-Scooters, because the main source of air pollution in the Municipality of Bitola is actually

Mining and Energy Combine or REK Bitola, the largest subsidiary in the composition of AD Elektrani of Macedonia, and the second source of pollution is actually motor vehicles. Therefore, from all the researches done in the past period, the central city area with the surrounding city settlements and the flow of how the use of E-scooters is needed. As an example, I move from a place in the city of Bitola near the student dormitory, which is far from the city center to the clock, the distance is about 2.5 km. If we use public transport in

the summer period, it takes about 45 minutes to get to the desired destination. It is so because the lines are circular, i.e. circular movement.

To use our own transport - a passenger car, we need about 20 minutes and more expenses until we arrive, provided we find a suitable parking place. It takes about 30 minutes to walk. By using the E-scooter, we need about 10 minutes. We still have a lot of research like this before we introduce and propose E-scooters as an alternative means of transportation.

Why is that. Since the configuration of the terrain of the city of Bitola and the layout of the street network is such that the traffic solutions are prepared not in proportion to the density of residents and cars. That's why in the summer period and on days suitable for driving E-scooters are the most ideal solution for traveling around the city of Bitola.



ADVANTAGES AND DISADVANTAGES OF ELECTRIC SCOOTER

Advantages of electric scooters:

- small dimensions - easy to pack and carry, either to the apartment, or to public transport, the office... unlike a bicycle.
- it is faster than walking and more practical than public transport, especially for shorter distances (up to 10 km), except in bad weather conditions.
- avoiding traffic jams - although this can also be achieved by bicycle, probably better.
- it's easy to go uphill, without breaking a sweat, because it has an electric motor.
- favorable price compared to other high-quality electric bicycles.

Disadvantages of electric scooters:

- No recreation, such as cycling and hiking (although this may be an advantage for those engaged in heavy physical work). Just standing - which is very similar to sitting in terms of damage to the spine and health in general.
- The wheels are very small, which is inconvenient, even dangerous, in case you encounter a pothole or a bump in the road.
- Small wheels make driving very uncomfortable.
- If air (pneumatic) tires are used and not "solid" tires, changing/patching is extremely laborious, compared to patching a flat tire on a bicycle. While the use of "solid" tires makes the ride very uncomfortable, even with shock absorbers, in large part due to the very small wheels.
- The profile of a rider standing, with legs behind each other, is quite small, even smaller than the profile of a cyclist. Both from the front and back, as well as from the side.

Controlling a scooter is much more difficult than, for example, controlling a bicycle. Turning, especially sharp, as well as braking more sharply, require a high degree of skill and concentration, and even then are inferior to the (average) bike.



Technological innovation in the world of electric scooters

In the last few years, electric scooters have become an indispensable means of urban mobility around the world. They are practical, environmentally friendly and increasingly popular among the urban population. However, what makes electric scooters even more exciting are the technological innovations that have gone into their design. The latest technology trends in the world of electric scooters, including smart apps, smart device connectivity and advanced safety features.

Smart apps for electric scooters

One of the most significant innovations in the world of electric scooters are smart applications that are designed to improve the user experience. These apps allow riders to easily find available scooters near them via GPS. After finding a scooter, users can unlock the scooter and pay for the ride through the app. (We have such a case in the city of Skopje).

In addition, smart applications often provide information about speed, remaining battery autonomy and the path of movement. This allows users to better plan their trips and avoid unpleasant surprises such as an empty battery while driving.

Connecting to smart devices

Another important trend in the world of electric scooters is connectivity with smart devices. Many scooter manufacturers now offer models that can connect to smartphones via

Bluetooth technology. This allows riders to remotely control their scooters through apps on their phones.

Connecting to smart devices also provides additional security features. For example, some scooters can automatically lock the wheels when the user moves away from the scooter, preventing unauthorized use. This feature is especially useful in urban areas where scooters are often used for public transportation.

Improving security features

Safety is essential in the world of electric scooters, and new technological trends are aimed at improving safety features. Some scooters are equipped with advanced sensors that detect obstacles and warn riders of potential dangers.

Technological innovations have transformed the world of electric scooters, making them smarter, safer and more practical means of urban mobility. Smart apps make it easy to find and use the scooter, while smart device connectivity and enhanced safety features make riding an electric scooter even more enjoyable and safer. In the future, we can expect that technological innovations will continue to shape this industry and make electric scooters an even more attractive means of urban mobility.

Maximum power of 600W

Mi Electric Also, many manufacturers are developing better brakes and shock absorption systems to reduce the risk of injury while driving. In addition, some models of scooters have light signals and reflectors that increase visibility during night rides.

Scooter 3 can reach a top speed of 25 km/h and has a climbing capacity of 16% gradient. 30 km on a single charge - top speed of 25 km/h - quick assembly in 3 seconds.

Range up to 30 km

The Kinetic Energy Recovery System (KERS) can recover kinetic energy from braking and cornering and convert it into usable electrical energy to further improve range. Cruise freely through wide streets and narrow alleys, enjoying the beautiful scenery along the way.

Three speeds

Simply press the power button twice to switch between the three modes. When traveling, press S to go faster. While cruising through the park press D, and in a crowd you can engage pedestrian mode. Speed mode safety has been assessed by TÜV Rheinland* according to EN17128 regulations.

Pedestrian mode 0-5 km/h; Standard mode 0-20km/h (D); Sport mode 0-25 km/h (S).

When the battery level is below 30% and the Mi Electric Scooter 3 has not been turned on for about 10 consecutive days, the battery will go into sleep mode* to extend its life. In

In addition, the fifth generation BMS intelligent battery management system will keep the battery safe.

Mi Electric Scooter 3 has LED rear warning light, large front reflector light and two-way side reflectors to keep you safe. The dual-pad disc brake offers efficient braking for quick response and extends the life of the brake pads, making driving safer.

Quick assembly in 3 steps

Innovative folding design rated by TUV Rheinland* (according to EN17128) for a minimalist look, convenient storage and greater stability.

The frame is made of high strength aerospace grade aluminum alloy (class 6) equipped with more comfort

CONCLUSION

In the end, in conclusion, I can say that E-scooters from any manufacturer and any type of means of transport can be used for the need to travel through urban environments if the weather conditions, the configuration of the terrain, the layout of the street network and the financial possibility allow it. .

IF WE WANT TO BE PART OF THE EUROPEAN FAMILY, WE NEED TO PROTECT THE ENVIRONMENT FROM VARIOUS POLLUTANTS.

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24.АНАЛИЗА ЗНАЊА ПРОФЕСИОНАЛНИХ ВОЗАЧА КАТЕГОРИЈА С И D У ОБЛАСТИ ВРЕМЕНА УПРАВЉАЊА, ОДМОРА ВОЗАЧА И КОРИШЋЕЊА ТАХОГРАФА

Резиме: Унапређење знања возача је основа од чијег квалитета у многоне зависи какав ће се возач у саобраћају наћи након полагања испита и добијања возачке дозволе. У Србији се унапређење знања возача може вршити кроз Центре за обуку професионалних возача – СРС центара. Теоријском, као и практичном обуком возачима се поред стицања знања и вештина, жели формирати правилан став о безбедном учешћу у саобраћају. Циљ рада је да се сагледају и анализирају знања професионалних возача категорија С и D категорије у области времена управљања, одмора возача и коришћења тахографа. Анализа знања ће се извршити на основу улазних тестова који ће се спровести са професионалним категоријама возача С и D категорије. Тестирање је вршено у Центру за обуку возача Безбедност у Врању. Тестирању је било подвргнуто 356 возача С и D категорије. Генерално гледано возачи обе категорије су одговорили тачно на око 60% питања са улазног теста.

Кључне речи: професионални возачи, знање, безбедност саобраћаја

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УВОД

Унапређење знања возача је основа од чијег квалитета у многоне зависи каков ќе се возач у саобраќају наћи након полагања испита и добијања возачке дозволе. Обуку за стицање почетне квалификације и реализацију периодичне обуке возача, спроводи правно лице које испуњава прописане услове и које је за то добило одобрење од Агенције за безбедност саобраќаја, а на основу Правилника о условима које мора да испуњава правно лице које врши професионално оспособљавање возача.

Стицање сертификата о професионалним компетенцијама, почетни СРС и периодични СРС, су програми који имају свој крајњи циљ, а то је повећање опште безбедности саобраќаја, побољшање ефикасности и комуникације између возача и осталих субјеката који учествују у транспортном ланцу.

Почетна обука и стицање почетног СРС-а има за циљ да произведе професионалног возача који ќе успешно одговорити на све изазове у транспорту, а периодична обука, тј. периодични СРС има за циљ да одржава почетне компетенције и да их током наредног периода усавршава у складу са напредком саобраќаја и транспорта.

Законом о безбедности саобраќаја на путевима прописано је да возач моторног возила, односно скупа возила, коме је управљање возилом основно занимање, када управља возилом, односно скупом возила, за обављање послова професионалног возача мора имати стечену почетну квалификацију, односно периодичну обуку. Доказ почетне квалификације, односно периодичне обуке професионалних возача, су:

- Сертификат о стручној компетентности (СРС) – документ којим се потврђује почетна квалификација возача за превоз терета или путника и издаје се са роком важења од 5 година, и
- Квалификациона картица возача – лични документ који гласи на име возача и која се добија на основу сертификата. Квалификациона картица се издаје са роком важења до 5 година.

Почетна квалификација возача је дефинисана датумом пре и после 29.12.2019:

- пре – ослобођени од похађања обуке и полагања испита.
- после – морају да похађају обуку и положе испит.

Обавезна основна обука организује се као:

- основна обука - 280 наставних часова - возач који није стекао најмање средње образовање у трогодишњем трајању,
- основна убрзана обука - 140 наставних часова - возач који је стекао најмање средње трогодишње образовање.

Сертификат о стручној компетентности којим се потврђује периодична обука траје 35 наставних часова. У току једне календарске године возачу се признају највише два семинара. Семинар унапређења знања се организује као једнодневни у овлашћеним Центрима за обуку и састоји се од седам наставних часова.

Циљ рада је да се сагледају и анализирају знања професионалних возача категорија С, С1, D, D1, СЕ, С1Е, DE и D1Е категорије у области времена управљања, одмора возача и коришћења тахографа, који су похађали други семинар у Центру за обуку возача Безбедност у Врању. Назив другог семинара је „Основни прописи из области времена управљања и одмора возача и коришћења тахографа“.

МЕТОД ИСТРАЖИВАЊА

У овом раду вршено је тестирање познавања саобраћајних прописа и правила у области времена управљања, одмора возача и коришћења тахографа. Сви испитаници су полазници другог семинара у Центру за обуку возача Безбедност у Врању.

Тестирању је било подвргнуто укупно 356 возача. Од укупног броја тестираних возача који су похађали семинар само један полазник је особа женског пола, а сви остали су мушког пола.

Анализа знања ће се извршити на основу улазних тестова који ће се спровести са професионалним категоријама возача C, C1, D, D1, CE, C1E, DE и D1E категорије. Тестирање је вршено у Центру за обуку возача Безбедност у Врању. Истраживање је рађено у новембру и децембру 2022. године. Старост возача који су били тестирани је од 25 до 65 година. Возачи нису били упознати да ће бити извршено тестирање (слика 1).

Сви возачи су били подвргнути тестирању које се састојало из 20 питања. Питања су била затвореног типа са четири понуђена одговора. Само један одговор је био тачан. Овај тест се решавао у штампаној форми. Сваки испитаник је радио исти тест. Лица албанске националности су тест решавала на албанском језику.



Слика 1. Приказ тестирања

Улазни тест је садржао следећих 20 питања:

1. Које врсте возила морају да имају тахограф?
2. Који је рок за обавезно преузимање података са картице?
3. Шта представља симбол ?
4. Дневно време управљања возилом не сме бити дуже од 9 часова изузев када се?
5. Недељно време управљања не сме бити дуже од?
6. Скраћени дневни одмор се сме направити највише?
7. Ноћни рад је рад који се обавља између?
8. Шта не спада у радно време?
9. Шта представља симбол ?
10. Најдуже недељно радно време возача укључујући и прековремени рад?
11. Колико је најдуже дневно радно време, укључујући и прековремени рад?
12. Шта спада у остале послове возача?
13. Шта је тахограф?

14. Након колико часова вожње, возач је у обавези да користи непрекидну паузу у трајању од најмање 45 минута?
15. У случају неисправности дигиталног тахографа, возач је дужан да?
16. Приликом постављања тахографског листића у тахограф, евидентирање података о марки и типу возила од стране возача?
17. Возач може да користи аналогни тахограф који је уграђен у возило, а који је прегледан у овлашћеној радионици за тахограф у року који није дужи од?
18. Рок важења картице за возача?
19. Тахографи могу бити?
20. Када се издаје потврда активности возача?

РЕЗУЛТАТИ СПРОВЕДЕНОГ ИСТРАЖИВАЊА

У табели 1 дати су резултати спроведеног тестирања на основу улазног теста. Табеларно су приказани резултати са одговорима на сва 20 питања у процентима.

Табеларни приказ резултата теоријског дела тестирања на основу улазног теста

Питање	тачно	нетачно	тачно (%)	нетачно (%)
1	329	27	92	8
2	287	69	81	19
3	231	125	65	35
4	285	71	80	20
5	204	152	57	43
6	112	244	31	69
7	187	169	53	47
8	171	185	48	52
9	184	172	52	48
10	64	292	18	82
11	49	307	14	86
12	246	110	69	31
13	182	174	51	49
14	340	16	96	4
15	279	77	78	22
16	215	141	60	40
17	261	95	73	27
18	327	29	92	8
19	107	249	30	70
20	181	175	51	49
Укупно	4241	2879	60	40

Интересантан податак је да су возачи одговорили тачно на 4.241 питање, односно на 60% и нетачно на 2.879 питања, односно на 40%. Највећи број тачних одговора је било на питањима број 1, 2, 4, 14 и 18, преко 80% тачних одговора. Највећи број нетачних одговора је било на питањима број 6, 8, 10, 11 и 19, преко 50% нетачних одговора.

На прво питање - Које врсте возила морају да имају тахограф? - тачних одговора је било 329, односно 92%, док је нетачних било 27, односно 8%, што се може сматрати добрим резултатом.

На друго питање - Који је рок за обавезно преузимање података са картице? - тачних одговора је било 287, односно 81%, док је нетачних било 69, односно 19%, што се може сматрати добрим резултатом.

На треће питање - Шта представља симбол ? - тачних одговора је било 231, односно 65%, док је нетачних било 65, односно 35%, што се не може сматрати добрим резултатом. То значи да 35% возача не знају када активност треба да пребаце на расположивост.

На четврто питање - Дневно време управљања возилом не сме бити дуже од 9 часова изузев када се? - тачних одговора је било 285, односно 80%, док је нетачних било 71, односно 20%, што се може сматрати добрим резултатом.

На пето питање - Недељно време управљања не сме бити дуже од? - тачних одговора је било 204, односно 57% док је нетачних било 152, односно 43%, што се не може сматрати добрим резултатом. То значи да 43% возача не знају колико сати мога да управљају возилом у току недеље.

На следећем графикону – слика 2 приказани су резултати одговора на шесто питање - Скраћени дневни одмор се сме направити највише? - тачних одговора је било 112, односно 31%, док је нетачних било 244, односно 69%, што се не може сматрати добрим резултатом. То значи да 69% возача не знају колико пута недељно могу да користе скраћени дневни одмор који траје од 9 до 11 сати.



Слика 2. Графички приказ успешности одговора на питање - Колико пута се скраћени дневни одмор може направити у току радне недеље

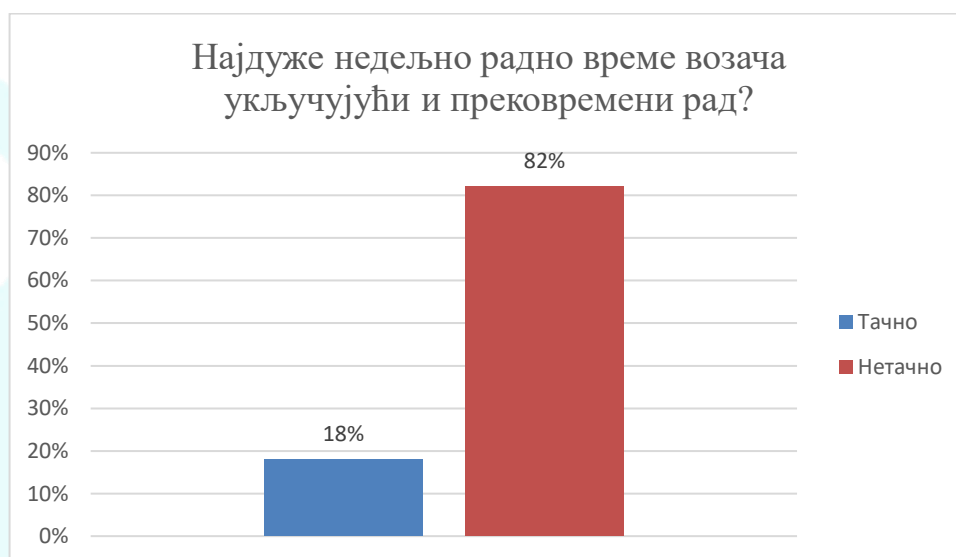
На седмо питање - Ноћни рад је рад који се обавља између? - тачних одговора је било 187, односно 53%, док је нетачних било 169, односно 47%, што се не може сматрати добрим резултатом. То значи да 47% возача не знају када почиње, а када се завршава ноћни рад.

На осмо питање - Шта не спада у радно време? - тачних одговора је било 171, односно 48%, док је нетачних било 185, односно 52%, што се не може сматрати добрим резултатом. То значи да 52% возача не знају које активности не спадају у радно време.

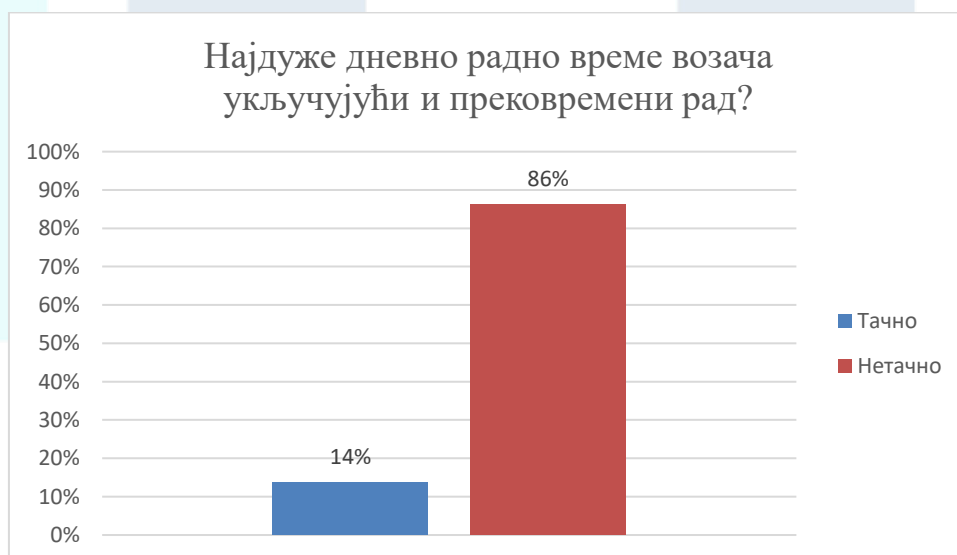
На девето питање - Шта представља симбол ? - тачних одговора је било 184, односно 52% док је нетачних било 172, односно 48%, што се не може сматрати добрим резултатом. То значи да 48% возача не знају када морају да активност изаберу на остало радно време.

На следећем графикону - слика 3 приказани су резултати одговора на десето питање - Најдуже недељно радно време возача укључујући и прековремени рад? - тачних одговора је било 64, односно 18%, док је нетачних било 292, односно 82%, што се не може сматрати добрим резултатом. То значи да 82% возача не знају колико сати могу да раде недељно.

На следећем графикону - слика 4 приказани су резултати одговора на једанаесто питање - Најдуже дневно радно време возача укључујући и прековремени рад? - тачних одговора је било 49, односно 14%, док је нетачних било 307, односно 86%, што се не може сматрати добрим резултатом. То значи да 86% возача не знају колико сати могу да раде дневно. У овом питању је садржана проблематика непознавања појмова радно време и радни дан (арбајт). Врло честа грешка код возача је да мисле да је радно време 15 сати, а не 14 сати. Радни дан је 15 сати.



Слика 3. Графички приказ успешности одговора на питање - Најдуже недељно радно време возача укључујући и прековремени рад



Слика 4. Графички приказ успешности одговора на питање - Најдуже дневно радно време возача укључујући и прековремени рад

На дванаесто питање - Шта спада у остале послове возача? - тачних одговора је било 264, односно 69%, док је нетачних било 69, односно 31%, што се може сматрати добрим резултатом.

На тринаесто питање - Шта је тахограф? - тачних одговора је било 182, односно 51%, док је нетачних било 174, односно 49%, што се не може сматрати добрим резултатом. Међутим, овде се ради о дефиницији тахографа која не утиче на рад возача.

На четрнаесто питање - Након колико часова вожње, возач је у обавези да користи непрекидну паузу у трајању од најмање 45 минута? - тачних одговора је било 340, односно 96%, док је нетачних било 16, односно 4%, што се може сматрати добрим резултатом.

На петнаесто питање - У случају неисправности дигиталног тахографа, возач је дужан да? - тачних одговора је било 279, односно 78%, док је нетачних било 77, односно 22%, што се може сматрати добрим резултатом.

На шеснаесто питање - Приликом постављања тахографског листића у тахограф, евидентирање података о марки и типу возила од стране возача? - тачних одговора је било 215, односно 60%, док је нетачних било 60, односно 40%, што се може сматрати добрим резултатом.

На седамнаесто питање - Возач може да користи аналогни тахограф који је уграђен у возило, а који је прегледан у овлашћеној радионици за тахограф у року који није дужи од? тачних одговора је било 261, односно 73% док је нетачних било 95, односно 27%, што се може сматрати добрим резултатом.

На осамнаесто питање - Рок важења картице за возача? тачних одговора је било 327, односно 92%, док је нетачних било 29, односно 8%, што се може сматрати добрим резултатом.

На деветнаесто питање - Тахографи могу бити? - тачних одговора је било 107, односно 30%, док је нетачних било 249, односно 70%, што се не може сматрати добрим резултатом. То значи да 30% возача не знају које врсте тахографа постоје.

На двадесето питање - Када се издаје потврда активности возача? - тачних одговора је било 181, односно 51%, док је нетачних било 175, односно 49%, што се не може сматрати добрим резултатом. То значи да 49% возача не знају у којим случајевима се издаје потврда о активностима.

ЗАКЉУЧАК

Ограничење овог истраживања је да се ради о малим узорцима испитаника као и да примењена статистичка метода не даје доволно података да ли су разлике у постигнућу резултат случајности или системског деловања независних варијабли. Ограничавајући фактор овог истраживања је и да је тестирање вршено само у једном центру и да су тестирани возачи на југу Србије.

Интересантан податак је да су возачи одговорили тачно на 4.241 питање, односно на 60% и нетачно на 2.879 питања, односно на 40%. Највећи број тачних одговора је било на питањима број 1, 2, 4, 14 и 18, преко 80% тачних одговора. Највећи број нетачних одговора је било на питањима број 6, 8, 10, 11 и 19, преко 50% нетачних одговора.

Оно што забрињава је податак да на питања 10 и 11, било је нетачно 82%, односно 86%. 82% возача није знало колико траје недељно радно време, док 86% возача није знало колико траје дневно радно време.

Сваки кандидат који је радио улазни тест на крају едукације која је трајала 7 наставних часова радио је и излазни тест. Улазни тестови имају проценат успешности 60%. Излазни тестови имају проценат успешности 85%. На основу резултата са излазних тестова можемо да закључимо да су возачи усвојили нова знања.

У разговорима који су аутори водили са возачима пре семинара преовладало је незадовољство зашто они морају да долазе на семинаре и да им центар узима само паре. Поред улазних и излазних тестова возачи су попуњавали и евалуационе упитнике након завршетка седмог часа. У евалуационим упитницима аутори су наилазили на саме похвале семинара и коментаре да са оваквим семинарима треба наставити.

Аутори су мишљења да су ови семинари потребни и да се мора наставити са истим. Само свеобухватним деловањем свих чиниоца број саобраћајних незгода и број погинулих лица у Републици Србији може се смањити.

Автори:

Ивица Ристић , Ивана Селенић ,Светлана
Величковић Дијана Радивојевић Теодора
Ристић

24.ANALYSIS OF KNOWLEDGE OF PROFESSIONAL DRIVERS CATEGORY C AND D IN THE FIELD OF DRIVING TIME, DRIVER RESTS AND USE OF TACHOGRAPHS

Summary: What type of driver will be found in the traffic after taking the test and obtaining a driver's license depends on improving the driver's knowledge. In Serbia, improvement of drivers' knowledge can be done through Professional Driver Training Centers – CPC centers. In addition to acquiring knowledge and skills, and theoretical and practical training for drivers, this work aims to form a proper attitude toward safe participation in traffic. The work aims to see and analyze the knowledge of professional drivers of categories C and D in the area of driving time, driver's rest, and use of the tachograph. Knowledge analysis will be done based on initial tests carried out with professional driver categories C and D. The testing was carried out at the Driver Training Center "Bezbednost" in Vranje. 356 C and D category drivers were subjected to testing. In general, drivers of both categories answered correctly about 60% of the questions from the initial test.

Keywords: professional drivers, knowledge, traffic safety

INTRODUCTION

What kind of driver there will be in traffic after taking the test and obtaining a driver's license largely depends on improving drivers' knowledge. Training for the acquisition of the initial qualification and the implementation of periodic driver training is carried out by a legal entity that meets the prescribed conditions and has received approval from the Agency for Traffic Safety, based on the Rulebook on conditions that must be met by a legal entity that provides professional driver training.

Acquiring professional competence certificates, initial CPC, and periodic CPC, are programs that aim to increase general traffic safety, and improve efficiency and communication between drivers and other subjects participating in the transport chain.

The initial training and acquisition of the initial CPC aims to produce a professional driver who will successfully respond to all challenges in transport, and periodic training, i.e. the periodic CPC aims to maintain the initial competencies and to improve them during the next period according to the progress of traffic and transport.

The law on road traffic safety stipulates that the driver of a motor vehicle, that is, a group of vehicles, whose main occupation is driving a vehicle, when driving a vehicle, that is, a group of vehicles, to perform the duties of a professional driver, must have an initial qualification, that is, periodic training. Proof of initial qualification, i.e. periodic training of professional drivers, are:

- Certificate of Professional Competence (CPC) – a document that confirms the initial qualification of a driver for transporting cargo or passengers is issued with a validity period of 5 years, and

- Driver's qualification card – a personal document bearing the driver's name and obtained based on a certificate. The qualification card is issued with a validity period of up to 5 years.

The driver's initial qualification is defined by the date before and after December 29, 2019:

- before - exempted from attending training and taking exams.
- after - they have to attend training and pass an exam.

Mandatory basic training is organized as follows:

- basic training - 280 lessons - a driver who has not obtained at least a three-year secondary education,

- basic accelerated training - 140 lessons - a driver who has obtained at least a three-year secondary education.

The certificate of professional competence confirms periodic training, which lasts 35 teaching hours. During one calendar year, a driver is recognized for a maximum of two seminars. The knowledge improvement seminar is organized as a one-day seminar in authorized training centers and consists of seven teaching hours.

The work aims to review and analyze the knowledge of professional drivers of categories C, C1, D, D1, CE, C1E, DE, and D1E in the area of driving time, driver rest, and the use of tachographs, who attended the second seminar at the Safety Driver Training Center in Vranje. The title of the second seminar is "Basic regulations in the area of driver's driving and rest time and the use of tachographs".

RESEARCH METHOD

This work tested knowledge of traffic regulations and rules in the area of driving time, driver rest, and tachograph use. All respondents took part in the second seminar at the Safety Driver Training Center in Vranje.

A total of 356 drivers were tested. Out of the total number of tested drivers who attended the seminar, only one attendee was female, and all the others were male.



Knowledge analysis will be performed on the basis of entrance tests conducted with professional driver categories C, C1, D, D1, CE, C1E, DE, and D1E categories. The testing was carried out at the Bezbednost Driver Training Center in Vranje. The research was conducted in November and December 2022. The drivers who were tested are from 25 to 65 years old. The drivers were not aware that the test would be performed (picture 1).

All drivers were subjected to a test consisting of 20 questions. The questions were closed-ended with four possible answers. Only one answer was correct. This test was solved in printed form. Each subject performed the same test. Persons of Albanian nationality took the test in the Albanian language.



Picture 1 Testing

The entrance test contained the following 20 questions:

1. What types of vehicles must have a tachograph?
2. What is the deadline for the mandatory download of data from the card?
3. What does the symbol  represent?
4. Daily driving time must not be longer than 9 hours, except when?
5. The weekly management time must not be longer than?
6. Shortened daily rest may be taken at most?
7. Night work is work done between?
8. What is not included in working hours?
9. What does the symbol  represent?
10. Longest weekly working hours of a driver including overtime?
11. What is the longest daily working time, including overtime?
12. What are the other duties of a driver?
13. What is a tachograph?
14. After how many hours of driving, the driver is obliged to take a continuous break of at least 45 minutes?
15. In case of malfunction of the digital tachograph, the driver is obliged to?

16. When placing the tachograph slip in the tachograph, is the driver recording data on the mark and type of vehicle?

17. The driver can use an analog tachograph installed in the vehicle, which has been inspected in an authorized tachograph workshop within a period not longer than?

18. Validity period of the driver's card?

19. Tachographs can be?

20. When is the driver's activity certificate issued?

THE RESULTS OF THE CONDUCTED RESEARCH

Table 1 shows the results of the conducted testing based on the entrance test. The results with answers to all 20 questions in percentages are tabulated.

Table 1 The results of the theoretical part of the test based on the entrance test are shown in a table.

Question	correct	incorrect	correct (%)	incorrect (%)
1	329	27	92	8
2	287	69	81	19
3	231	125	65	35
4	285	71	80	20
5	204	152	57	43
6	112	244	31	69
7	187	169	53	47
8	171	185	48	52
9	184	172	52	48
10	64	292	18	82
11	49	307	14	86
12	246	110	69	31
13	182	174	51	49
14	340	16	96	4
15	279	77	78	22
16	215	141	60	40
17	261	95	73	27
18	327	29	92	8
19	107	249	30	70
20	181	175	51	49
Total	4241	2879	60	40

Interestingly, the drivers answered 4,241 questions correctly, i.e. 60%, and 2,879 questions, i.e. 40%, incorrectly. The highest number of correct answers were on questions number 1, 2, 4, 14, and 18, with over 80% correct answers. The largest number of incorrect answers were on questions number 6, 8, 10, 11, and 19, with over 50% of incorrect answers.

To the first question - What types of vehicles must have a tachograph? - there were 329 correct answers, i.e. 92%, while 27, i.e. 8% were incorrect, which can be considered a good result.

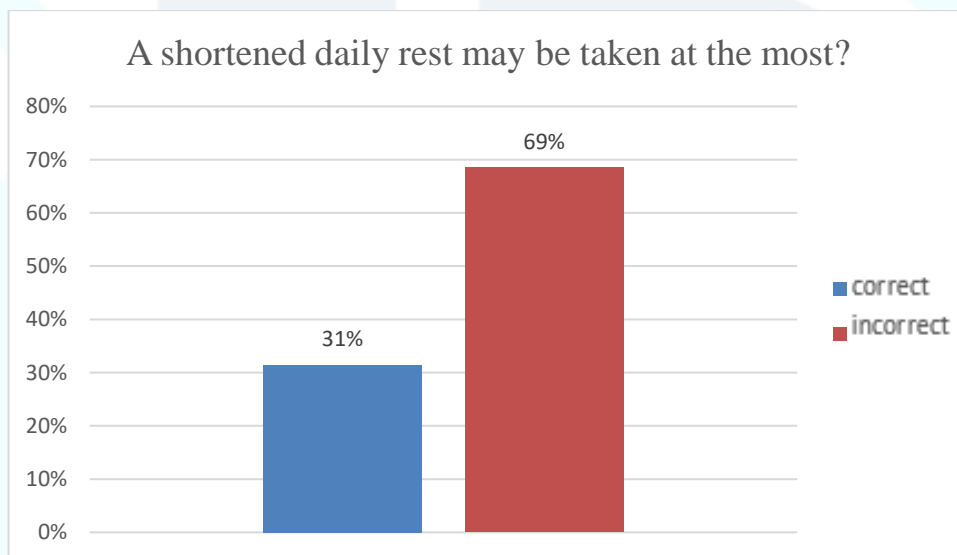
To the second question - What is the deadline for mandatory download of data from the card? - there were 287 correct answers, i.e. 81%, while 69, i.e. 19% were incorrect, which can be considered a good result.

To the third question - What does the symbol represent? - there were 231 correct answers, or 65%, while 65, or 35% were incorrect, which cannot be considered a good result. This means that 35% of drivers do not know when to switch the activity to availability.

To the fourth question - Daily driving time must not be longer than 9 hours, except when? - there were 285 correct answers, i.e. 80%, while 71 i.e. 20% were incorrect, which can be considered a good result.

To the fifth question - The weekly management time must not be longer than? - there were 204 correct answers, i.e. 57%, while 152, i.e. 43% were incorrect, which cannot be considered a good result. This means that 43% of drivers do not know how many hours they can drive a vehicle during the week.


The following graph - Picture 2 shows the results of the answers to the sixth question - Is it possible to take a shortened daily rest at most? - there were 112 correct answers, or 31%, while 244, or 69% were incorrect, which cannot be considered a good result. This means that 69% of drivers do not know how many times a week they can use the shortened daily rest that lasts from 9 to 11 hours.



Picture 2 Graphic representation of the success of the answer to the question - How many times a shortened daily rest can be taken during the working week

To the seventh question - Night work is work that is done in between? - there were 187 correct answers, i.e. 53%, while 169, i.e. 47% were incorrect, which cannot be considered a good result. This means that 47% of drivers do not know when night work starts and ends.

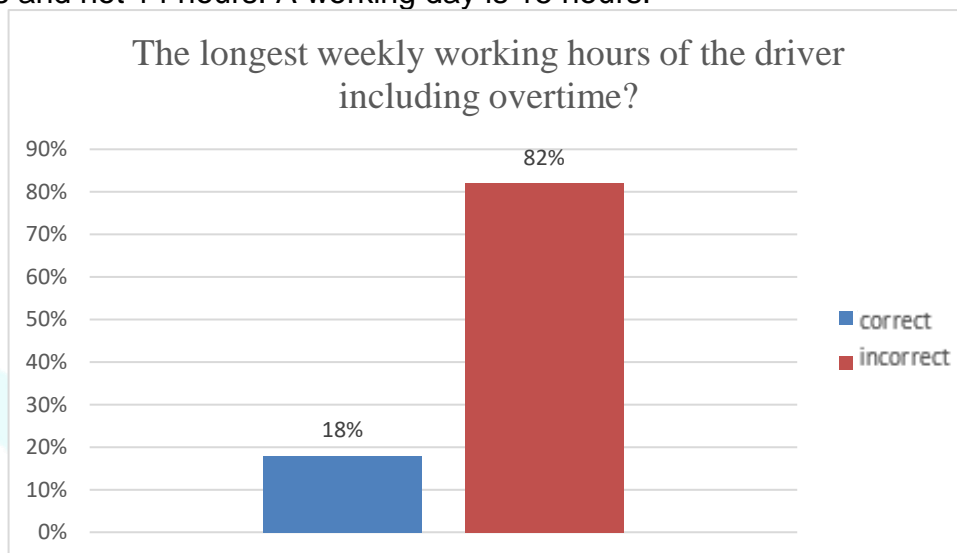
To the eighth question - What is not included in working hours? - there were 171 correct answers, or 48%, while 185, or 52% were incorrect, which cannot be considered a good result. This means that 52% of drivers do not know which activities do not fall within working hours.

To the ninth question - What does the symbol  represent? - there were 184 correct answers, i.e. 52%, while 172, i.e. 48% were incorrect, which cannot be considered a good result. This means that 48% of drivers do not know when they have to choose an activity for the rest of their working hours.

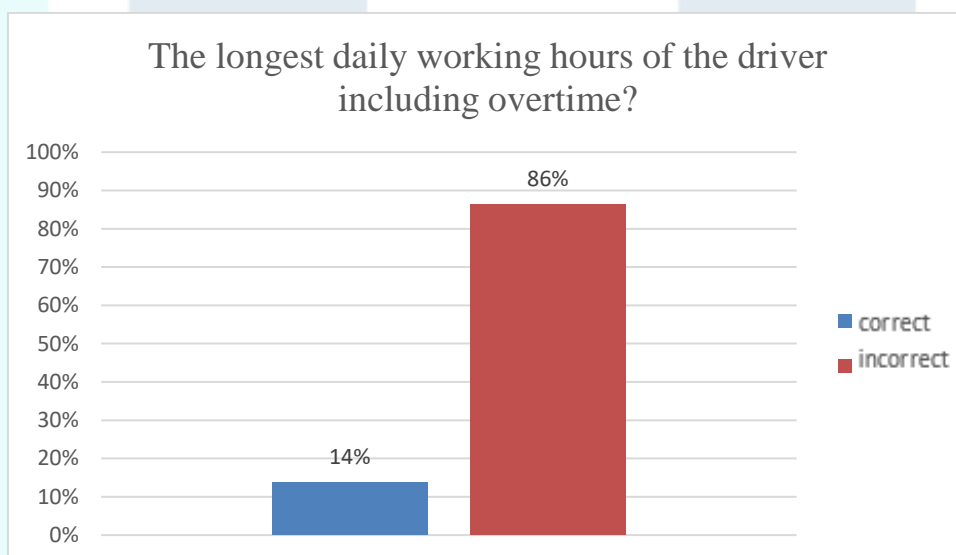
The following graph - Picture 3- shows the results of the answers to the tenth question - The longest weekly working hours of the driver, including overtime? - there were 64 correct answers, i.e. 18%, while 292, i.e. 82% were incorrect, which cannot be considered a good result. This means that 82% of drivers do not know how many hours they can work per week.

The following graph - Picture 4- shows the results of the answers to the eleventh question - The longest daily working hours of a driver including overtime? - there were 49 or

14% correct answers, while 307 or 86% were incorrect, which cannot be considered a good result. This means that 86% of drivers do not know how many hours they can work per day. This question contains the problem of not knowing the concepts of working time and working day (arbeit). A very common mistake among drivers is that they think that the working hours are 15 hours and not 14 hours. A working day is 15 hours.



Picture 3 Graphic representation of the success of the answer to the question - The longest weekly working hours of the driver including overtime



Picture 4 Graphic representation of the success of the answer to the question - The longest daily working hours of the driver including overtime

To the twelfth question - What is included in the driver's other duties? - there were 264 correct answers, or 69%, while 69, or 31% were incorrect, which can be considered a good result.

To the thirteenth question - What is a tachograph? - there were 182 correct answers, or 51%, while 174, or 49% were incorrect, which cannot be considered a good result. However, this is a definition of a tachograph that does not affect the work of the driver.

To the fourteenth question - After how many hours of driving, the driver is obliged to take a continuous break of at least 45 minutes? - there were 340 correct answers, i.e. 96%, while 16, i.e. 4% were incorrect, which can be considered a good result.

To the fifteenth question - In case of malfunction of the digital tachograph, the driver is obliged to? - there were 279 or 78% correct answers, while 77 or 22% were incorrect, which can be considered a good result.

To the sixteenth question - When placing the tachograph slip in the tachograph, is the driver recording data on the brand and type of vehicle? - there were 215, or 60%, correct answers, while 60, or 40% were incorrect, which can be considered a good result.

To the seventeenth question - The driver can use an analog tachograph installed in the vehicle, which has been inspected in an authorized tachograph workshop within a period not longer than? there were 261 correct answers, i.e. 73%, while 95 i.e. 27% were incorrect, which can be considered a good result.

To the eighteenth question - The validity period of the driver's card? there were 327 correct answers, i.e. 92%, while 29, i.e. 8% were incorrect, which can be considered a good result.

On the nineteenth question - Tachographs can be? - there were 107 correct answers, or 30%, while 249, or 70% were incorrect, which cannot be considered a good result. This means that 30% of drivers do not know what types of tachographs exist.

To the twentieth question - When is the driver's activity certificate issued? - there were 181 correct answers, or 51%, while 175, or 49% were incorrect, which cannot be considered a good result. This means that 49% of drivers do not know in which cases an activity certificate is issued.

CONCLUSION

The limitation of this research is that it is a small sample of respondents and that the applied statistical method does not provide enough data on whether the differences in achievement are the result of chance or the systemic action of independent variables. Another limiting factor of this research is that the testing was done only in one driving center and that the drivers were tested in the south of Serbia.

Interestingly, the drivers answered 4,241 questions correctly, i.e. 60%, and 2,879 questions, i.e. 40%, incorrectly. The highest number of correct answers were on questions number 1, 2, 4, 14, and 18, with over 80% correct answers. The largest number of incorrect answers were on questions number 6, 8, 10, 11, and 19, with over 50% of incorrect answers.

What is worrying is the fact that on questions 10 and 11, 82% and 86%, respectively, were incorrect. 82% of drivers did not know how long weekly working hours are, while 86% of drivers did not know how long daily working hours are.

Every candidate who took the entrance test at the end of the education, which lasted 7 hours, also took the exit test. Entrance tests have a success rate of 60%. Exit tests have a success rate of 85%. Based on the results of the exit tests, we can conclude that the drivers have acquired new knowledge.

In the conversations that the authors had with the drivers before the seminar, dissatisfaction prevailed as to why they had to come to the seminars and that the center only takes money from them. In addition to the entrance and exit tests, drivers also filled out evaluation questionnaires after the end of the seventh lesson. In the evaluation questionnaires, the authors encountered praise for the seminar and comments that such seminars should be continued.

The authors think that these seminars are necessary and that they must be continued. The number of traffic accidents and the number of fatalities in the Republic of Serbia can only be reduced by the comprehensive action of all factors.



Škola za cestovni promet

ŠKOLA ZA CESTOVNI PROMET, ZAGREB

Authors:

Renata Heljić dipl. ing. - prof. mentor

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25. ODRŽIVOST U PROMETU I LOGISTICI –

KORIŠTENJE POSLOVNIH SLUČAJEVA PODUZEĆA U PODRUČJU PROMETA I LOGISTIKE U NASTAVI UPOTREBOM NOVIH PEDAGOŠKIH METODA KAO PRODUKT PROJEKTA "SUSTAIN4VET"

Sažetak:

Škola za cestovni promet iz Zagreba sudjeluje kao partner u projektu "Innovative and Sustainable pedagogies for Digital Green Case Study – based Teaching 4 VET", skraćenog naziva "SUSTAIN4VET", u sklopu programa Europske unije Erasmus+ . Projekt je trajao 19 mjeseci, od 1.11.2021. do 31.5.2023..

Voditelj projekta bio je Fakultet prometnih znanosti iz Zagreba koji svojim višegodišnjim iskustvom i radom na projektima u području prometa i logistike nastoji ostvariti ideju o uspostavi strateškog partnerstva između ustanova za strukovno obrazovanje i visokog školstva kako bi razmjenom dobre prakse i digitalnih tehnoloških inovacija u prometu i logistici ojačali međusobne veze i suradnju. Osim Škole za cestovni promet i nositelja projekta Fakulteta prometnih znanosti iz Zagreba, partneri na projektu bili su: Fakultet pomorskih znanosti i prometa iz Ljubljane, Association pour le développement de la formation, professionnelle dans les transports France, JAMK University of Applied Sciences (professional teacher education) Finska, Šolski center Celje Slovenia, Jyväskylä Educational Consortium Gradia Finska, Srednja škola Zlatar Croatia, Strokovni izobrazevalni center, Ljubljana, Slovenia i Istituto di Istruzione Secondaria Superiore "A.Berenini", Italy.

Cilj ovog projekta bio je razvijati poslovne slučajeve na temelju stvarnih podataka konkretnih tvrtki iz područja prometa i logistike a koji pridonose održivosti, brizi za okoliš i povećanju produktivnost uvođenjem inovacija u poslovanju. Osim razvoja poslovnih slučajeva radilo se na novim pedagoškim metodama u nastavi te na posljertku njihovo korištenje prilikom testiranja istih u nastavi učenika smjera Tehničar za logistiku i špediciju. Strukovne škole, partneri u projektu, kreirale su po dva poslovna slučaja te ih testirali u nastavi uz pomoć novih nastavnih metoda. Važan rezultat je i internacionalizacija škole kao i jačanje suradnje s partnerskim školama u tom obrazovnom sektoru, s Fakultetom prometnih znanosti i s tvrtkama koje se bave prometom i logistikom.

Ključne riječi: Održivost u poslovanju u području prometa i logistike, Korištenje poslovnih slučajeva u nastavi uz primjenu novih pedagoških metoda

Održivost u prometu i logistici - korištenje poslovnih slučajeva poduzeća u području prometa i logistike u nastavi upotrebom novih pedagoških metoda kao produkt projekta "SUSTAIN4VET"

1. O projektu



SUSTAIN4VET

SUSTAIN4VET je skraćeni naziv projekta 'Innovative and Sustainable Pedagogies for Digital Green Case Study-based Teaching 4 VET', čiji koordinador je bio Fakultet prometnih znanosti Sveučilišta u Zagrebu.

Izvorna ideja za ovaj projekt proizašla je iz prepoznatih slabosti strukovnog obrazovanja i osposobljavanja (VET) u logistici. Strukovno obrazovanje i osposobljavanje u logistici nije dovoljno strukovno orijentirano i inovativno da bi odgovorilo na tehnološke promjene. Iz tih razloga strukovno obrazovanje i osposobljavanje u logistici nije dovoljno atraktivno i učenici ne dobivaju sve vještine i kompetencije potrebne za tržište rada.

Neki od razloga za ove slabosti su poteškoće koje pogađaju strukovne nastavnike i trenere koji nemaju odgovarajuću opremu u školama i moraju raditi prema nastavnim planovima i programima koji nisu prilagođeni potrebama sadašnjeg i budućeg tržišta rada.

Ovaj projekt pruža podršku strukovnim nastavnicima i trenerima na način da im pruža nove i kreativne nastavne metode i modele za podučavanje učenika koristeći studije slučaja s izvornim podacima logističkih tvrtki. Ova vrsta nastave stavlja učenike u realne situacije i poboljšava njihove vještine obrade podataka i donošenja odluka.

Projekt je trajao 19 mjeseci, započeo je 1. studenog 2021., a završio 31. svibnja 2023.

2. Kreiranje studije slučaja

Kreiranje studije slučaja započeo je definiranjem kriterija za studije slučaja prikladne za poučavanje strukovnih predmeta u logistici i transportu. Nakon definiranja kriterija kvalitete, kolege sa Sveučilišta JAMK u Finskoj kreirali su pedagoške smjernice koje korak po korak opisuju kako razviti studiju slučaja u logistici i transportu. Sve smjernice prikladne su za online nastavu i nastavu u učionici.

Strukovni profesori iz Škole za cestovni promet u Zagrebu kreirali su dvije studije slučaja iz logistike i transporta koristeći stvarne podatke distributera medicinskom opremom iz Zagreba. Naša škola već godinama surađuje s ovom tvrtkom i mnogi učenici tamo pohađaju praktičnu nastavu pa smo smatrali prikladnim raditi s njihovim podacima. Studije slučaja koje smo razvili imaju vrlo jaku ekološku svijest kao jedan od glavnih ciljeva ovog projekta.

2.1 Poslovni slučaj broj 1 - Povećanje učinkovitosti otpreme

Prvi slučaj na kojem smo radili temelji se na implementaciji novog kontrolnog softvera u poduzeću koji smanjuje pogreške u isporuci farmaceutskih proizvoda. Obzirom da su

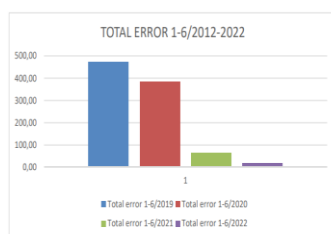
farmaceutski proizvodi vrlo osjetljivi na održavanje određene temperature tijekom transporta i zahtijevaju druge uvjete transporta, ova softverska kontrola nužna je za unapređenje poslovanja i zaštitu tvrtke od nepotrebnog otpada farmaceutskih proizvoda koji su tijekom transporta izgubili kvalitetu, jer su npr. isporučeni pogrešnom kupcu.

Ovom studijom slučaja željeli smo pokazati učenicima kako rok valjanosti lijekova utječe na okoliš i emisiju stakleničkih plinova. Također smo htjeli postići da učenici uoče razliku između podataka prikupljenih prije i nakon implementacije softvera za praćenje.

Učenici su izračunali procijenjeni broj kvarova na kraju 2022. koristeći prikazane vrijednosti

The start of using the new control system				
Error description	AVERAGE 1-6 2021		AVERAGE 1-12 2021	
	Br. gr	%	Br. gr	%
Delivered to wrong customer 2021	7,33	0,59	6,17	0,40
Late delivery	0,33	0,02	0,17	0,01
Breakage during shipment / transport	7,67	0,07	9,08	0,07
Document repetition 2021	15,00	0,25	8,75	0,08
Re-authorization	25,67	12,33	17,58	5,50
Goods at the exit - with the driver	7,83	0,07	7,58	0,05
Total error 1-6/2021	63,83		49,33	
Delivery number	12.614,33		13.405,50	
Number of invoices	64.476,33		66.243,17	
Number of the package	114.538,33		116.827,33	

AVERAGE 1-6 2022		
Error description	Br. gr	%
Delivered to wrong customer 2022	4,00	0,21
Late delivery	0,00	0,00
Breakage during shipment / transport	6,00	0,02
Document repetition 2021	0,50	0,00
Re-authorization	0,33	0,05
Goods at the exit - with the driver	7,00	0,03
Total error 1-6/2022	17,83	
Delivery number	12.946,00	
Number of invoices	65.239,17	
Number of the package	117.421,83	



trenda, izračunali su smanjenje potrošnje goriva povezano sa smanjenjem broja neispravnih isporuka te usporedili i komentirali rezultate za neispravne isporuke u prvoj polovici 2019. i istom razdoblju 2022. godine.

Primjer podataka na kojima studenti rade prikazan je na slici 1.

Slika 1 – Studentski materijali za rad na studiji slučaja 1

2.2. Studija slučaja 2 - Aktivni spremnici za cestovni prijevoz farmaceutskih proizvoda

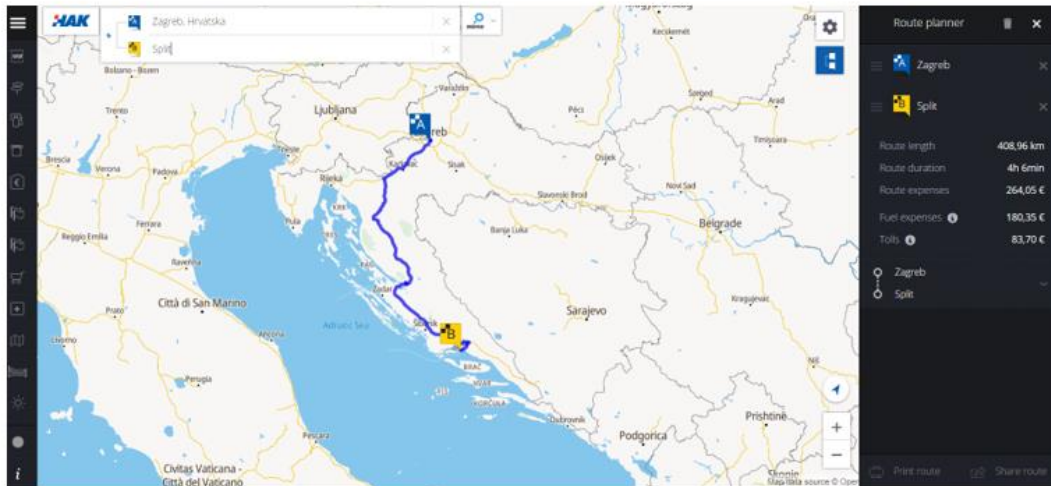
U ovoj studiji slučaja htjeli smo pokazati našim učenicima kako korištenje aktivnih kontejnera u transportu može pojednostaviti organizaciju transporta i osigurati da se svi proizvodi dopreme iste kvalitete kao što su bili prije samog transporta. Za ovu studiju slučaja učenici koriste interaktivnu kartu Hrvatskog autokluba (HAK) na kojoj su odabrali ceste za najjeftiniji prijevoz, bez nepotrebnih troškova, vodeći računa o emisiji stakleničkih plinova i bez otpada i kvarenja tereta.

Tijekom rada na ovoj studiji slučaja učenici su uvidjeli važnost kvalitetne i pravovremene distribucije farmaceutskih proizvoda, o čemu ovise cijena i brzina transporta te kakav je utjecaj aktivnih spremnika na emisiju stakleničkih plinova. Iz ovog poslovnog slučaja vidljiv je i utjecaj aktivnih kontejnera na učinkovitost poslovanja. Učenici su izračunavali troškove prijevoza, odabirali su isplativiju i ekološki prihvatljiviju prijevoznu rutu i sredstvo prijevoza, računali su emisiju stakleničkih plinova te su naučili koristiti interaktivnu kartu HAK-a.

Primjer korištenja interaktivne karte je na slici 2:

2. **Departure and destination point (town or city) within your country or internationally, for example: (Picture 5)**

Zagreb - Split
Zagreb – Osijek
Zagreb – Celje



Slika 2 – Odabir rute

3. Nastavne metode

Jedan od glavnih ciljeva projekta bio je uvođenje i primjena novih nastavnih metoda te njihovo testiranje u nastavi. Projekt je ponudio nekoliko metoda poučavanja koje podržavaju poučavanje i učenje temeljeno na studijama slučaja u suradničkom i online okruženju. Odabrane metode trebale su zadovoljiti nekoliko kriterija kao što su: omogućiti suradničko učenje, biti prikladne za učenike strukovnog obrazovanja i osposobljavanja i za učenje na daljinu te također biti primjenjive u različitim uvjetima. Metode smo podjelili prema fazama procesa učenja, a između 34 ponuđene metode odabrali smo sljedeće:

Metode za uvod i motivaciju: „Istraživač, kupac, turist, zatvorenik“

Metode aktivne suradnje: „Snježna gruda“ i „Šest šešira za razmišljanje“

Metode formativnog i sumativnog ocjenjivanja: „SWOT“ i „Morska zvijezda“

3.1 Istraživač, kupac, turist, zatvorenik

Ova kratka aktivnost prikladna je za početak lekcije i pomaže nastavniku da sazna koliko su učenici motivirani i zainteresirani za temu, a zatim mu omogućuje da reagira na odgovarajući način.

Provedba: Nastavnik na ploči crta četiri odjeljka i u svaki upisuje po jedan od sljedećih pojmova: Istraživač, Kupac, Turist i Zatvorenik. Zatim dijeli post-it svakom učeniku i objašnjava značenje svakog odjeljka.

Istraživač je željan otkrivanja novih ideja i perspektiva i želi naučiti što je više moguće o temi.

Kupac je zainteresiran za sve dostupne informacije i uživa u odmoru od svakodnevne rutine.

Turista ne zanima radna grupa, ali ga veseli odmor od svakodnevice.

Zatvorenik se osjeća prisiljenim sudjelovati u radnoj skupini a radije bi radio nešto drugo.

Sada učenici stavljaju svoj post-it u željeno polje.

Ova je aktivnost prikladna za dobivanje povratnih informacija od učenika prije početka rada na studiji slučaja i omogućuje nastavniku uvid u to kojeg učenika treba više motivirati.

3.2 Snježna gruda

„Snježna gruda“ je strategija aktivnog učenja koja pomaže učenicima podučavati jedni druge različite koncepte i teme. Omogućuje učenicima da rade u grupama i postupno izgrađuju svoje znanje. Metoda se može koristiti za pokretanje rasprave, stvaranje novih ideja i utvrđivanje trenutnog razumijevanja teme od strane učenika. Učenici započinju ovu aktivnost pojedinačno, a zatim postupno formiraju veće grupe za raspravu, udvostručujući veličinu grupe svakih pet minuta dok se svi ponovno ne okupe u velikoj grupi na kraju aktivnosti.

Provedba: Nastavnik zadaje temu i daje učenicima sve potrebne informacije.

Učenici zatim mogu samostalno proći kroz informacije (10-15 minuta) i prepoznati najvažnije činjenice, ideje ili odgovore na pitanja. Učenici zatim dijele činjenice, ideje ili odgovore s drugim učenikom i raspravljaju oko 5 minuta. Nakon što je par raspravio i uskladio svoje misli, nastavnik traži od učenika da s drugim parom izmijene svoja razmišljanja kako bi se formirala grupa od četiri učenika. Nakon još 5 minuta četveročlana grupa nastavlja proces i formira grupu od 8 učenika itd.

Ova metoda navodi učenike da zajedno usvajaju znanje i razvijaju ideje. Promiče komunikaciju, kritičko mišljenje, analizu i vještine vrednovanja kroz grupne rasprave u kojima se razvijaju argumenti i protuargumenti. Ova metoda omogućuje učenicima da izgrade znanje radeći na rješavanju problema, umjesto da im nastavnik objasni kroz izravne upute bez interakcije.

3.3 Šest šešira za razmišljanje

Metoda „Šest šešira za razmišljanje“ može se koristiti u učionici ili u radu na daljinu za poučavanje kritičkog razmišljanja i debate, te razmišljanja o konceptu ili ideji. Različiti šeširi predstavljaju različite kognitivne funkcije ljudskog mozga koje namjerno uključuju nastavnika ili voditelja tijekom vježbe.

Provedba: Nastavnik odabire temu ili problem za grupnu aktivnost i formira grupu od 6 učenika. Nakon što su se učenici odlučili o boji šešira, nastavnik objašnjava pojedinačne uloge šešira za razmišljanje i daje upute:

Bijeli šešir - govori o činjenicama i objektivnim informacijama o problemu. Pruža objektivne podatke

Crveni šešir - dijeli svoje osjećaje i emocije o problemu, strastvene, neobjektivne ideje

Crni šešir – Predlaže rješenja u slučaju najgore situacije (pesimističan pogled)

Žuti šešir - Razmatra pozitivne aspekte ili prednosti situacije (optimističan pogled)

Zeleni šešir - Razmatra kreativne ideje koje proizlaze iz novog načina gledanja na problem

Plavi šešir - Sažima sve što je naučeno. Obično ga nosi nastavnik.

Ovisno o tome koji su šešir odabrali, učenici mogu započeti postavljanje pitanja i raspravljati kako bi nastavili razgovor i pružili povratne informacije na temelju perspektive svog šešira. Svaki bi učenik trebao biti slobodan improvizirati sve dok ostaje u liku. Ako skrene s teme, plavi šešir (nastavnik) uvijek ih može podsjetiti na njihovo mjesto u procesu razmišljanja.

Ova metoda potiče razmišljanje izvan okvira, stvara produktivnu grupnu dinamiku i osigurava da svi učenici sudjeluju u raspravama.

3.4 SWOT

SWOT analiza je tehnika koja pomaže učenicima analizirati i identificirati pozitivne i negativne unutarnje (snage i slabosti) i vanjske (prilike i prijetnje) čimbenike situacije kako bi se postigli određeni ciljevi. SWOT analiza se može koristiti u aktivnom dijelu studije slučaja za evaluaciju rješenja, ali i na kraju kao povratna informacija. Učenici mogu koristiti alat SWOT za pružanje povratnih informacija nastavniku o metodama poučavanja, učinkovitosti različitih strategija i tehnika koje se koriste u učionici.

Provedba: Nastavnik objašnjava svrhu i cilj aktivnosti, a zatim crta veliki kvadrat na bijelu ploču ili papir. Kvadrat podijeli na 4 dijela i označi svaki određenim pojmom: „snage“, „slabosti“, „prilike“, „i „prijetnje“ i objašnjava svaki pojam:

Snage: Područja u kojima je učenik/tim učenika koji sudjeluju dobar/bio dobar.

Slabosti: Razmotriti što će drugi učenici ili druge skupine učenika vjerojatno vidjeti kao slabosti u vama ili vašem radu.

Mogućnosti: Trendovi/ponašanja koje bi učenik ili grupa učenika mogli iskoristiti.

Prijetnje: Vanjski izvori koji ometaju rad učenika ili postojeći prijetnje koji djeluju kao prepreke u ispunjavanju njihovih zadataka.

Učenici se upoznaju s kriterijima, procesom i temom koja se ocjenjuje. Zapisuju svoje ideje i zatim ih stavljaju u određenu kategoriju. Na kraju rezultate SWOT analize pretvoraju se u strateški plan. Ova metoda poboljšava vještine učenja i grupnog rada učenika, kao i njihovu stručnost. Potiče učenike da preuzmu veću odgovornost za svoje učenje i razvija metode strateškog razmišljanja i rješavanja problema.



3.5 Morska zvijezda

Metoda „ Morska zvijezda“ omogućuje nastavniku dobivanje povratne informacije o svojim metodama poučavanja. Razvija vještine analize i razmišljanja kod učenika dajući im priliku da izraze svoje mišljenje. Metoda Morska zvijezda može se koristiti za evaluaciju ili analizu bilo koje vrste procesa ili aktivnosti (npr. metoda poučavanja).

Provedba: Nastavnik crta dijagram u obliku zvijezde na flip chartu ili bijeloj ploči. Zatim zapisuje sljedeći naslov

između krakova zvijezde i objašnjava što svaki naslov znači:

Nastavljamo činiti: sve što nam se svidjelo na nastavi, sve što nam je pomoglo u našem radu

Prestajemo činiti: sve što nam ne koristi ili koči naš rad

Činimo manje: aktivnosti koje je potrebno doraditi u trenutnom kontekstu

Činimo više: aktivnosti koje bi trebalo unaprijediti

Pokušavamo/počinjemo: ideje za nove aktivnosti i strategije koje bismo trebali uvesti

Nastavnik zatim daje svakom učeniku 5 samoljepivih listića i oni zapisuju svoje ideje na samoljepljive listiće kako bi dovršili dijagram. Jedan post-it po ideji i po području. Učenici zatim naizmjenice iznose svoje ideje. Nastavnik zatim traži od učenika da glasaju o tome koje ideje smatraju najvažnijima u svakom području.

Ova metoda omogućuje uvođenje novih ideja putem konstruktivnih povratnih informacija. Učenici su motivirani i ohrabreni promjenama koje bi mogle uslijediti zahvaljujući novim strategijama koje koriste.

4. Testiranje studija slučaja u radu s učenicima

Studije slučaja koje smo izradili testirali smo na dva načina: Prvo smo ih radili s našim učenicima iz Škole za cestovni promet, a zatim smo organizirali hibridni test (djelomično online) sa Školskim centrom u Ljubljani, u kojem su sudjelovali i naši i njihovi učenici. Ovo vanjsko testiranje pratili su koordinatori projekta koji su ocjenjivali naš rad. Oba su testa prošla vrlo dobro, učenici su sudjelovali u pred testu i post testu pomoću kojih se ocjenjivao njihov napredak u radu na studijama slučaja. Rezultati su bili zadovoljavajući i složili smo se da su studije slučaja koje smo razvili i metode koje smo koristili tijekom testiranja bile primjerene.

4.1. Interno testiranje – Testiranje u Školi za cestovni promet Zagreb



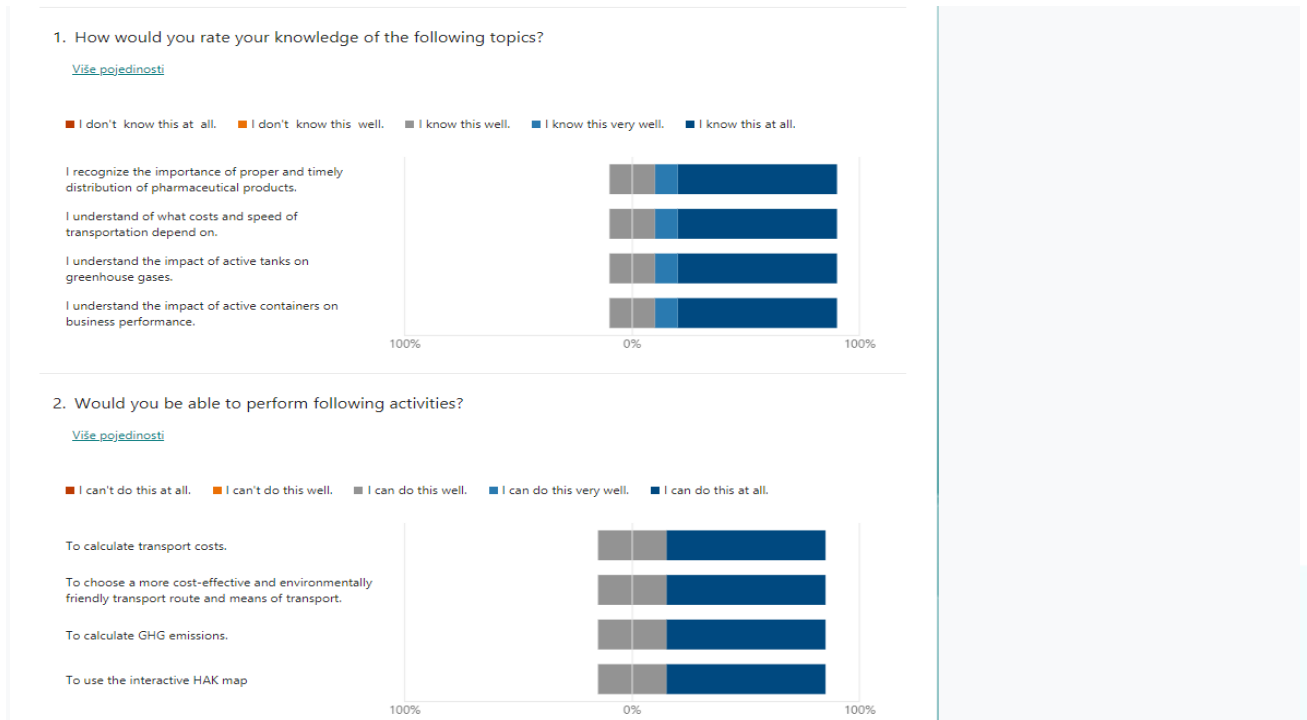
Sudionici internog testiranja bili su učenici koji se školuju za zvanje Tehničara za logistiku i špediciju te su imali potrebno predznanje za razumijevanje važnosti dobro pripremljenog prijevoza, posebice medicinske opreme. Bili su jako zainteresirani za temu obje studije slučaja koje smo pripremili i aktivno su sudjelovali u testiranju. Učenici su bili podijeljeni u dvije grupe i svaka je grupa radila na jednoj od studije slučaja koristeći različite nastavne metode koje su opisane u nastavku. Učenici na Slika 3 – Interno testiranje

(metoda Šest šešira za razmišljanje)

slici sudjeluju u testiranju studije slučaja 2: Aktivni spremnici za cestovni prijevoz farmaceutskih proizvoda, igrajući ulogu metode Six Thinking Hats. Ova metoda ih je navela na kritičko razmišljanje o prednostima korištenja aktivnih spremnika i koliko je složeno planirati odgovarajući prijevoz osjetljivih proizvoda kao što su medicinski proizvodi.

4.2. Rezultati nakon internog testiranja

Nakon svakog testiranja učenici su rješavali testove u MS Forms-u, a rezultate smo podijelili s ostalim sudionicima projekta. Rezultati internog testiranja su na sljedećoj slici (slika 4).



Slika 4 – Rezultati nakon internog testiranja (MS Forms)

5. Zaključak – Prednosti projekta

Rad na ovom projektu bilo je novo iskustvo i smatramo da su aktivnosti koje smo imali tijekom ovog projekta bile vrlo korisne i potrebne. Te aktivnosti uključuju edukaciju za kreiranje studija slučaja, praktičan rad na novim pedagoškim metodama i testiranje studija slučaja s učenicima. Poseban naglasak je na samom testiranju studije slučaja u sklopu ovog projekta za koje smatramo da je bilo neophodno, jer su ove studije slučaja napravljene za učenike i kao pomoć strukovnim nastavnicima. Naše iskustvo u kreiranju i testiranju studija slučaja također će biti korisno za sve strukovne nastavnike koji žele u svoj rad uvoditi nove metode i načine poučavanja i osposobljavanja svojih učenika.



Škola za cestovni promet

ŠKOLA ZA CESTOVNI PROMET, ZAGREB

Authors:

Renata Heljić dipl. ing. - prof. Mentor

Željka Turković dipl. oecc. – VET teacher

25. SUSTAINABILITY IN TRANSPORT AND LOGISTICS

– USING BUSINESS CASES OF TRANSPORT AND LOGISTICS COMPANIES IN THE CLASSROOM USING NEW PEDAGOGICAL METHODS AS A PRODUCT OF THE "SUSTAIN4VET" PROJECT

Summary:

School of Road Transport from Zagreb participates as a partner in the project "Innovative and Sustainable pedagogies for Digital Green Case Study – based Teaching 4 VET", abbreviated as "SUSTAIN4VET", within the Erasmus+ program of the European Union. The project lasted 19 months, from November 1, 2021 to May 31, 2023.

The project leader was the Faculty of Transport Sciences from Zagreb, which, with its long experience and work on projects in the field of transport and logistics, aims to realize the idea of a strategic partnership between institutions of vocational education and higher education in order to strengthen mutual relations and cooperation through the exchange of best practices and digital technological innovations in the field of transport and logistics. In addition to the Road Traffic School, Zagreb and the project coordinator, the Faculty of Transport Sciences from Zagreb, the project partners were: Faculty of Maritime Sciences and Transport from Ljubljana, Association pour le développement de la formation, professionnelle dans les transports France, JAMK College of Applied Sciences (professional teacher training) Finland, School Center Celje Slovenia, Jyvaeskylae Educational Consortium Gradia Finland, Sredni škola Zlatar Croatia, Vocational Education Center, Ljubljana, Slovenia and Istituto di Istruzione Secondaria Superiore "A.Berenini," Italy.

The aim of this project was to develop business cases based on real data from specific companies in the field of transport and logistics that contribute to sustainability, environmental protection and increased productivity by introducing innovations in the economy. In addition to developing business cases, the project also worked on new pedagogical methods in the classroom and, finally, their application when tested in classes of logistics and shipping technician students. The vocational schools involved in the project each developed two business cases and tested them in the classroom using the new teaching methods. An important result is the internationalization of the school as well as the strengthening of cooperation with partner schools in this educational field, with the Faculty of Transport Sciences and with companies involved in transport and logistics.

Keywords: Sustainability in business in the field of transportation and logistics, Use of business cases in teaching with the application of new pedagogical methods

Teaching traffic and logistics through case studies using new pedagogical methods as a product of project "SUSTAIN4VET"

1. About the project



SUSTAIN4VET

SUSTAIN4VET is the short name of the project 'Innovative and Sustainable Pedagogies for Digital Green Case Study-based Teaching 4 VET', coordinated by the Faculty of Transport and Traffic Sciences at the University

of Zagreb.

The original idea for this project arose from the recognised weaknesses of vocational education and training (VET) in logistics. VET in logistics is not sufficiently vocationally oriented and innovative to respond to technological changes. For these reasons, VET in logistics is not attractive enough and students do not get all the skills and competencies needed for the labour market.

Some of the reasons for these weaknesses are difficulties that affect VET teachers and trainers who do not have the right equipment in schools and have to work according to curricula that are not adapted to the needs of the current and future labour market.

This project supports VET teachers and trainers in a way that provides them with new and creative teaching methods and models for teaching students using case studies with original data from logistics companies. This type of teaching puts students in realistic situations and improves their data processing and decision-making skills.

The project had a duration of 19 months, started on November 1, 2021, and ended on May 31, 2023.

2. Case study development

Case study development began with defining criteria for case studies appropriate for VET in logistics and transportation. After defining quality criteria, colleagues at JAMK University in Finland developed pedagogical guidelines that describe step by step how to develop a case study in logistics and transportation. All guidelines are suitable for online and classroom teaching.

Vocational teachers from the Road Traffic School in Zagreb developed two case studies in logistics and transport using real data from a medical equipment dealer in Zagreb. Our school has been working with this company for years and many students attend practical classes there, so we thought it appropriate to work with their data. The case studies we developed have a very strong ecological awareness as one of the main goals of this project.

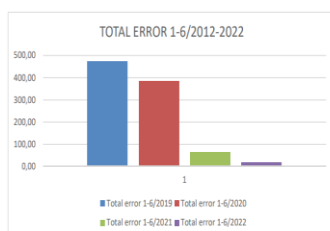
2.1 Case Study 1 - Increasing the Efficiency of Expedit

The first case study we worked on is based on the implementation of a new control software in a company that reduces errors in the delivery of pharmaceutical products. Since pharmaceutical products are very sensitive to certain temperatures and other transport conditions, this software control is necessary to improve business and protect the company from unnecessary waste of pharmaceutical products that have lost their quality during transport, e.g. because they were delivered to the wrong customer.

With this case study, we wanted our students to understand how the expiration date of medications affects the environment and how to reduce greenhouse gas emissions. We also wanted students to learn the difference between the data collected before and after the tracking software was implemented.

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Error description	Br. gr	%	Br. gr	%
Delivered to wrong customer 2021	7,33	0,58	6,17	0,40
Late delivery	0,33	0,02	0,17	0,01
Breakage during shipment / transport	7,67	0,07	9,08	0,07
Document repetition 2021	15,00	0,25	8,75	0,08
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	AVERAGE 1-6 2022	
Error description	Br. gr	%
Delivered to wrong customer 2022	4,00	0,21
Late delivery	0,00	0,00
Breakage during shipment / transport	6,00	0,02
Document repetition 2021	0,50	0,00
Re-authorization	0,33	0,05
Goods at the exit - with the driver	7,00	0,03
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Students worked on the case study to calculate the estimated number of defects at the end of 2022 using the trend values presented, calculate the decrease in fuel consumption associated with the decrease in the number of defective deliveries, and compare and comment on the results for defective deliveries in the first half of 2019 and the same period in 2022.

The example of the data that the students are working on is shown in the Picture 1.

Picture 1 – Student materials for working on case study 1

2.2. Case study 2 - Active containers for road transport of pharmaceutical products

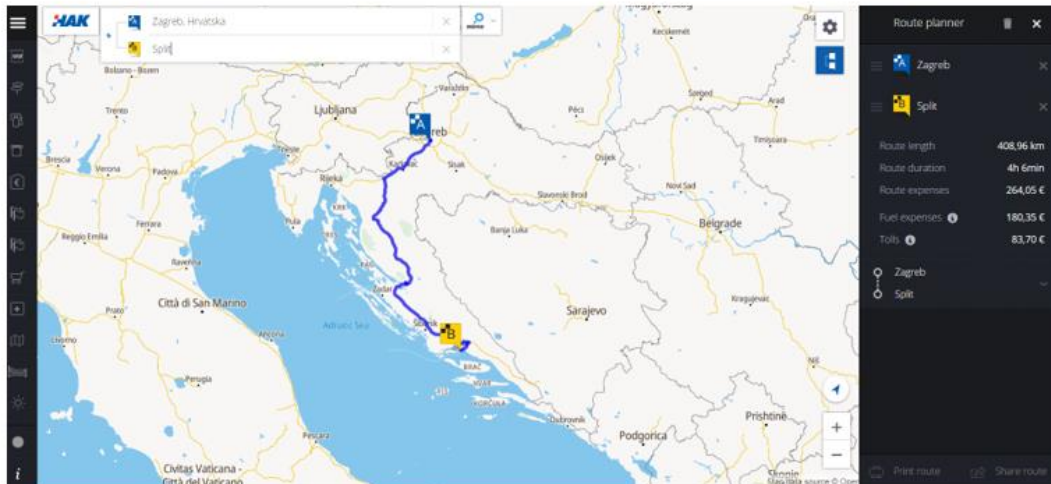
In this case study, we wanted to show our students how the use of active containers in transportation can simplify the organization of transportation and ensure that all products are of the same quality as they were at the beginning of the transportation process. For this case study, students use the interactive map of the Croatian Automobile Club (HAK), in which they selected roads for the cheapest transportation, without unnecessary costs, taking into account greenhouse gas emissions and without wasting the transported products.

While working on this case study, students had to realize the importance of quality and timely distribution of pharmaceutical products, understand what the cost and speed of transportation depend on, understand the impact of active containers on greenhouse gas emissions, and understand the impact of active containers on business efficiency. They calculated transportation costs, had to choose a more cost-efficient and environmentally friendly transportation route and means, had to calculate GHG emissions, and learned how to use the interactive map HAK.

An example of using the interactive map is in the picture 2 below:

2. **Departure and destination point (town or city) within your country or internationally, for example:** (Picture 5)

Zagreb - Split
Zagreb – Osijek
Zagreb – Celje



Picture 2 – Route selection

3. Teaching methods

One of the main goals of the project was to introduce and apply new teaching methods and test them in the classroom. The project offered several teaching methods that support living case study-based teaching and learning in a collaborative online environment. They were selected based on several criteria and must enable collaborative learning, be suitable for VET students and for distance learning, and also be adaptable for different types of situations. The methods were classified according to the phases of the learning process and among the 34 methods we chose the following:

Method for orientation and motivation: „Explorer, shopper, vacationer, prisoner“
Methods for the active experimentation: „Snowballing“and „Six thinking hats“

Methods for formative and summative assessment: „SWOT“ and „The Starfish“

3.1 Researcher, shopper, vacationer, prisoner

This short activity is suitable for the beginning of the lesson and helps the teacher to find out whether the learners are very motivated and interested in the topic or more reluctant, and then allows the teacher to respond if necessary.

Delivery: On a large cardboard box, the teacher draws four sections (boxes) and writes the following terms in each: Researcher, Shopper, Vacationer, and Prisoner. Then the teacher distributes a Post-it to each learner and explains the meaning of each box:

Researcher is eager to discover new ideas and perspectives and wants to learn as much as possible about the topic.

Shopper is interested in all available information and enjoys a break from the daily routine.

Vacationer is not interested in the work group, but is happy to have a break from everyday life.

Prisoner feels compelled to participate in the workgroup and would rather be doing something else.

Now learners put their post-it in the desired field.

This activity is suitable to get feedback from learners before starting the case study and allows the teacher to know which learner needs to be motivated more.

3.2 Snowballing

Snowballing is an active learning strategy that helps students teach each other concepts and topics. It allows students to work in groups and build their knowledge gradually. The method can be used to initiate discussions, generate new ideas, and capture students' current understanding of a topic. Students begin this activity individually and then gradually form larger discussion groups, doubling their group size every five minutes until everyone is reassembled in the large group at the end of the activity.

Delivery: The teacher introduces the topic and gives students all the information they need.

Students can then go through the information (10-15 minutes) and identify the most important facts, ideas, or answers to the questions. Students then share the facts, ideas, or answers with another student and discuss again for about 5 minutes. Once the pair has discussed and consolidated their thoughts, the teacher asks students to move to another pair and share their thoughts again to form a group of four students. After another 5 minutes, the group of four continues the process and finally forms a group of 8 students.

This method leads students to produce knowledge and develop thoughts together. Promotes communication, critical thinking, analysis, and evaluation skills through group discussions in which arguments and counterarguments are developed. This method allows students to build knowledge by working on a challenging problem rather than having the teacher explain through direct instruction without interaction.

3.3 Six thinking hats

In the classroom or remotely, teachers can use the Six Thinking Hats exercise to teach critical thinking and debate or brainstorm about a concept or idea. The different hats represent different cognitive functions of the human brain that are intentionally turned on by the teacher or facilitator during the sessions or exercises.

Implementation: The teacher selects the topic or problem for the group activity and forms groups of 6 students. After students have decided on a hat color, the teacher explains to the class the individual roles of the thinking hats and gives instructions for the order of the thinking hats:

White Hat - Discusses the facts and objective information about the problem. Provides objective data

Red Hat - Shares your feelings and emotions about the problem. Passionate, non-objective ideas

Black Hat – Suggests solutions in case the worst situation occurs (pessimistic view)

Yellow Hat - Considers the positive aspects or benefits of the situation (optimistic view)

Green hat - Considers creative ideas that result from a new way of looking at the problem

Blue Hat - Summarize everything that has been learned. Usually worn by the teacher

Depending on which hat they have chosen, students can begin by asking the following questions and prompts to keep the conversation going and provide feedback based on their hat's perspective. Each student should be free to improvise as long as they stay in character. If they digress, the blue hat (teacher) can always remind them of their place in the thinking process. This method encourages thinking outside the box, creates a productive group dynamic, and ensures that all members of the class participate in the discussions.

3.4 SWOT

The SWOT analysis is a technique that helps students analyze and identify the positive and negative internal (strengths and weaknesses) and external (opportunities and threats) factors of a situation to achieve goals or purposes. The SWOT analysis can be used in the active part of a case study to evaluate solutions, but also as a feedback mechanism. Students can use the tool SWOT to provide feedback to the teacher on teaching methods, effectiveness of different strategies, and technology used in the classroom.

Implementation: The teacher explains the purpose and goal of the activity and then draws a large square on a white board, chart, or paper. Divide the square into quadrants and label each with terms: „strengths," "weaknesses," „opportunities," „and „threats," and explain each term:

Strengths: The areas in which the student/team of students in question is/was good.

Weaknesses: Consider what other students or other groups of students are likely to see as weaknesses in you or your work.

Opportunities: The trends/behaviors that a student or group of students could take advantage of.

Threats: External sources that interfere with students' work or existing threats that act as obstacles to their accomplishing their tasks.

Students become familiar with the criteria, the process, and the issue to be evaluated. They write down their ideas and then place them in a specific category. Now it is time to turn the SWOT analysis into a strategic plan.

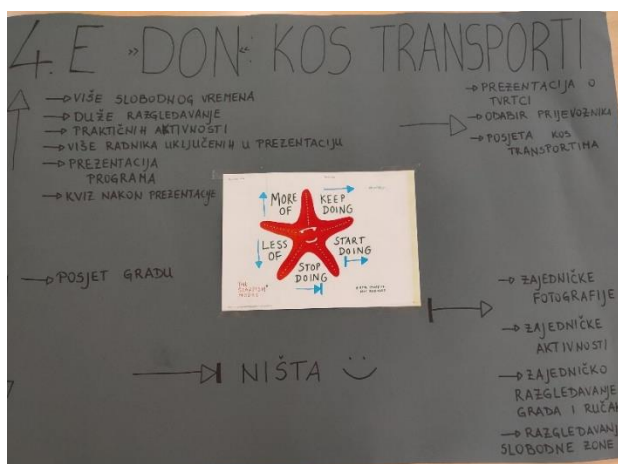
This method improves students' learning and group work skills as well as their expertise. It encourages students to take more responsibility for their learning and promotes strategic thinking and problem solving.

3.5 The Starfish

The Starfish method allows the trainer to receive feedback on his or her teaching method or training session. It develops learners' analysis and reflection skills by giving them a voice. The Starfish method can be used to evaluate or review any type of process, activity, or product (e.g., a teaching method).

Implementation: The teacher draws a star-shaped diagram on a flip chart or white board. Then writes the following headings on each part of the chart and explains what each part of the chart means:

We continue: everything we liked about the session, everything that helped us do our work



Picture 3 – Starfish method (done by students)

We stop: everything that does not benefit us or hinders our work

We do less: the practices that need refinement in the current context

We do more: the practices that do not benefit us enough and that should be improved

We try/start: Ideas for new practices that we should introduce

The trainer then gives each learner 5 post-its and they write their ideas on the post-its to complete the diagram. One post-it per idea and per area. Learners then take turns presenting their ideas. The teacher then asks the learners to vote on which ideas they think are most important in each area.

This method allows for the introduction of new ideas through constructive feedback. Learners are motivated and encouraged to look forward to something great that could come their way because of the new strategies they use.

4 Testing case studies with students

We tested the case studies we created in two ways: First, we worked on them with our students from the Road Traffic School, and then we organized a hybrid test (partly online) with the School Center in Ljubljana, in which our students and theirs participated. This external testing was observed by the project coordinators, who evaluated our work.

Both tests went very well, the students participated in a pretest and a posttest in which they evaluated their progress in working on the case studies. The results were satisfactory and we agreed that the case studies we developed and the methods we used during the tests were appropriate.

4.1 Internal testing – Testing at Road Traffic School, Zagreb

The participants in the internal testing were students training to become logistics technicians in the freight sector and had the necessary prior knowledge to understand the importance of well-prepared transportation, especially of medical equipment. They were very interested in the subject of the two case studies we prepared and actively participated in the testing.

The students were divided into two groups and each group worked on a case study using different teaching methods, which are described below. The students in the picture are



participating in the testing of Case Study 2: Active containers for road transport of pharmaceutical products, playing the role of the Six Thinking Hats method. This method led them to think critically about the benefits of using active containers and how complex it is to plan appropriate transportation of sensitive products such as medical products.

Picture 3 – Internal testing (Six Thinking Hats method)

4.2 The results after the external testing

After each testing the students took tests in MS Forms and we shared their results with the other participants on the project. The results of internal testing are on the following picture (picture 4).



Picture 4 – The results after internal testing (MS Forms)

5 Conclusion – Benefits of the project

Working on this project was new experience and we found activities that we had during this project were very usefull and necessary. Those activities include education of working on case studies in the class, practical work on new pedagogical methods and testing case studies with the students which we find necessary because this case studies were made for the students and to help VET teachers to educate and train their VET students. Our experience in those testing will be also usefull for all VET teachers who have need to implement new methods and new ways of teaching and training their students.



26. VPLIV ŠOLE VOŽNJE NA VZGOJO UDELEŽENCEV V CESTNEM PROMETU

POVZETEK

Povečanje varnosti cestnega prometa in s tem zmanjšanje števila prometnih nesreč z najhujšimi posledicami je potrebno doseči z ukrepi, ki se že začnejo pri usposabljanju mladih voznikov, ki bodo po pridobitvi voznškega dovoljenja samostojni udeleženci v cestnem prometu.

Postavi se vprašanje, kako doseči učinkovitost v tako kratkem času, ki je šoli vožnje dana na razpolago, da bi dosegli maksimalne učinke vplivanja na kandidate.

Ključne besede: šola vožnje, cestni promet, prometna varnost

1. UVOD

Sodobni promet je prinesel velike spremembe v življenju in delu ljudi. Predvsem je pomemben cestni promet, ki je s svojim razvojem močno vplival na gospodarstvo, kulturo, družbene namene, urbanizem in na druge odnose v družbi.

S prometno vzgojo želimo bodočim udeležencem v cestnem prometu podati znanje in oblikovati njihov odnos za varno sodelovanje v prometu.

Samo vključevanje v cestni promet prinaša številne in različne probleme. Največji problem je varnost, zato ima vloga voznškega izpita v vzgoji in izobraževanju za voznika motornih vozil poseben pomen in mesto.

2. DELOVANJE ŠOLE VOŽNJE

Šola vožnje je ustanova, ki opravlja dejavnost vzgoje in izobraževanja kandidatov kot bodočih udeležencev v cestnem prometu. To dejavnost lahko na podlagi koncesije opravljajo gospodarske družbe, samostojni podjetniki ter izobraževalne ustanove, ki izpolnjujejo predpisane pogoje. Dobiti morajo odločbo Ministrstva za notranje zadeve o vpisu v register šol vožnje.

Šola vožnje mora za izvajanje svoje dejavnosti imeti funkcionalno opremljeno učilnico, v kateri je za kandidata na razpolago najmanj 1,5 m² in za učitelja predpisov najmanj 3 m² delovne površine. Učilnica mora biti opremljena z optičnim medijem (računalnikom in projektorjem ali pametno tablo), ki omogoča prikaz pravil cestnega prometa ter delovanje in opreme motornih vozil. V učilnici mora biti tudi šolska tabla in strokovna literatura s področja cestnega prometa.

Šola vožnje mora še imeti učne pripomočke za izvajanje teoretičnega in praktičnega usposabljanja kandidatov, vadbeno površino za izvajanje praktičnega usposabljanja kandidatov spretnosti vožnje in ustrezno opremljena motorna vozila tistih kategorij, za katere izvaja program usposabljanja.

V šoli vožnje morajo biti zaposleni najmanj trije učitelji vožnje in enega učitelja predpisov, ki imajo veljavna dovoljenja za opravljanje tega dela ter strokovnega vodjo šole vožnje, ki ima dovoljenje za strokovnega vodjo šole vožnje in veljavno dovoljenje za učitelja vožnje.

Vadbena površina, ki jo ima v lasti ali najemu šola vožnje, mora omogočati izvajanje vaj iz tehnike vožnje. Na tej površini za izvajanje vaj s prve učne stopnje mora biti najmanj 25 štožcev, količkov ali drugih primernih elementov ustrezne višine glede na kategorijo vozila, za katero šola vožnje izvaja usposabljanje.

Šola vožnje usposablja kandidate z motornimi vozili, ki so v uporabi šole vožnje in morajo izpolnjevati določene pogoje. Ker je v šolah vožnje primarno izobraževanje kandidatov motornih vozil za kategorijo B, mora imeti šola vožnje osebni avtomobil, ki doseže hitrost 130 km/h, z najmanj štirimi vrati, opremljen s tritočkovnim varnostnimi pasovi in naslonjali za glavo na najmanj dveh sedežih v drugi sedežni vrsti ter napravo, ki med zaviranje preprečuje blokiranje koles. Ti avtomobili imajo še dodatno notranje in zunanje ogledalo za učitelja vožnje ter dodatne stopalke sklopke, zavore in plina za učitelja vožnje (Uradni list RS, 2021).

3. USPOSABLJANJE KANDIDATOV MOTORNIH VOZIL

Kandidat, ki želi opraviti vozniški izpit za kategorijo B, mora iti skozi teoretični in praktični del usposabljanja, da pridobi veljavno vozniško dovoljenje.

TEORETIČNO USPOSABLJANJE KANDIDATOV MOTORNIH VOZIL

Teoretični del usposabljanja se izvaja kot organizirana oblika vzgojno-izobraževalnega dela v učilnici šole vožnje in se organizira tako, da usposabljanje za posameznega kandidata traja največ 4 pedagoške ure dnevno in največ 20 pedagoških ur v sedmih zaporednih dneh. Pedagoška ura traja 45 minut. To pomeni, da je kandidat opravil tečaj iz cestno prometnih predpisov (CPP). Kandidat lahko opravi ta tečaj, ko dopolni 16 let.

Da kandidat lahko prične s praktičnim usposabljanjem, mora iti na zdravniški pregled, ki ga opravi pri medicini dela, prometa in športa. Zdravnik mu izda zdravniško spričevalo, ki velja 3 leta. Prav tako mora opraviti tudi tečaj prve pomoči, ki ga izvajajo območne enote Rdečega križa Slovenije, in opraviti izpit. Opravljen izpit ima trajno veljavo. Kandidati, ki imajo končano srednjo ali višjo medicinsko šolo, zdravniki in zobozdravniki, bolničarji in vojaki z opravljenim tečajem so oproščeni opravljanja tečaja prve pomoči (AMZS, brez datuma).

Ko kandidat opravi tečaj iz cestno prometnih predpisov, pridobi zdravniško spričevalo in opravi izpit iz prve pomoči, se lahko prijavi za opravljanje teoretičnega dela vozniškega dovoljenja pri Upravni enoti.

Pred pričetkom opravljanja teoretičnega dela izpita kandidat izkaže ocenjevalcu svojo identiteto z veljavnim identifikacijskim dokumentom, opremljenim s fotografijo, in mu predloži evidenčni karton vožnje.

Na teoretičnem delu vozniškega izpita se ugotavlja, ali ima kandidat za voznika znanje, predpisano s programom. Izpit se opravlja s pomočjo računalnika. Za reševanje testa ima kandidat na voljo 40 minut. Izpit iz teoretičnega dela je opravljen, če je kandidat pri tem izpitu uspešen v 88-odstotnem deležu (Agencija za varnost prometa, brez datuma).

PRAKTIČNO USPOSABLJANJE KANDIDATOV MOTORNIH VOZIL

Ko ima kandidat opravljen teoretični izpit, lahko prične s praktičnim delom usposabljanja. Na vsaki uri vožnje mora imeti s sabo osebni dokument, zdravniško spričevalo in evidenčni karton vožnje. Vsi ti dokumenti morajo biti originalni. Če katerega od naštetih dokumentov nima pri sebi, učitelj vožnje z njim ne sme voziti, saj bi storil prekršek.

Praktični del usposabljanja se deli na tri učne stopnje. Prva učna stopnja vključuje spoznavanje motornega vozila ter se izvaja na vadbeni površini šole vožnje. Čas za izvedbo prvih učnih vaj je najmanj dve učni uri. Druga učna stopnja vključuje učenje vožnje po cestah z malo prometa in v manj zahtevnem prometnem okolju. Čas za izvedbo učnih vaj je najmanj šest učnih ur. Tretja učna stopnja vključuje učenje vožnje po cestah z gostim prometom in

v zahtevnejšem prometnem okolju, podnevi in ponoči, ter učenje osnov tehnik varčne in okolju prijazne vožnje. Čas za izvedbo učnih vaj je najmanj dvanajst učnih ur.

V enem dnevu lahko šola vožnje usposablja posameznega kandidata največ štiri učne ure. Na prvi in drugi učni stopnji se kandidat lahko usposablja skupno največ tri učne ure, na tretji učni stopnji pa skupno največ štiri učne ure. V okviru tretje učne stopnje se izvede usposabljanje najmanj trikrat po najmanj dve učni uri skupaj vožnja po dnevi s poudarkom na vožnji po cestah zunaj naselij, pri čemer kandidat prevozi najmanj 70 km (dnevna relacija), vožnja ponoči s poudarkom na vožnji po cestah zunaj naselij, pri čemer kandidat prevozi najmanj 60 km (nočna relacija) in vožnja po avtocesti ali hitri cesti, vključevanje na te ceste in izključevanje iz njih, pri čemer kandidat prevozi najmanj 70 km.

Za vožnjo ponoči se šteje januarja, februarja, novembra in decembra od 17:00 do 7:00 naslednjega dne, marca, septembra in oktobra od 19:00 do 5:00 naslednjega dne in aprila, maja, junija, julija in avgusta od 20:00 do 5:00 naslednjega dne.

Pri usposabljanju mora učitelj vožnje upoštevati vrstni red predpisanih stopenj in začeti usposabljanje na naslednji stopnji, ko kandidat obvlada učno snov predhodne stopnje. Učitelj vožnje lahko v učni uri obravnava več učnih vaj ali obravnava in utrjuje že obravnavane. Učne vaje lahko smiselno združi in jih vpiše v evidenčni karton vožnje in dnevni razvid vožnje.

Pri obravnavi vsebin posameznih učnih vaj so lahko vključene tudi vsebine učnih vaj tiste vsebine, ki še niso bile obravnavane, ter v primeru usposabljanja na drugi učni stopnji tudi vsebine učnih vaj tretje stopnje, razen vožnje po avtocesti in hitri cesti (Agencija za varnost prometa, brez datuma).

Ko kandidat opravi najmanj dvajset učnih ur, se lahko na Upravni enoti prijavi k vozniškemu izpitu, ki ga izvaja Javna agencija RS za varnost prometa (AMZS, brez datuma). Na vozniškem izpitu se ugotavlja, ali ima kandidat za voznika znanje in spretnosti, ki se jih ocenjuje na vozniškem izpitu.

Praktični del izpita je sestavljen iz treh delov. Prvi del obsega pripravo na vožnjo, pregled vozila z vidika prometne varnosti in preverjanje predpisanih znanj. Drugi del zajema preizkus spretnosti pri vožnji vozila, ki poteka na vadbeni površini. Tretji del pa zajema preizkus vožnje vozila v cestnem prometu. Kandidat lahko opravlja praktični del izpita, ko dopolni 18 let (Agencija za varnost prometa, brez datuma).

Po uspešno opravljenem praktičnem delu izpita, kandidat pridobi status voznika začetnika. Vozniku začetniku se vozniško dovoljenje izda z veljavnostjo do dopolnjenega 21 leta starosti oziroma za dve leti po prvi pridobitvi vozniškega dovoljenja. Vozniško dovoljenje se vozniku začetniku podaljša, ko opravi program dodatnega usposabljanja voznikov začetnikov in predloži potrdilo o opravljenem programu dodatnega usposabljanja voznikov začetnikov oziroma varni vožnji (AMZS, brez datuma).

VPLIV AVTOŠOLE NA IZOBRAŽEVANJE VOZNIKOV MOTORNIH VOZIL

Izobraževalni proces v šolah vožnje dosega zgledno in kakovostno raven znanja za udeležbo v cestnem prometu. To pomeni, da šola vožnje zakonske norme uspešno in pravilno prenaša na bodoče voznike in nudi ustrezen nivo znanja tako na teoretičnem kot tudi na praktičnem usposabljanju kandidatov motornih vozil.

Zahtevan nivo znanja, ki usposablja kandidate za voznike motornih vozil, je na ustrezni strokovni ravni. Temeljna in splošna stališča so vedenja v prometu se izoblikujejo že v zgodnjem otroštvu, pri čemer imajo največji vpliv starši s svojim zgledom. Na varnost v prometu na posameznika vplivajo tudi vrtci in osnovne šole.

4. ZAKLJUČEK

Starši imajo največji vpliv na mlade, na njihovo ravnanje v prometu in izoblikovanje mladostniškega odnosa do prometne varnosti. Vpliv šole vožnje je trenuten in po večini vpliva na mladostnikovo vedenje v času, ko je bodoči voznik v programu usposabljanja za voznika.

Dostikrat se zgodi, da kandidat po usposabljanju v šoli vožnje po večini prevzame stare vzorce vedenja v prometu, ki so se izoblikovali v otroštvu. Zato je pomembno, da starši otroke začnemo že zelo zgodaj učiti o prometni varnosti in našo vzgojo nato prevzamejo šole vožnje, ko usposabljujejo mladostnike za bodoče udeležence v cestnem prometu.

26. INFLUENCE OF DRIVING SCHOOL ON THE EDUCATION OF PARTICIPANTS IN ROAD TRANSPORT

SUMMARY

Increasing road traffic safety and thus reducing the number of traffic accidents with the most serious consequences must be achieved by measures that already begin with the training of young drivers who, after obtaining a driver's license, will be independent participants in road traffic.

The question arises as to how to achieve efficiency in such a short period of time, which is made available to the driving school, in order to achieve maximum effects of influencing the candidates.

Key words: driving school, road transport, traffic safety

INTRODUCTION

Modern transport has brought great changes in the lives and work of people. Above all, road traffic is important, and its development has had a strong impact on the economy, culture, social purposes, urban planning and other relations in society.

With traffic education, we want to provide knowledge to future participants in road traffic and shape their attitude for safe participation in traffic.

Just getting involved in road traffic brings with it many and various problems. The biggest problem is safety, which is why the role of the driving test in the education and training of motor vehicle drivers has a special meaning and place.

2.DRIVING SCHOOL OPERATIONS

The driving school is an institution that educates and educates candidates as future participants in road traffic. On the basis of a concession, this activity can be carried out by commercial companies, independent entrepreneurs and educational institutions that meet the prescribed conditions. They must obtain a decision from the Ministry of the Interior on entry into the register of driving schools.

In order to carry out its activities, the driving school must have a functionally equipped classroom, in which there is at least 1.5 m² of work space available for the candidate and at least 3 m² for the teacher of the regulations. The classroom must be equipped with an optical medium (computer and projector or smart board) that enables the display of road traffic rules and the operation and equipment of motor vehicles. The classroom must also have a school board and professional literature in the field of road traffic.

The driving school must also have teaching aids for conducting theoretical and practical training of candidates, a practice area for conducting practical training of candidates in driving skills, and appropriately equipped motor vehicles of the categories for which the training program is conducted.

A driving school must employ at least three driving instructors and one regulations instructor who have valid licenses to perform this work, as well as a professional driving school manager who has a license as a professional driving school manager and a valid license for a driving instructor.

The training area owned or leased by the driving school must enable the implementation of driving technique exercises. There must be at least 25 cones, pegs or other suitable elements of appropriate height for the category of vehicle for which the driving school conducts training on this surface for conducting exercises from the first learning level.

The driving school trains candidates with motor vehicles, which are used by the driving school and must meet certain conditions. As driving schools primarily train candidates for category B motor vehicles, the driving school must have a passenger car that can reach a speed of 130 km/h, with at least four doors, equipped with three-point seat belts and head restraints on at least two seats in the second passenger compartment type and a device that prevents the wheels from locking during braking. These cars also have an additional interior and exterior mirror for the driving instructor, as well as additional clutch, brake, and gas pedals for the driving instructor (Uradni list RS, 2021).

3. TRAINING OF MOTOR VEHICLE CANDIDATES

A candidate who wants to pass the category B driving test must go through the theoretical and practical part of the training to obtain a valid driving license.

3.1 THEORETICAL TRAINING OF MOTOR VEHICLE CANDIDATES

The theoretical part of the training is carried out as an organized form of educational work in the driving school classroom and is organized in such a way that the training for an individual candidate lasts a maximum of 4 teaching hours per day and a maximum of 20 teaching hours in seven consecutive days. This means that the candidate has completed a course in Road Traffic Regulations (CPP). A candidate can take this course after completing 16 years of age.

In order for the candidate to be able to start practical training, he must undergo a medical examination performed by the Department of Occupational, Traffic and Sports Medicine. The doctor issues him a medical certificate that is valid for 3 years. He must also complete a first aid course conducted by the regional units of the Slovenian Red Cross and pass an exam. The passed exam has permanent validity. Candidates who have completed secondary or higher medical school, doctors and dentists, paramedics and soldiers who have completed the course are exempt from taking the first aid course (AMZS, no date).

After the candidate completes the course in road traffic regulations, obtains a medical certificate and passes the first aid exam, he can apply for the theoretical part of the driver's license at the Administrative Unit.

Before starting the theoretical part of the exam, the candidate must prove his identity to the evaluator with a valid identification document, equipped with a photo, and submit his driving record.

In the theoretical part of the driving test, it is established whether the driver candidate has the knowledge prescribed by the program. The exam is conducted using a computer. Candidates have 40 minutes to complete the test. The exam in the theoretical part is passed if the candidate is successful in this exam in a proportion of 88% (Traffic Safety Agency, undated).

3.2 PRACTICAL TRAINING OF MOTOR VEHICLE CANDIDATES

Once the candidate has passed the theoretical exam, he can start the practical part of the training. During every hour of driving, he must have an identity document, a medical certificate and a driving record card with him. All these documents must be original. If he

does not have one of the listed documents with him, the driving instructor must not drive with it, as he would be committing an offence.

The practical part of the training is divided into three learning levels. The first learning level includes learning about the motor vehicle and is carried out on the driving school's practice area. The time required to carry out the first training exercises is at least two teaching hours. The second learning level includes learning to drive on roads with little traffic and in a less demanding traffic environment. The time required to carry out the training exercises is at least six teaching hours. The third learning level includes learning to drive on roads with heavy traffic and in more demanding traffic environments, day and night, and learning the basics of economical and environmentally friendly driving techniques. The time for the implementation of learning exercises is at least twelve teaching hours.

The driving school can train an individual candidate for a maximum of four hours in one day. At the first and second study level, the candidate can train for a total of no more than three teaching hours, and at the third study level for a total of no more than four study hours.

As part of the third training level, the training is carried out at least three times for a minimum of two hours in total, driving during the day with an emphasis on driving on roads outside settlements, with the candidate driving at least 70 km (daily route), driving at night with an emphasis on driving on roads outside settlements, where the candidate travels at least 60 km (night route) and driving on a highway or expressway, joining and exiting these roads, where the candidate travels at least 70 km.

Driving at night is considered in January, February, November and December from 17:00 to 07:00 of the following day, in March, September and October from 19:00 to 05:00 of the following day and in April, May, June, July and August from 20:00 to 5:00 the following day.

During the training, the driving instructor must follow the order of the prescribed levels and start the training at the next level when the candidate has mastered the learning material of the previous level. The driving instructor can cover several learning exercises during the lesson or cover and reinforce the ones already covered. He can sensibly combine the training exercises and enter them in the driving record card and daily driving report.

When dealing with the content of individual training exercises, the content of training exercises that have not yet been covered can also be included, and in the case of training at the second training level, the content of training exercises at the third level, with the exception of driving on the highway and expressway (Agency for Traffic Safety, undated).

When the candidate completes at least twenty lessons, he can apply for the driving test at the Administrative Unit, which is conducted by the Public Agency of the Republic of Slovenia for Traffic Safety (AMZS, undated). The driving test determines whether the driver candidate has the knowledge and skills that are assessed in the driving test.

The practical part of the exam is made up of three parts. The first part includes preparation for driving, inspection of the vehicle from the point of view of traffic safety, and verification of prescribed skills. The second part covers the vehicle driving skills test, which takes place on a practice surface. The third part covers the driving test of the vehicle in road traffic. The candidate can take the practical part of the exam when he turns 18 (Road Safety Agency, undated).

After successfully completing the practical part of the exam, the candidate acquires the status of a beginner driver. A driver's license is issued to a novice driver with validity until the age of 21, or for two years after the first acquisition of the driver's license. A driver's license is renewed for a novice driver when he completes the additional training program for novice drivers and submits a certificate of completion of the additional training program for novice drivers or safe driving (AMZS, undate).

3.3 INFLUENCE OF DRIVING SCHOOLS ON MOTOR VEHICLE DRIVER EDUCATION

The educational process in driving schools achieves an exemplary and high-quality level of knowledge for participation in road traffic. This means that the driving school successfully and correctly conveys the legal norms to future drivers and offers an appropriate level of knowledge both in theoretical and practical training for motor vehicle candidates.

The required level of knowledge that trains candidates for motor vehicle drivers is at the appropriate professional level. The fundamental and general points of view are that behavior in traffic is formed already in early childhood, with parents having the greatest influence through their example. Kindergartens and primary schools also have an impact on traffic safety for the individual.

CONCLUSION

Parents have the greatest influence on young people, on their behavior in traffic and the formation of adolescent attitudes towards traffic safety. The impact of the driving school is immediate and mostly affects the adolescent's behavior during the time that the prospective driver is in the driver training program.

It often happens that, after training in a driving school, the candidate mostly adopts old patterns of traffic behavior that were formed in childhood. That is why it is important that parents start teaching children about traffic safety from a very early age, and our education is then taken over by driving schools when they train young people to be future road users.



Srednja šola za
storitvene dejavnosti in logistiko

SREDNJA ŠOLA ZA
STORITVENE DEJAVNOSTI IN
LOGISTIKO

Avtor:

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27. IZZIVI POKLICNIH VOZNIKOV

POVZETEK

Delavci, ki opravljajo poklic voznika so danes v primanjkljaju na vseh nivojih gospodarstva. Tako v dostavi kot pri mednarodnih prevozi. Zagotovo lahko trdimo, da je poklic voznika zahteven in naporna oblika dela. Prispevek se osredotoči na glavne ovire, s katerimi se poklicni vozniki srečujejo vsakodnevno - kot so izpolnjevanje dokumentacije, skrb in odgovornost za tovor in potnike, majhno plačilo kljub večurnemu sedenju za volanom. V zadnjih letih se je ta poklic razširil izključno zato, ker mlade privlači denar, ki ga dobijo za opravljanje tega dela. Vendar zgolj solidno plačilo ni dovolj, da bi pridobili ustrezno izobražen in kompetenten kader v temu segmentu logistike.

Ključne besede: poklicni vozniki, kompetence, izzivi, motivacija.

1 UVOD

Z leti se je poklic voznika zelo razširil. Moški, in prav tako ženske, so začeli vse bolj spoznavati to naporno in zahtevno delo. Vendar so sčasoma ljudje ugotovili, da to ni le osemurno sedenje v prevoznem sredstvu, ampak da vključuje še mnogo drugih odgovornosti.

Vsakodnevno se posameznik v tem poklicu sooča z različnimi izzivi, se nauči marsičesa novega ter začne sprejemati delo z veseljem in radostjo, da ga opravi po svojih najboljših močeh.

Vsak poklic se srečuje z izzivi in težavami, ki jih je potrebno rešiti za uspešno opravljeno delo. Poklic voznika je eden izmed deficitarnih poklicev; predvsem zaradi narave dela, ki je zelo razgibana (nenehno potovanje, mednarodni tranzit ...) ter hkrati monotona (večurno sedenje za volanom, odsotnost od doma ...). Poleg posebnosti tega poklica pa zahteva to delo tudi poznavanje več različnih področij stroke. Od poznavanja poti in tovora, do odgovornosti za tovor in potnike, poznavanje prometne signalizacije ter pravil in zakonov,

katere mora kot poklicni voznik upoštevati za varnost tako sebe kot tudi za tovor in potnike ter ostale udeležence v prometu. Poleg tega se od njega zahteva, da zna izpolnjevati pomembno dokumentacijo ter navsezadnje opraviti izpit za kategorijo, katero od njega zahteva delodajalec. Velikokrat je za opravljanje poklica voznika zahtevana tudi temeljna poklicna kvalifikacija.

2 POKLICNI VOZNIKI DANES

V Sloveniji trenutno po podatkih, navedenih na portalu 24ur.com, manjka kar 3.800 voznikov, v Evropi pa okoli pol milijona. Mednarodno združenje za cestni transport predvideva, da bo število primanjkljaja poklicnih voznikov naraščalo tudi na svetovni ravni. Vidno in očitno je, da se Slovenija že vrsto let bori s pomanjkanjem usposobljenih za ta poklic. Razlogi za to so različni: od pomankanja motivacije s strani zaposlenih, opravljanje zahtevnega in težavnega dela, pogosta odsotnost od doma in ostalo. V Sloveniji je zaposlovanje delavcev iz tujine nadomestilo pomanjkanje voznikov v preteklosti, kateri so predvsem zaradi mesečnega dobička imeli motivacijo pri delu, vendar tudi ta tako imenovani »jugoslovanski bazen« delovne sile zadnje čase odhaja na delo v ostale države Evropske unije. Potreba po poklicnih voznikih iz leta v leto narašča, trenutno ta delovna mesta počasi zasedajo prebivalci azijskih držav, kjer je standard življenja znatno nižji kot pri nas. Kar posledično pomeni, da so zadovoljni s plačilom, ki pa našim državljanom ne omogoča udobnega življenjskega sloga. Potrebno se je zavedati dejstva, da uvoz voznikov iz Pakistana, Nepala in Indije ne pomeni njuno optimalno rešitev problema. Ti vozniki niso opremljeni z ustreznim znanjem in kompetencami, ki so potrebne za opravljanje učinkovitega in v logistiki predvsem racionalnega načina vožnje. Ne poznajo evropskih predpisov, zakonov in nenazadnje tudi jezika. V te voznike je potrebno vložiti veliko časa in jih ustrezno izobraziti, da ne omenjamo stroške in čas, ki ga potrebujemo za izpolnjevanje vseh potrebnih dokumentov, ki so potrebni za delo v tujini. Poraja se vprašanje, ali je zadeva rentabilna na dolgi rok, saj lahko pri opravljanju svojega poklica naredijo več napak zaradi pomanjkljivega znanja in izkušenj.²⁵

Po podatkih *Javne agencije Republike Slovenije za varnost cestnega prometa*, ki vodi, nadzira in evidentira opravljanje vozniških izpitov, je bilo uspešno opravljenih izpitov v Republiki Sloveniji v letu 2022 za kategorijo C, CE in D slabih 1886. Za primerjavo v letu 2012 je bilo to število drastično večje in sicer 2319, kar pomeni, da se že v desetih letih opazi vidna razlika upadanja zanimanja za opravljanje izpita. Razloge v tako drastičnem upadu števila opravljenih izpitov lahko delno pripišemo tudi vse višji ceni opravljanju tako teoretičnega kot tudi praktičnega dela izpita. Vse pogostejši so namreč podatki, da veliko

²⁵ Povzeto po: <https://www.24ur.com/novice/dejstva/cez-tri-leta-bo-manjkalo-vec-kot-10000-poklicnih-voznikov.html>
7. 2. 2023

kandidatov teoretičnega kot tudi praktičnega dela izpita ne opravi v prvem roku. Seveda zagotovo ni edini možni razlog za tako znaten padec opravljenih izpitov.²⁶

2. 1 IZOBRAŽEVALNI PROGRAM ZA POKLICNEGA VOZNIKA V CELJU

Med leti 1965/66 in 1984/85 se je v celjski regiji, natančneje na srednji šoli Borisa Kidriča, omogočalo redno izobraževanje poklicnih voznikov *Voznik-mehanik*. V enakem časovnem obdobju je potekalo tudi izobraževanje odraslih. Izobraževanje je bilo uvrščeno med srednje poklicno izobraževanje in je trajalo tri leta. Poleg strokovnih modulov so dijaka nadgradili tudi teoretična znanja. Zraven prakse in teorije na šoli so kandidati lahko opravljali tudi praktični del varne vožnje in pridobili vozniško dovoljenje C-kategorije, to pomeni vožnja in opravljanje tovornega vozila. Na šoli je bilo mogoče opravljati vozniški izpit še za B, C in E-kategorijo. To pomeni, da so na srednji šoli Borisa Kidriča v Celju omogočali eno od izobraževanj poklicnega voznika v Sloveniji. Danes možnosti za pridobitev redne izobrazbe na Celjskem ni že od leta 1985. Ministerstvo za šolstvo je to smer preoblikovalo v *Prometnega tehnika*, kjer se poleg osnov delovanja prometnih sistemov učijo tudi špedicijskih poslov, prometnih tokov, osnove motornih vozil in ostalo.²⁷

Po internih podatkih šole (šolske kronike) je izsledljivo število opravljenih zaključnih izpitov med leti 1970 in 1981 v izobraževalnem programu *Voznik – mehanik* na srednji šoli Borisa Kidriča v Celju. V obdobju desetih let je uspešno opravilo izobraževalnih program *Voznik-mehanik* kar 2169 dijakov. Seveda je potrebno poudariti, da je v preteklosti šolo obiskovalo veliko dijakov in dijakin iz relativno oddaljenih krajev, se pravi iz območja celotne Savinjske regije. V roku desetih let pa je padec pri uspešno končanem izobraževalnem programu občuten, kar 67 odstotkov oziroma v kar 173 dijakov manj. Razloge za takšen upad lahko iščemo na različnih ravneh. Od upada otrok v generaciji, prevladovanje drugih poklicev, ki so bili bolj atraktivni za takratno mladino, razmere na trgu dela in še bi lahko špekulirali. Oblikovanje programa *Prometni tehnik* vseeno kaže tendence po potrebah trga dela po tovrstni izobrazbi, ki pa se je danes usmerila predvsem v širšo dejavnost - *logistiko*.

Danes se na Srednji šoli za storitvene dejavnosti in logistiko dijaki in dijakinje izobražujejo po programu *Logistični tehnik/ Logistični tehnica*. V tem šolskem letu je v štiriletni splošni strokovni program vpisanih skupno 118 dijakov. Prav tako je program *Voznik* namenjen zgolj izobraževanju odraslih, kar pomeni, da je potrebno za ustrezno izobraževanje plačati. Program *Voznik*, ki omogoča pridobitev srednjega poklicnega izobraževanja in traja tri leta, se izvaja v Ljubljani v sklopu avtošole Ježica, ki je vključena v sklop Strokovnega izobraževalnega centra Ljubljana. Pogoji za vpis je uspešno končana osnovna šola, končan skrajšan program srednje šole (dvoletni) ali končana triletna/štiriletna srednja šola in ustrezno zdravstveno stanje, ki omogoča opravljanje del v tem poklicu. Danes se večinoma ljudje za ta poklic izobrazijo s kodo 95 in z vsakodnevno prakso na delovnem mestu.²⁸

²⁶ Povzeto po: <https://www.avp-rs.si/vozniski-izpiti/analize-in-statisticni-podatki-o-opravljanju-vozniskih-izpitov/>, dostop 7. 2. 2023

²⁷ Letno poročilo Srednje šole Boris Kidrič v Celju, 1981-1982, 1982-1983, 1983-1984, 1984-1985

²⁸ Povzeto po: <https://www.avtosola-jezica.com/>, dostopno 20. 2. 2023

3 ZAKONODAJA S PODROČJA POKLICNIH VOZNIKOV

Poklicni vozniki se srečujejo z različnimi izzivi pri njihovem poklicu. To je odvisno predvsem od tega, v katerem podjetju so zaposleni, kakšna je njihova naloga, kaj prevažajo, kam so napoteni (kot na primer v katero državo, kraj, mesto ali vozijo izključno samo na določena območja, če gre za tovorna vozila), kakšen je njihov delovni čas ter najpomembneje: katero kategorijo vozniškega dovoljenja imajo opravljeno. Veliko voznikov ima opravljen izpit tako za tovorna vozila kot tudi za avtobuse. To je odvisno tudi od podjetja, v katerem se je zaposlil in mu omogočilo opravljanje le teh.

4 ANKETA POKLICNIH VOZNIKOV

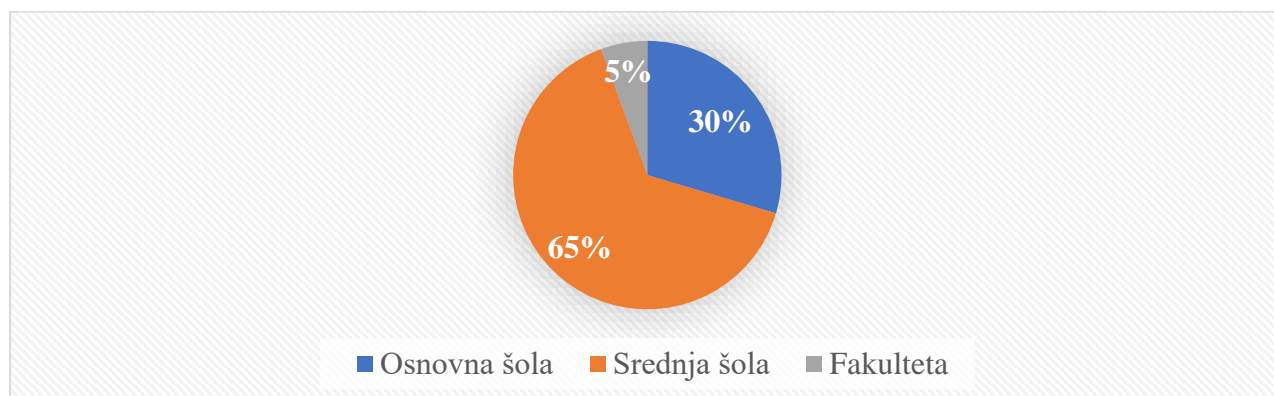
Analiza ankete

Anketa se je izvajala poleti leta 2022 na območju Celja, Mozirja, Velenja, Slovenskih Konjic in Slovenske Bistrice. Anketirani so bili izključno poklicni vozniki, ki so zaposleni v javnih in privatnih prevoznih podjetjih. Anketo je rešilo 125 posameznikov iz različnih starostnih skupin, od tega kar 12 žensk in 113 moških. Ankete so bile anonimne. Sestavljena je bila iz 15-ih zaprtih vprašanj, od tega 4-ih demografskih in enega odprtega vprašanja, da bi bilo reševanje lažje.

Anketa je bila osredotočena na izzive, s katerimi se srečujejo poklicni vozniki pri svojem delu. V nadaljevanju so predstavljena izbrana ključna vprašanja z analizo odgovorov, ki so predstavila uvid v delo poklicnih voznikov.

VPRAŠANJE 1: *Katero stopnjo izobrazbe imate?*

Od 125 anketiranih jih ima kar 81 (65 odstotkov) dokončano srednjo šolo; 37 (30 odstotkov) osnovno šolo; 7 (5 odstotkov) pa fakulteto. Zanimivo je, da se je kar 37 anketirancev po končani osnovni šoli odločilo za opravljanje poklica voznika. Uspešno končana poklicna ali strokovna šola je zagotovo primerna stopnja izobrazbe za delovno mesto voznika. Je pa rahlo zaskrbljujoč podatek, da je 30 odstotkov anketiranih končalo samo osnovno šolo, kar zagotovo ni ustrezen nivo znanja za opravljanje tega relativno zahtevnega delovnega mesta. Poklicni vozniki morajo obvladovati znanja povezana z motoroznanstvom, poznavanjem blaga, izpolnjevanjem dokumentacije, poznavanjem zakonodaje in predpisov ter še marsikaj. Zagotovo ta podatek prikazuje realno situacijo na trgu dela, glede na to, da je za ta poklic potreben zgolj vozniški izpit (vezan na starost kandidatov) in koda 95, ki je plačljiva in se izvaja v obliki tečaja.

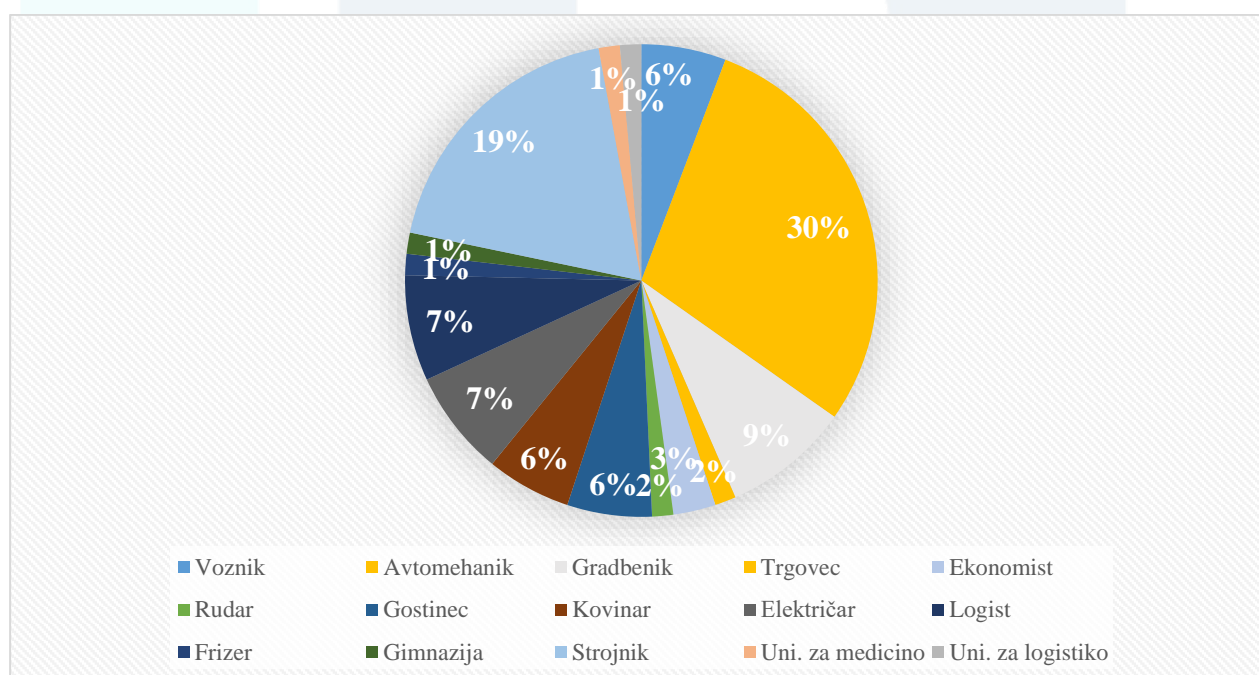


Grafikon 1: Katero stopnjo izobrazbe imate?

VPRAŠANJE 2: Smer izobrazbe

Drugo vprašanje je bilo odprtega tipa. Tisti, ki so dokončali samo osnovno šolo, so ga izpustili. Analiza je pokazala, da jih ima največ končano poklicno šolo za avtomehanika - 20 anketiranih oziroma 30 odstotkov. 13 anketirancev oz. 12 odstotkov je strojnikov, 6 anketirancev oz. 9 odstotkov je gradbenikov, 7 odstotkov oz. 5 anketirancev je logističnih tehnikov; enako električarjev, 4 anketiranci oz. 6 odstotkov so se izobraževali za voznika; enako za gostinca in kovinarja. 2 anketiranca oz. 3 odstotki sta ekonomista, ena oseba oz. 1 odstotek je frizer; prav tako rudarjev, trgovcev, gimnazijcev. 2 anketiranca oz. 2 odstotka imata končano fakulteto, kar je zelo zanimivo, saj za poklicnega voznika ne potrebuješ tako visoke izobrazbe.

Najpogosteje ta poklic opravljajo avtomehaniki, tj. 30 odstotkov, kar ustreza znanju, ki ga potrebujejo glede prevoznega sredstva. Sorodna znanja o delovanja vozila imajo tudi strojni in logistični tehniki. Če združimo te tri smeri izobrazbe, je 46 odstotkov tistih anketiranih, ki imajo ustrezno predznanje. Podatek, da se je zgolj 6 odstotkov anketiranih izobraževalo za poklic voznika je pričakovan, glede na to, da tega izobraževalnega programa ne izvajamo pri nas v rednem šolskem sistemu. Kar pomeni, da so ti vozniki med starejšimi anketiranimi.



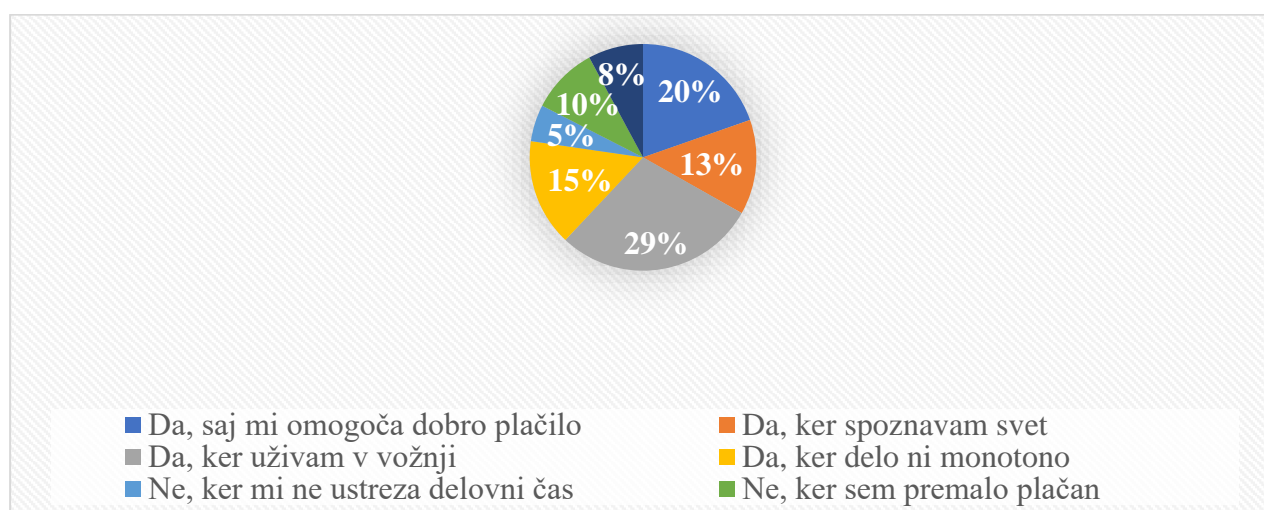
Grafikon 2: Smer izobrazbe

VPRAŠANJE 3: Ali ste zadovoljni z vašim poklicem?

Pri tem vprašanju je bilo na voljo 7 odgovorov ter odprti tip odgovora »Drugo«. Anketiranci so lahko obkrožili več odgovorov. Rezultati analize so pokazali, da je največ voznikov zadovoljnih s poklicem, ker uživajo v vožnji. Ta odgovor je obkrožilo 66 anketirancev (29 odstotkov). 45 (20 odstotkov) jih je zadovoljnih s poklicem, ker jim omogoča dobro plačilo; 35 (15 odstotkov) jih je zadovoljnih, ker delo ni monotono; 31 (13 odstotkov) pa jih je

zadovoljnih, ker spoznavajo svet. Kar 22 anketirancev s poklicem voznika ni zadovoljnih. 22 (10 odstotkov) anketirancev je odgovorilo, da niso zadovoljni zaradi premajhnega plačila; 18 (8 odstotkov) jih ni zadovoljnih, ker so premalo doma; 12 (5 odstotkov) pa jih ni zadovoljnih, ker jim ne ustreza delovni čas. En anketiranec je pod kategorijo odgovora »Drugo« napisal: »Vsako leto manj!«.

Evalvacija ankete je dober pokazatelj, da se primarno za ta poklic odločajo tisti, ki uživajo v vožnji (29 odstotkov), kar pomeni, da jih opravljanje poklica osrečuje oziroma ga opravljajo z veseljem. Sklepamo lahko, da so pri opravljanju poklica odgovorni in vestni. 20 odstotkov jih pri opravljanju poklica najbolj osrečuje denar. Če evalviramo rezultate v širšem pogledu, sta dve tretjini anketirancev zadovoljnih s poklicem. Zagotovo so med njimi takšni, ki si želijo večjega zaslužka, vendar prevladuje pozitivna naravnost k delu.

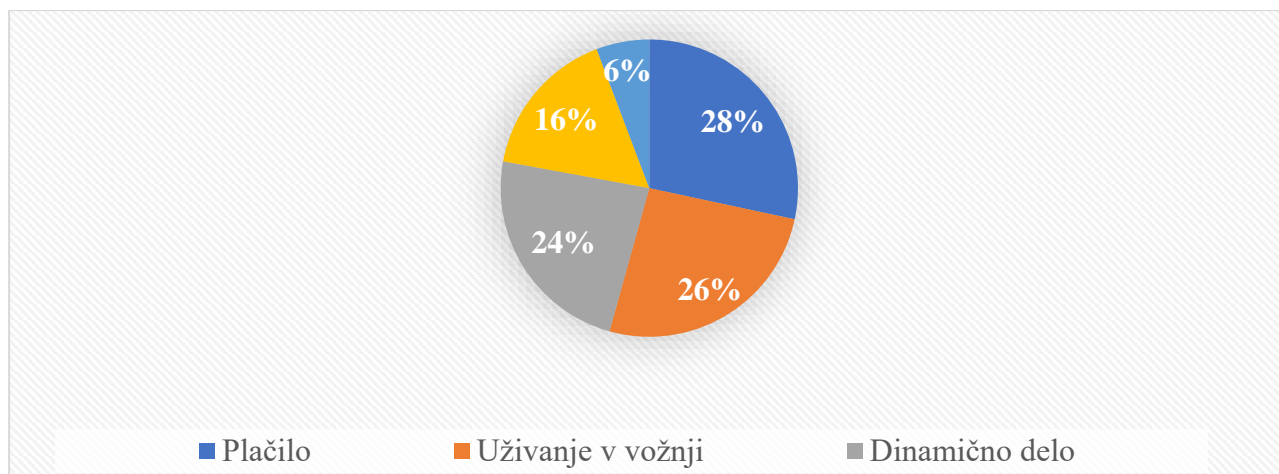


Grafikon 3: Ali ste zadovoljni z vašim poklicem?

VPRAŠANJE 4: Zakaj ste se odločili za poklic voznika?

Pri tem vprašanju je bilo na voljo pet različnih odgovorov. Anketiranec je lahko izbral največ dva. Nekateri odgovori so si bili številčno zelo podobni. Največ anketiranih se je za poklic odločilo prav zaradi plačila - 59 anketiranih (28 odstotkov). Nekateri pravijo, da so poklicni vozniki še zmeraj premalo plačani. 54 anketirancev (26 odstotkov) se je odločilo za poklic voznika zaradi uživanja v vožnji; 49 anketiranih (24 odstotkov) se je za poklic voznika odločilo, ker je delo dinamično. 34 anketiranih (16 odstotkov) rado spoznava svet; le 12 (6 odstotkov) pa jih je v tem poklicu zaradi družinskega podjetja.

Rezultati so zanimivi predvsem v primerjavi s prejšnjim vprašanjem, ki je pokazalo, da sta dve tretjini zadovoljnih s svojim delom, ki pa se lahko razlikuje od prvotnega razloga za opravljanje tega poklica. To je predvsem v prvi meri plačilo. Vendar je tudi to vprašanje potrdilo dejstvo, da je glavna motivacija poklicnih voznikov prav užitek v vožnji - 24 odstotkov. Hkrati je poklic dovolj dinamičen in razgiban (40 odstotkov – dinamičen poklic), ki omogoča spoznavanje sveta.

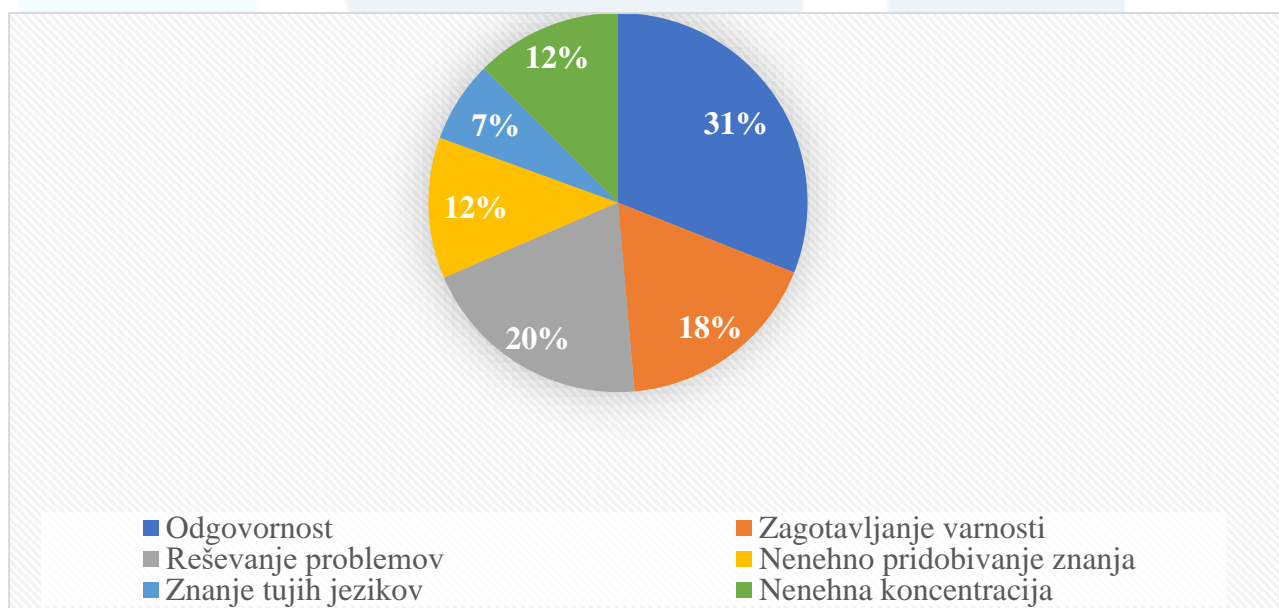


Grafikon 4: Zakaj ste se odločili za poklic voznika?

VPRAŠANJE 5: Kaj je po vašem mnenju izziv pri opravljanju poklica voznik?

Pri petem vprašanju je bilo na voljo 7 odgovorov, eden od njih je bil tudi odprtega tipa »Drugo«. Največ anketiranih meni, da je največji izziv pri opravljanju poklica voznik odgovornost za blago/tovor in prevozno sredstvo. To možnost je obkrožilo 67 (31 odstotkov) anketiranih. Drugi najbolj pogost izziv je po mnenju anketiranih reševanje problemov – kot so okvara vozila, natovor ali celo končna dostava. To možnost je obkrožilo 43 anketiranih (20 odstotkov). 38 anketiranih (18 odstotkov) meni, da je za njih izziv zagotavljanje varnosti. 27 anketiranih (12 odstotkov) misli, da je za njih izziv nenehno pridobivanje znanja. Enako število anketiranih meni, da je za njih izziv nenehna koncentracija. Najmanjši izziv pa predstavlja znanje tujih jezikov. To možnost je izbralo 15 anketirancev (7 odstotkov).

Evalvacija rezultatov je pokazala, da je glavnina voznikov odgovornih in vestnih pri svojem delu ter da se ne ustrašijo problemov, ki jih doletijo na poti. Izkazalo se je, da voznikom znanje tujega jezika ne povzroča enega izmed večjih izzivov, čeprav bi lahko sklepali, da je ravno to razlog za razne nesporazume.



Grafikon 5: Kaj je po vašem mnenju izziv pri opravljanju poklica voznik?

5 ZAKLJUČEK

Raziskava je pokazala, da je glavno vodilo za opravljanje poklicnega voznika prav užitek v vožnji. Lahko bi rekli, da je to način življenja, »nafto imajo v krvi«. Poklicni vozniki v svojem delu vidijo izziv in ne zgolj delo. Radi spoznavajo svet, skrbijo za tovor ali potnike ter predvsem za svoje vozilo. Tudi če sami niso lastniki prevoznega sredstva. Težava je, da bo v prihodnje vse manj ljudi, ki bi si želeli ta poklic opravljati vsakodnevno.

Ena izmed možnih rešitev glede povečanja števila kandidatov za poklicnega voznika je v uvedbi izobraževalnega programa *Voznik*, kjer bi kandidati pridobili poleg znanja tudi ustrezen vozniški izpit. Prav slednje bi bila, primerna motivacija za vpis dijakov v ta program, saj je danes pridobitev vozniških izpitov relativno težaven in predvsem drag postopek. Z ustrežno izobrazbo bi bili vozniki bolje usposobljeni in tudi samozavestnejši za opravljanje tega poklica.



Srednja šola za
storitvene dejavnosti in logistiko

SCHOOL CENTER CELJE
HIGH SCHOOL FOR SERVICE
ACTIVITIES AND LOGISTICS

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27. CHALLENGES OF PROFESSIONAL DRIVERS

SUMMARY

Workers who perform the profession of driver are currently in short supply at all levels of the economy. Both in delivery and in international transport. We can certainly say that the profession of a driver is a demanding and tiring form of work. The paper will focus on the main obstacles that professional drivers face daily - such as filling out documentation, taking care and responsibility for cargo and passengers, small payment despite hours behind the wheel. In recent years, this profession has expanded solely because young people are attracted to the money, they get for doing this work. However, a solid salary alone is not enough to obtain properly educated and competent personnel in this segment of logistics.

Key words: professional drivers, competences, challenges, motivation.

1 INTRODUCTION

Over the years, the profession of driver has expanded greatly. Men, as well as women, began to learn more and more about this hard and demanding work. However, over time, people realized that it is not just sitting in a vehicle for eight hours, but that it involves many other responsibilities. Every day, an individual in this profession faces various challenges, learns many new things, and begins to accept the work with joy and happiness, to do it to the best of his or her ability.

Every profession faces challenges and problems that need to be solved to successfully complete the work. The profession of driver is one of the deficit professions; mainly due to the nature of the work, which is very varied (constant travel, international transit...) and at the same time monotonous (sitting for hours behind the wheel, being away from home...). In addition to the specifics of this profession, this work also requires knowledge of several different areas of the profession. From knowing the route and cargo, to responsibility for cargo and passengers, knowledge of traffic signals and the rules and regulations that a professional driver must follow for the safety of himself as well as for cargo and passengers and other road users. In addition, he is required to be able to fill out

important documentation and, ultimately, pass an exam for the category that the employer requires of him. In many cases, a fundamental professional qualification is also required to practice the profession of driver.

2 PROFESSIONAL DRIVERS TODAY

According to the data provided on the portal 24ur.com, there are currently as many as 3,800 drivers missing in Slovenia, and around half a million in Europe. The International Road Transport Association predicts that the number of professional driver shortages will also increase globally. It is visible and obvious that Slovenia has been struggling with the lack of qualified people for this profession for many years. The reasons for this are various: from lack of motivation on the part of employees, performing demanding and difficult work, frequent absence from home and others. In Slovenia, the recruitment of workers from abroad replaced the lack of drivers in the past, who were motivated to work mainly because of the monthly profit, but even this so-called "Yugoslav labor pool" has recently been drained because the workers are going to work in other countries of the European Union. The need for professional drivers is increasing year by year, currently these jobs are slowly being filled by residents of Asian countries, where the standard of living is significantly lower than in the European Union. Which in turn means that they are satisfied with the payment, which does not allow our citizens a comfortable lifestyle. It is necessary to be aware of the fact that importing drivers from Pakistan, Nepal and India is not the optimal solution to the problem. These drivers are not equipped with the appropriate knowledge and competences that are necessary to perform an efficient and, in terms of logistics, especially rational way of driving. They do not know European regulations, laws and, last but not least, the language. It is necessary to invest a lot of time in these drivers and train them properly, not to mention the cost and time it takes to fill out all the necessary documents required to work abroad. The question arises as to whether the matter is profitable in the long run, as they may make more mistakes in the performance of their profession due to lack of knowledge and experience.²⁹

According to the data of the Public Agency of the Republic of Slovenia for Road Traffic Safety, which conducts, supervises, and records the passing of driving tests, in the Republic of Slovenia in 2022 there were 1,886 successful tests for category C, CE and D. For comparison in 2012, this was the number is drastically higher, namely 2319, which means that already in ten years there is a visible difference in the decline of interest in taking the exam. The reasons for such a drastic decline in the number of passed exams can be partly attributed to the ever-increasing cost of taking both the theoretical and practical part of the exam. Data is becoming more and more frequent that many candidates do not pass the theoretical as well as the practical part of the exam within the first deadline. Of course, it is certainly not the only possible reason for such a significant drop in passed exams.³⁰

²⁹ Sumnerized by: <https://www.24ur.com/novice/dejstva/cez-tri-leta-bo-manjkalo-vec-kot-10000-poklicnih-voznikov.html> 7. 2. 2023

³⁰ Sumnerized by: <https://www.avp-rs.si/vozniski-izpiti/analize-in-statisticni-podatki-o-opravljanju-vozniskih-izpitov/>, 7. 2. 2023

2.1 EDUCATIONAL PROGRAM FOR A PROFESSIONAL DRIVER IN CELJE

Between 1965/66 and 1984/85, in the Celje region, more precisely, at the Boris Kidrič secondary school, regular training of professional drivers, Driver-mechanic, was possible. Adult education also took place during the same time period. The education was classified as secondary vocational education and lasted three years. In addition to the professional modules, the students also upgraded their theoretical knowledge. In addition to practice and theory at the school, candidates were also able to perform the practical part of safe driving and obtain a C-category driver's license, which means driving and operating a truck. At the school, it was also possible to take the driving test for B, C and E-categories. That means that the Boris Kidrič's school in Celje provided one of the training courses for professional drivers in Slovenia. Today, the opportunity to obtain a regular education in this field in Celje does not exist since 1985. The Ministry of Education transformed this course into a Traffic Technician, where, in addition to the basics of the operation of transport systems, they also learn forwarding business, traffic flows, the basics of motor vehicles and the rest.³¹

According to the school's internal data (school chronicle), which shows the number of final exams passed between 1970 and 1981 in the Driver-Mechanic educational program at the Boris Kidrič Secondary School in Celje. The data shows, that over the years the demand for driver guidance has declined. Over a period of ten years, as many as 2,169 students successfully completed the Driver-Mechanic training program. Of course, it must emphasize that in the past, many students attended the school from relatively distant places, i.e., from the entire Savinja region. Within ten years, however, the drop in successfully completed educational programs is significant, as much as 67 percent, or as many as 173 less students. The reasons for such a decline can be sought at various levels. From the decline of children in the generation, the dominance of other professions that were more attractive to the youth of that time, the situation on the labor market, and it could be speculated. However, the design of the Traffic Technician program shows tendencies towards the needs of the labor market for this type of education, which today is mainly focused on a broader activity - logistics.

Today, at the Secondary School for Service Activities and Logistics, students are trained in the Logistics Technician program. In this school year, a total of 118 students are enrolled in the four-year general professional program. Also, the Driver program is only intended for the education of adults, which means that it is necessary to pay for the appropriate education. The Driver program, which enables the acquisition of secondary vocational education and lasts three years, is implemented in Ljubljana as part of the Ježica driving school, which is part of the Ljubljana Vocational Education Center. The prerequisite for enrollment is a successful completion of elementary school, completion of a shortened secondary school program (two-year) or completion of a three-year/four-year secondary school and an appropriate state of health that enables work in this profession. Today, most people are trained for this profession with code 95 and daily practice at the workplace.³²

³¹ Annual report of Boris Kidrič High School in Celje, 1981-1982, 1982-1983, 1983-1984, 1984-1985

³² Summerized by: <https://www.avtosola-jezica.com/>, 20. 2. 2023

3 LEGISLATION IN THE FIELD OF PROFESSIONAL DRIVERS

Professional drivers face various challenges in their profession. This mainly depends on which company they are employed in, what their tasks are, what they transport, where they are assigned (such as to which country, town, city, or do they drive exclusively only to certain areas in the case of trucks), what are their working hours and most importantly: what category of driver's license do they have. Many drivers have passed the test for both trucks and buses. This also depends on the company in which he was employed, and which allowed him to perform only these.

4 SURVEY OF PROFESSIONAL DRIVERS

Survey analysis

The survey was conducted in the summer of 2022 in the area of Celje, Mozirje, Velenje, Slovenske Konjice and Slovenske Bistrica. Only professional drivers employed in public and private transport companies were surveyed. The survey was completed by 125 individuals from different age groups, of which 12 were women and 113 were men. Surveys were anonymous. It consisted of 15 closed questions, 4 of which were demographic and one open-ended to make it easier to answer.

The survey focused on the challenges that professional drivers face in their work. In the following, selected key questions are presented with an analysis of the answers, which presented an insight into the work of professional drivers.

QUESTION 1: What level of education do you have?

Of the 125 respondents, as many as 81 (65 percent) have completed high school; 37 (30 percent) primary school; 7 (5 percent) have faculty education. It is interesting that as many as 37 respondents decided to pursue the profession of driver after finishing primary school. Successful completion of a vocational or professional school is certainly a suitable level of education for the driver's position. However, it is a slightly worrying fact that 30 percent of those surveyed only completed primary school, which is certainly not an adequate level of knowledge to perform this relatively demanding job. Professional drivers must master knowledge related to motor science, knowledge of goods, filling out documentation, knowledge of legislation and regulations and much more. Surely, this data shows the real situation on the labor market, given that this profession requires only a driving test (related to the age of the candidates) and code 95, which is paid and is carried out in the form of a course.

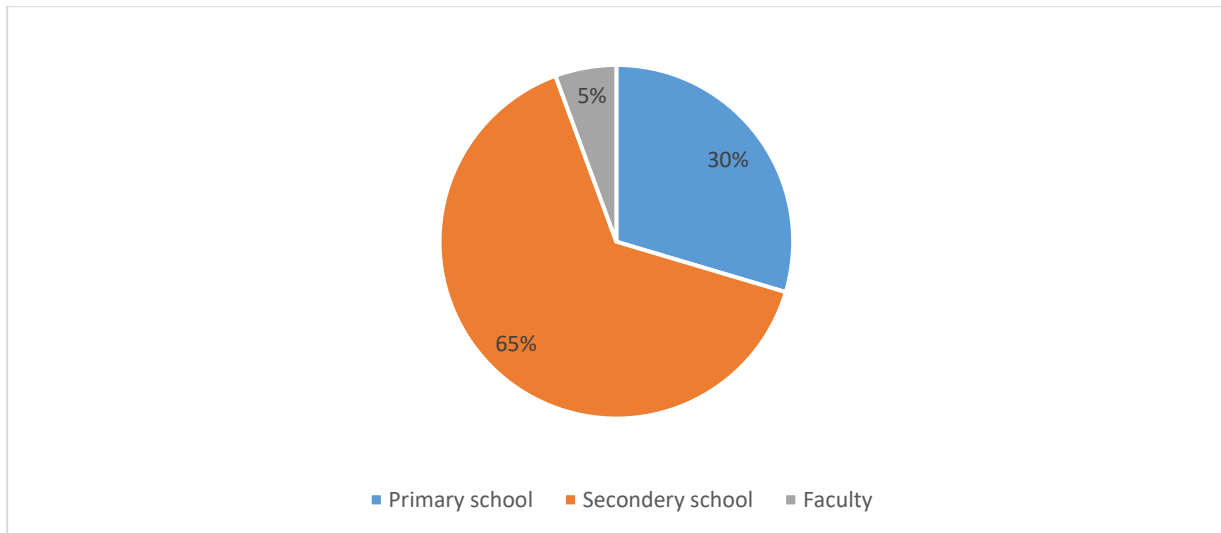


Chart 1: What level of education do you have?

QUESTION 2: Field of education

The second question was open-ended. Those who completed only primary school missed it. The analysis showed that most of them have completed vocational school for auto mechanics - 20 respondents or 30 percent. 13 respondents or 12 percent are machinists, 6 respondents or 9 percent are builders, 7 percent or 5 respondents are logistics technicians; the same number of electricians, 4 respondents or 6 percent were trained to be a driver; the same for the caterer and the metal worker. 2 respondents or 3 percent are economists, one person or 1 percent is a hairdresser; as well as miners, merchants, high school students. 2 respondents or 2 percent have completed college, which is very interesting, because you don't need such a high education to be a professional driver.

This profession is most often performed by car mechanics, i.e., 30 percent, which corresponds to the knowledge they need about the means of transport. Mechanical and logistics technicians also have related knowledge about vehicle operation. If we combine these three areas of education, 46 percent of those surveyed have relevant prior knowledge. The fact that only 6 percent of respondents received training for the profession of driver is expected, given that this educational program is not implemented in our country in the regular school system. Which means that these drivers are among the older respondents.

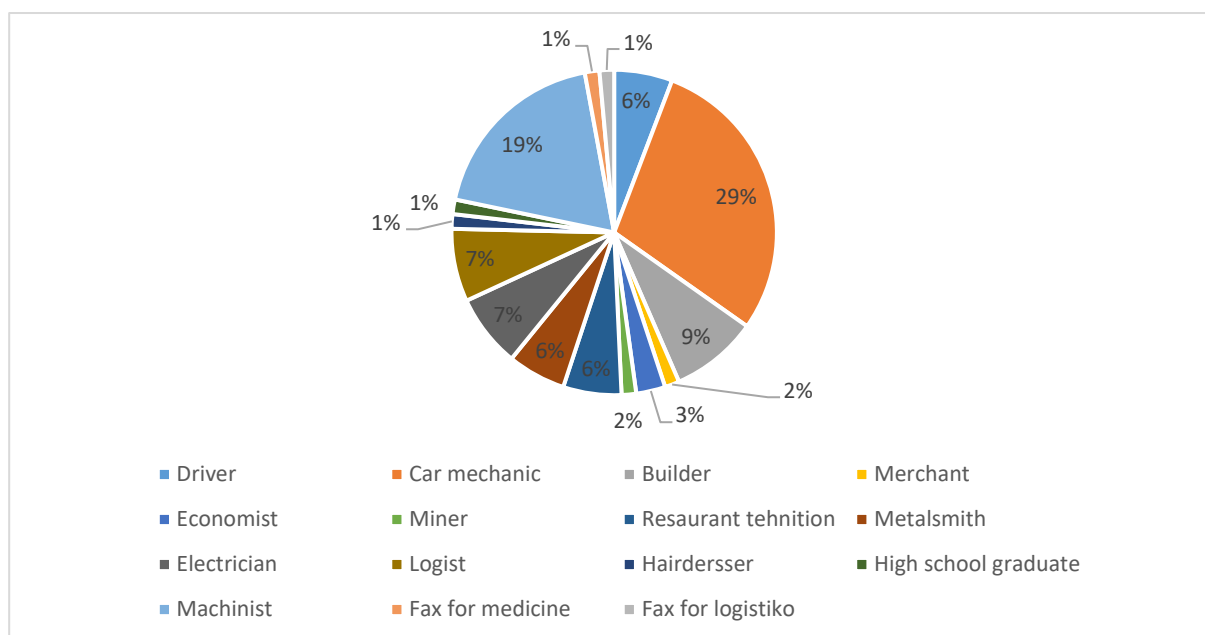


Chart 2: Direction of education

QUESTION 3: Are you satisfied with your profession?

There were 7 answers available for this question and the open answer type "Other". Respondents could circle multiple answers. The results of the analysis showed that most drivers are satisfied with their profession because they enjoy driving. 66 respondents (29 percent) circled this answer. 45 (20 percent) are satisfied with their profession because it allows them to be well paid; 35 (15 percent) are satisfied because the work is not monotonous; 31 (13 percent) are satisfied because they are getting to know the world. As many as 22 respondents are not satisfied with the profession of driver. 22 (10 percent) respondents answered that they are not satisfied because of insufficient payment; 18 (8 percent) are not satisfied because they are not at home enough; 12 (5 percent) are not satisfied because the working hours do not suit them. One respondent wrote: "Every year less!" under the answer category "Other".

The evaluation of the survey is a good indicator that this profession is primarily chosen by those who enjoy driving (29 percent), which means that performing the profession makes them happy or that they do it with pleasure. We can conclude that they are responsible and conscientious in their profession. 20 percent of them are most happy with money in their profession. If we evaluate the results in a broader perspective, two thirds of the respondents are satisfied with their profession. There are certainly those who want more money, but a positive attitude towards work prevails.

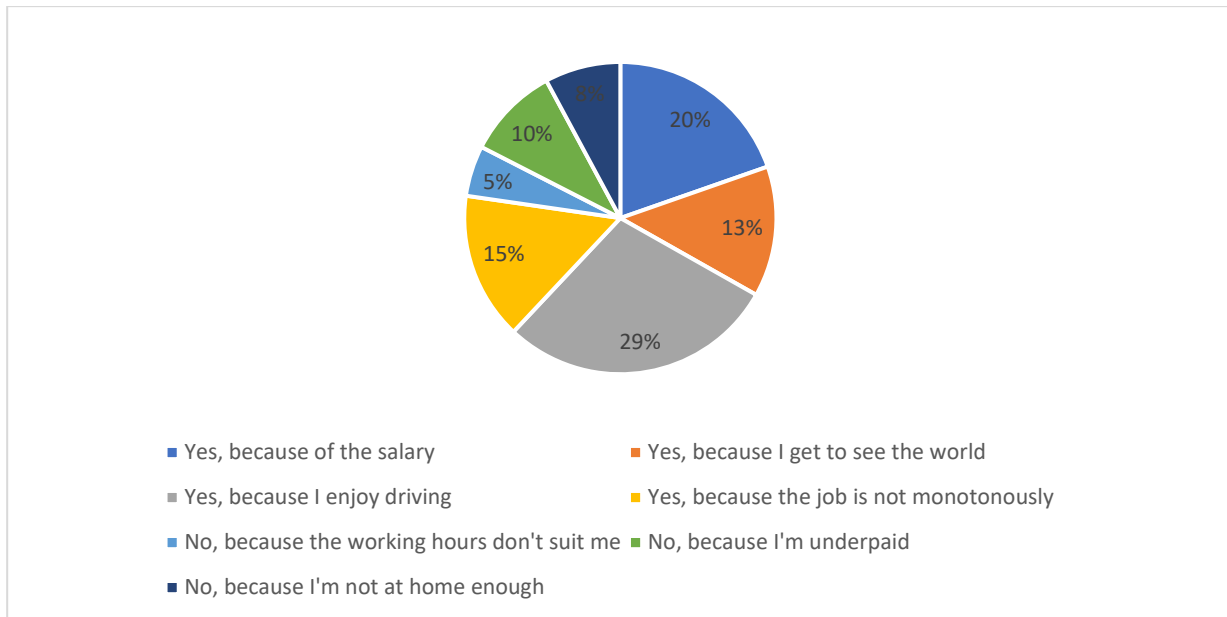


Chart 3: Are you satisfied with your profession?

QUESTION 4: Why did you decide to become a driver?

There were five different answers to this question. The respondent could choose a maximum of two. Some answers were numerically very similar. The majority of respondents chose the profession precisely because of the salary - 59 respondents (28 percent). Some say that professional drivers are still underpaid. 54 respondents (26 percent) decided to become a driver because of the enjoyment of driving; 49 respondents (24 percent) chose the profession of driver because the work is dynamic. 34 respondents (16 percent) enjoy getting to know the world; only 12 (6 percent) are in this profession because of a family business.

The results are interesting especially in comparison to the previous question, which showed that two thirds are satisfied with their work, which may differ from the original reason for pursuing this profession. This is mainly a payment in the first instance. However, this question also confirmed the fact that the main motivation of professional drivers is the pleasure of driving - 24 percent. At the same time, the profession is sufficiently dynamic and varied (40 percent – dynamic profession), which enables learning about the world.

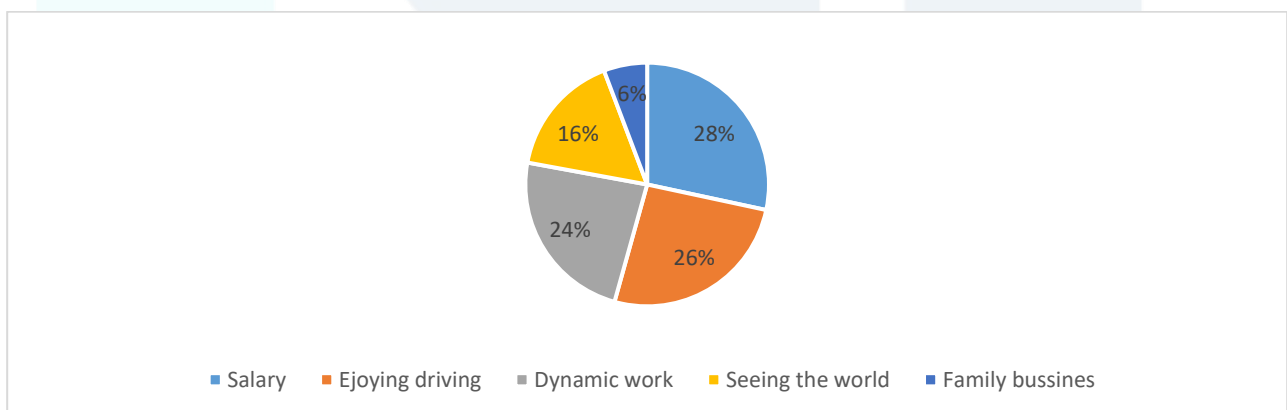


Chart 4: Why did you decide to become a driver?

QUESTION 5: What do you think is the challenge of being a driver?

For question number five, 7 answers were available, one of which was open-ended "Other". The majority of respondents believe that the biggest challenge in performing the profession of driver is the responsibility for goods/cargo and means of transport. 67 (31 percent) of those surveyed circled this option. According to the respondents, the second most common challenge is solving problems - such as vehicle breakdown, load or even final delivery. 43 respondents (20 percent) circled this option. 38 respondents (18 percent) believe that ensuring security is a challenge for them. 27 respondents (12 percent) think that the challenge for them is the constant acquisition of knowledge. The same number of respondents believe that constant concentration is a challenge for them. The smallest challenge is the knowledge of foreign languages. This option was chosen by 15 respondents (7 percent).

The evaluation of the results showed that the majority of drivers are responsible and conscientious in their work and that they are not afraid of the problems they encounter on the way. It turned out that the knowledge of a foreign language is not one of the major challenges for drivers, although one could conclude that this is precisely the reason for various misunderstandings.

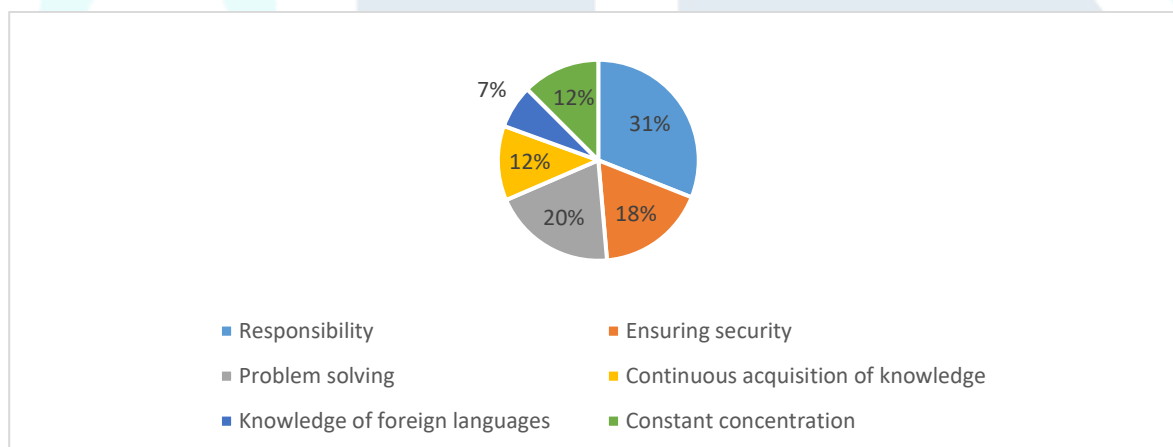


Chart 5: What do you think is the challenge of being a driver?

5 CONCLUSION

The research showed that the main guide for becoming a professional driver is the pleasure of driving. You could say that this is a way of life, "they have oil in their blood". Professional drivers see their work as a challenge and not just a job. They like to get to know the world, take care of cargo or passengers and especially their vehicle. Even if they do not own the means of transport themselves. The problem is that in the future there will be fewer and fewer people who would like to do this profession on a daily basis. One of the possible solutions for more candidates for profession drivers is the introduction of the *Driver education* program, where candidates would acquire, in addition to knowledge, the appropriate driving test. The acquisition of a driving license would be the appropriate motivation for enrolling students in this program, since today obtaining driving license is a relatively difficult and, above all, expensive process. With adequate education, drivers would be better qualified and also more confident to perform this profession.



АВТОСООБРАЌАЕН УЧИЛИШЕН ЦЕНТАР
„БОРО ПЕТРУШЕВСКИ“ НА ГРАД СКОПЈЕ

Изработил:

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Анета Пашоска

28.ИДНИНАТА НА ВОЗАЧОТ ВО ОБРАЗОВНИОТ СИСТЕМ КАКО ПРОФЕСИОНАЛНА ДЕЈНОСТ

ВОВЕД

Причината од која се одлучивме да истражуваме за да ја пишувам и презентирам а со цел случувањата во ЕУ токму оваа тема е поради мојата почит и доверба во она што се нарекува систем – образовен систем. Можеби ќе звучам патетично со оглед на свесноста за нелогичности и деструкции во разни видови системи во државата и регионот, но имам оптимизам дека вистински решенија од областа на сообраќајот можат да стабилизираат системи (не мислам преабициозно на големите политички или државни системи, туку на оние помалите: семејство како систем во образованието, училиштето како систем за образование, меѓународна соработка со колегите како систем на взаемно почитување и професионална соработка).

А сега нешто ќе потсетам што ми е и идеата повеќе години што веќе е познато како еден и единствен образовен систем до 90 тите Години од сообраќајната струка што имаше заземено големи размери беше занимањето ВОЗАЧ НА МОТОРНО ВОЗИЛО трет степен средно стручно занимање.:

Се поинтезивниот развој на побарувачката на пазарот на трудот е многу голема за занимањето ВОЗАЧ НА МОТОРНО ВОЗИЛО. Затоа голем дел од транспортните компании како во нашата држава така и надвор во земјите членки на ЕУ побарувачката е драстично зголемена за занимањето ВОЗАЧ НА МОТОРНО ВОЗИЛО. Само да споменам некоја бројка која што ја истраживме дека во Република Северна Македонија од 1880 транспортни претпријатија кои се занимаваат со меѓународен транспорт 20% до 30 % секојдневно имаат потреба од нови возачи. Недостатокот е тоа што голем дел од возачите заминуваат во земјите членки на ЕУ за да ја обавуваат истата професија за подобри европски дневници. Истиот проблем се јавува и во соседните земји како и земјите на екс ЈУ просторите. Затоа во комуникација со почитуваните колеги од соседна Р Србија, Р Хрватска Р Црна Гора и во нивните земји се соочуваат со истиот проблем од недостаток на Возачи.

Зошто е тоа така?

Од разните законски регулативи според законот за превоз во патниот сообраќај, за да еден возач да учествува во меѓународен транспорт на стоки и патници треба да поседува стручна компетентност, за учество на возачите во меѓународен транспорт на стоки и патници (СПК) или во ЕУ се нарекува COD 95. Според програмата која е застапена во СПК и COD 95 е дел од наставната програма за занимањето ВОЗАЧ НА МОТОРНО ВОЗИЛО, дури и поблиску до програмата за добивање на COD 95. На пример во една држава како што е Германија еден приоритетен услов за добивање на COD 95 е да има завршено занимање ВОЗАЧ НА МОТОРНО ВОЗИЛО, каде со свидетелство – диплома петте модули предвидени за посетување на семинар му се признаени и веднаш добива соодветна компетентност. Која е целта на истражувањето на овој труд.

Цел на истражувањето

Во периодот од март, април и мај извршени се истражувања по пат на анкета (анкетно ливче) и по пат на телефонско јавување.

Анкетата има опфатено три групи на анкетирани учесници.

- Прва група ученици од основно училиште каде и најголемиот број на испитаници е
- Втора група на учесници односно ученици од средно училиште и случајни минувачи и
- третата група се анкетирани лица кои се веќе работоспособни на возраст од 19 години до 50 години возраст по случаен избор (третата група е поделена во три под групи во зависност од возраста)

Главното анкетно прашање за учениците од основно образование беше каде јас сега како ученик се гледам понатаму, што би сакал да учам во средно за да завршам и што би работел.

Откога учениците - испитаници ќе одговореа на поставеното прашање следувахе второ анкетно прашање дали би се гледале во иднина како возач на автобус или камиот.

Истражувањето беше спроведено во 8 основни училишта од близу 1200 ученика, на територија на источна Македонија.

Од 8 основни училишта на анкетните ливчиња само по еден ученик имаше запишано **сакам возач** да бидам бидејќи татко ми или друг роднина возат камион или автобус. Останатите ученици имаа одговорено од слаткари, келнери, компјутери, медицина, обезбедување, полицаец и многу други различни професии. Само по себе се наметна и прашањето **зошто е тоа така?**

На втората средба со учениците беше сосема кристално јасно зашто е тоа така и се дојде до заклучок од следниве причини.

1. На учениците од основно образование предметот сообраќајна техника, сообраќајна култура, основи на сообраќај или како и да се вика е многу слабо застапено пак дури и некаде не се ни одржале часовите од различни причини
2. Сообраќајно техничката култура е на многу ниско ниво речиси 0
3. На учениците од основно образование не им е јасно што е всушност сообраќајот
4. Натпреварите по сообраќај односно возење велосипед не се одржуваат од разни причини кои некогаш претставуваа едукација и забава
5. Активности по сообраќај речиси во ни едно основно училиште не се реализираат на ниво што би им врежале дека сепак професија возач би ја запознале и засакале.

Во разговор со раководителите на основните училишта односно директорите и наставниците кои се директно вклучени во образовниот процес со наставните програми Сообраќајна култура како предмет не ни постои само постои неколку минимални часа на крајот од годината.



Сето ова има доведено до ова денес што сме тука дека професија возач на моторно возило замира односно исчезнува и не случајно има недостаток на работоспособни возачи што сакаат да егзистираат од ова професија.



Втората група на испитаници односно анкетирани лица беше ученици од средно училиште по случаен избор. Прашањето беше исто. И резултатот беше следен

Од 230 анкетирани лица само 4 одговорија дека сагат да бидат возачи, ако имаат можности да положат за возачки испит односно финансии.



Пак слични резултати.

Третат група беше поделена во три подгрупи според возраста и опфакше испитаници работоспособни од 19 до 50 години. резултатите беа следни на следното анкетно прашање- Дали би работел како возач на камиот или автобус

XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

- Возраст од 19 до 29 години – анкетирани 258 одговориле 140 за возач ДА
- Возраст од 30 до 40 години– анкетирани 150 одговориле 110 за возач ДА
- Возраст од 40 до 50 години– анкетирани 58 одговориле 14 за возач ДА



На секој испитаник беше поставено и дополнително прашање дали поседува возачка дозвола со соодветна категорија за возач на камион и автобус.

- Возраст од 19 до 29 години – анкетирани 258 одговориле возачка дозвола за камион или автобус не поседуваат
- Возраст од 30 до 40 години– анкетирани 150 одговориле само 11 имаат категорија Ц, а 3 Ц+Е категорија
- Возраст од 40 до 50 години– анкетирани 58 одговориле имаат Ц+Е категорија

После извршената анкета од првата група на возраст од 19 до 29 години секој испитаник од оваа возраст имаше и свое дополнително прашање.

Поврзано со законот за безбедност во сообраќајот.

Мора ли да чекам една година од Б категорија за да полагам за Ц категорија, 21 година за Ц категорија, 23 години за Д категорија, дали ќе полагам, дали ќе најдам работа.

Тоа се серија на прашања од испитаниците.

Од оваа анкета лесно можеше да се воочи дека образовниот систем си го направи своето. Сите законски измени и регулативи допринесоа денес сето ова што се случува.

Недостаток на работна сила **ВОЗАЧ НА МОТОРНО ВОЗИЛО**, Возач на камиот, а што е актуелно во сите земји присутен е недостаток на возачи во јавните градски претпријатија што ги опслужуваат граѓаните односно **ВОЗАЧИ НА АВТОБУСИ ВО ЈАВНИОТ ГРАДСКИ ПРЕВОЗ**.

Зошто е тоа така и како ќе се справиме со овој проблем?

1. Знаеме дека секоја професија за понатаму се подготвува кај индивидуата уште од мали нозе
2. Знаеме дека возач на моторно возило е нешто што не може секој да се занимава
3. Постои соодветна програма за полагање на возачки испит од одредена категорија, регулирана со Законот за безбедност во сообраќајот
4. За да бидеш добар возач професионално да си ја извршуваш обврската потребно е добро да ги познаваш законските прописи од областа на сообраќајот
5. Да имаш извршено обука и положено испит за соодветна категорија на возила

Сега од сите овие истражувања можеме да се осврнеме на следното

Во идниот период за да не замре професијата возач на моторно возило да не се соочуваме со недостаток на кадар од овој профил на работоспособни луѓе, да не бараме по светот да донесеме кадар од други земји потребно е да се направат низа измени во образовниот систем и тоа:

- Воведување предмет познавање на сообраќајни правила и прописи редовно во основното образование
- Разни секции и активности во текот на учебната година
- Спроведување редовни активности со учениците
- Организирање редовни натпревари од сообраќајот
- Соработка со институциите задолжени за сообраќајот во државата
- Одржување на редовни активности поврзани со сообраќајот

И уште многу други образовни и едукативни активности за сообраќајот.

Кога сето ова би се спровело голем дел од учениците уште од рана возраст би знаеле за што би се определиле што би работеле и како би се образовале за понатаму.

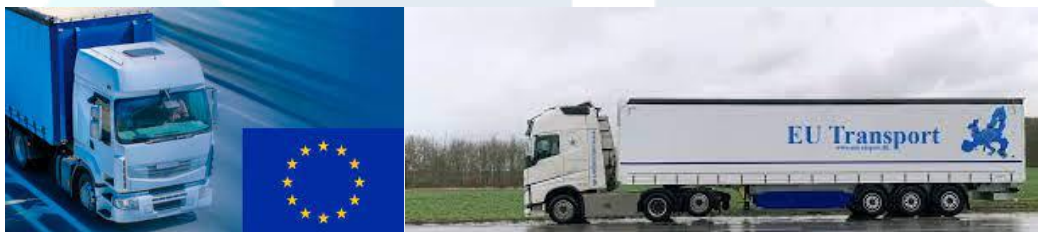




ЗАКЛУЧОК

Се надевам дека ќе можеме да ги усогласиме и заеднички да настапиме и дејствуваме во создавањето на кадри од ова област со тоа што ќе имаме за нашиот пазар на труд и надвор од нашите држави да понудиме соодветен стручен и добро обучен кадар **ВОЗАЧ НА МОТОРНО ВОЗИЛО.**

БИДИ И ТИ ДЕЛ ОД ОБРАЗОВНИОТ СИСТЕМ НА ЕВРОПСКОТО СЕМЕЈСТВО НА ВОЗАЧИ





CAR TRAFFIC SCHOOL CENTER "BORO PETRUSHEVSKI"

Authors:

Zoki Stojmirov traffic engineer.

Aneta Pashoska

28. THE FUTURE OF THE DRIVER IN THE EDUCATION SYSTEM AS A PROFESSIONAL ACTIVITY

INTRODUCTION

The reason why we decided to research in order to write and present it and with the purpose of developments in the EU, this very topic is because of my respect and trust in what is called the system - the education system. I may sound pathetic given the awareness of illogicalities and destruction in various types of systems in the country and the region, but I am optimistic that real solutions in the field of traffic can stabilize systems (I am not thinking too ambitiously of large political or state systems, but of smaller ones : family as a system in education, school as an education system, international cooperation with colleagues as a system of mutual respect and professional cooperation).

And now I will remind you of something that has been my idea for many years, which has been known as one and only educational system until the 90s Years of the traffic profession that had taken a large scale was the occupation of MOTOR VEHICLE DRIVER third degree secondary professional occupation:

The increasingly intensive development of demand on the labor market is very great for the occupation of MOTOR VEHICLE DRIVER. That's why a large part of the transport companies, both in our country and outside in the EU member states, the demand has increased drastically for the occupation of MOTOR VEHICLE DRIVER. Let me just mention some number that we have researched that in the Republic of North Macedonia out of 1880 transport companies that deal with international transport, 20% to 30% need new drivers every day. The disadvantage is that a large number of drivers go to EU member states to do the same profession for better European daily wages. The same problem occurs in the neighboring countries as well as the countries of the ex-EU areas. Therefore, in communication with respected colleagues from the neighboring Republic of Serbia, Republic of Croatia, Republic of Montenegro and in their countries they are facing the same problem of lack of drivers.

Why is that?

From the various legal regulations according to the road transport law, in order for a driver to participate in the international transport of goods and passengers, he must possess professional competence, for the participation of drivers in the international transport of goods and passengers (SPK) or in the EU it is called COD 95. According to the program represented in SPK and COD 95 is part of the curriculum for the occupation DRIVER OF A MOTOR VEHICLE, even closer to the program for obtaining COD 95. For example in a country such as Germany a priority condition for obtaining of COD 95 is to have completed the occupation of MOTOR VEHICLE DRIVER, where with a certificate - diploma the five modules provided for attending the seminar are recognized and he immediately receives the appropriate competence. What is the research objective of this paper.

Aim of the research

In the period of March, April and May, research was carried out by means of a survey (survey sheet) and by means of telephone calls.

The survey included three groups of surveyed participants.

- First group of students from elementary school where the largest number of respondents is
- Second group of participants, i.e. high school students and passers-by and
- the third group is surveyed people who are still able to work between the ages of 19 and 50 years old randomly selected (the third group is divided into three sub-groups depending on age)

The main survey question for primary school students was where I now as a student see myself going forward, what I would like to study in secondary school in order to graduate and what I would do.

After the students - respondents answered the question, a second survey question followed, whether they would see themselves as a bus driver or a truck driver in the future.

The research was conducted in 8 primary schools with close to 1200 students, in the territory of eastern Macedonia.

Out of 8 elementary schools, only one student wrote on the questionnaires that I want to be a driver because my father or another relative drives a truck or bus. The rest of the students had answers from pastry chefs, waiters, computers, medicine, security, police and many other different professions. By itself, the question arose, why is that so?

At the second meeting with the students, it was crystal clear why this is so and the conclusion was reached for the following reasons.

1. The subject of traffic technique, traffic culture, basics of traffic or whatever it is called is very poorly represented for students from primary education, and in some places the classes were not even held for various reasons.
2. Traffic technical culture is at a very low level, almost 0
3. Elementary school students do not understand what traffic actually is
4. Competitions in traffic or cycling are not held for various reasons, which once represented education and entertainment
5. Traffic activities are not implemented in almost any elementary school at a level that would impress upon them that they would still know and love the profession of driver.

In a conversation with the principals of primary schools, that is, principals and teachers who are directly involved in the educational process with the curricula, Traffic culture as a subject does not even exist, it only exists for a few minimal hours at the end of the year.



All of this has led to the fact that we are here today, that the profession of motor vehicle driver is dying or disappearing, and it is no coincidence that there is a lack of able-bodied drivers who want to make a living from this profession.



The second group of respondents, i.e. surveyed persons, were randomly selected high school students. The question was the same. And the result was as follows

Out of 230 people surveyed, only 4 answered that they want to be drivers, if they have the opportunity to pass the driving test, ie finance.



Similar results again.

The third group was divided into three subgroups according to age and included respondents who were able to work from 19 to 50 years old. The results were based on the following survey question - Would you work as a truck or bus driver?

XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

- Age from 19 to 29 years - surveyed 258 answered 140 for a driver YES
- Age from 30 to 40 years – surveyed 150 answered 110 for a driver YES
- Age from 40 to 50 years – surveyed 58 answered 14 for a driver YES



Each respondent was asked an additional question about whether they have a driver's license with the appropriate category for truck and bus drivers.

- Age from 19 to 29 years - surveyed 258 answered that they do not have a driver's license for a truck or bus
- Age from 30 to 40 years - 150 respondents answered only 11 have category C, and 3 category C+E
- Age from 40 to 50 years old - 58 respondents answered that they have C+E category

After the survey of the first group aged 19 to 29, each respondent of this age group had their own additional question.

Related to traffic safety law.

Do I have to wait one year from B category to apply for C category, 21 years for C category, 23 years for D category, will I pass, will I find a job.

These are a series of questions from respondents.

From this survey it was easy to see that the education system had done its job. All legal changes and regulations contributed to all that is happening today.

Lack of labor DRIVER OF A MOTOR VEHICLE, Driver of a truck, and what is current in all countries is the lack of drivers in public city enterprises that serve the citizens, ie BUS DRIVERS IN PUBLIC CITY TRANSPORT.

Why is this so and how will we deal with this problem?

1. We know that every profession prepares the individual from an early age
2. We know that motorcycle driving is something that not everyone can do

3. There is an appropriate program for taking a driving test of a certain category, regulated by the Traffic Safety Law
4. In order to be a good driver and perform your duty professionally, you need to know the legal regulations in the field of traffic.
5. To have completed training and passed an exam for the appropriate category of vehicles

Now from all these researches we can refer to the following

In the future period, so that the profession of motor vehicle driver does not die out, so that we do not face a lack of staff from this profile of able-bodied people, so that we do not look around the world to bring staff from other countries, it is necessary to make a series of changes in the educational system and that :

- Introducing the subject of knowledge of traffic rules and regulations regularly in primary education
- Various sections and activities during the school year
- Carrying out regular activities with students
- Organizing regular traffic competitions
- Cooperation with the institutions in charge of traffic in the country
- Maintenance of regular activities related to traffic

And many other educational and educational activities about traffic.

If all this were implemented, a large part of the students would know from an early age what they would decide for, what they would work for and how they would be educated for the future.





CONCLUSION

I hope that we will be able to harmonize them and jointly perform and act in the creation of personnel from this area by having for our labor market and outside our countries to offer suitable professional and well-trained staff **MOTOR VEHICLE DRIVER.**

BE A PART OF THE EDUCATION SYSTEM OF THE EUROPEAN FAMILY OF DRIVERS





PROMETNA ŠOLA MARIBOR, SLOVENIJA

Authors:

Dušan Veršec, dipl. inž. prom.

Benjamin Pivec, mag. inž. prom

29. MARIBORSKI MOTO DAN

Povzetek:

Motoristi morajo na prvem mestu sami poskrbet za svojo varnost. Danes so motoristi postali pogosti udeleženci prometa, ki imajo svoj cilj potovanja razvedrilo in spremembo po končanem delovnem tednu. Za vikend, ko sonce napoveduje lep dan se na Slovenskih cestah srečujemo z različno usposobljenimi motoristi – pravimi motoristi in vikend motoristi. Prometne nesreče so kot opozorilo na nevarnost slabe prepoznavnosti motorista na cesti za ostale udeležence. Za vožnjo motornega kolesa je potrebna vozna kondicija, brezhibno motorno kolo in oprema motorista. Na začetku motoristične sezone se različni moto klubi odločajo za zборе motoristov, obstajajo treningi varne vožnje na AMZS poligonu. Na mestni občini Maribor – občinski Svet za preventivo in vzgojo v cestnem prometu so si zadali nalogo, da izvedejo dogodek za motoriste. Pri nastanku in izvedbi vzgojno preventivnega dogodka za motoriste v Mariboru sodeluje tudi Prometna šola Maribor z dijaki.

Ključne besede: prometna varnost, varnost motoristov, SPV

UVOD

Med vozniki motornih koles se prepletajo medsebojni odnosi, ki pri drugih skupinah voznikov niso poznane. V Sloveniji se ustanavljajo motoristična društva, ki med sebe vabijo voznike motornih koles. Vožnja z motornim kolesom postaja način življenja. Panoramske vožnje skupine motoristov na naših cestah niso več osamljeni dogodki ampak jih srečujemo ob vikendih na vseh koncih države.



Slika 10: panoramska vožnja MK Jezerski duhovi

Vir: <https://www.prlekija-on.net/lokalno/10044/na-panoramsko-voznjo-izpred-gajsevskega-jezera-se-je-podalo-okoli-stiristo-motoristov.html> (31.5.2023)

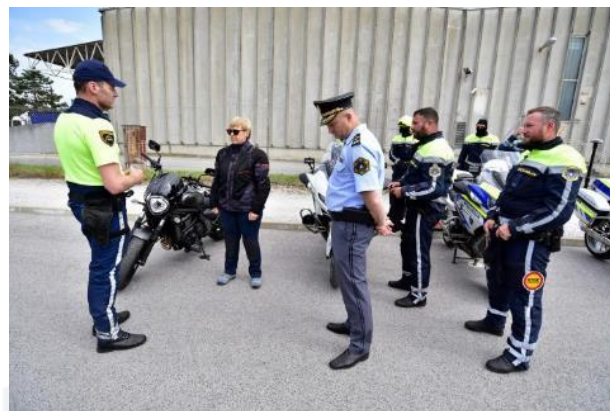
Dogodki motoristov so znanilci lepega vremena in dolgih dni. Večina motoristov se s pomladanskimi druženji prične pripravljati na letne dogodivščine na jeklenem konjičku. Za večjo zaščito se na srečanjih udeležijo tudi blagoslova motornih koles in motoristov, ki jih opravijo duhovniki.



Slika 2: Srečanje motoristov ob blagoslovitvi motornih koles

Vir: <https://www.rtvlo.si/zabava-in-slog/zanimivosti/blagoslov-motorjev-ob-zacetku-nove-sezone-prometna-varnost-se-vedno-nezadostna/664335> (31.5.2023)

V Sloveniji se za varnost motoristov zavzema tudi predsednica države Nataša Pirc Musar kot motoristka. Sezono je začela na pripravah motoristov z ljubljanskimi policisti in inštruktorji na prometnem poligonu Jarše pri Domžalah. Opomnila je, da bi bilo dobro, da bi vsak motorist na začetku sezone opravil trening varne vožnje.



Slika 3: Predsednica Republike Slovenije Nataša Pirc Musar na treningu varne vožnje
Vir: <https://www.rtv slo.si/zabava-in-slog/avtomobilnost/natasa-pirc-musar-ozavesca-o-varni-voznji-z-motorjem-najprej-trening-nato-krajse-razdalje/670037> (31.5.2023)

V Sloveniji za varno vožnjo izvajajo treninge varne vožnje tudi največja moto zveza AMZS – Avto moto zveza Slovenije. Motoriste v pomladnem času vabijo na treninge varne vožnje na svoj poligon na Vransko. V svoji ponudbi treningov imajo različne programe, ki so prilagojeni različni strukturi motoristov. Na njihovi spletni imajo informacije o vrsti programov.

Voznik začetnik - motorist	Vozi 125 z glavo	Intenzivni program	Enduro trening
Program s sopotnikom	Nadaljevalni program	Individualni trening	Program s trial motorji
Ogrevalni program	Varno na cesti	Na pot z inštruktorjem	

Slika 4: Ponudba treningov varne vožnje za motoriste AMZS
Vir: <https://www.amzs.si/cvv/programi/za-motoriste> (31.5.2023)

Za večjo varnost motoristov v prometu imajo posluh tudi na mestni občini Maribor.

MARIBORSKI MOTO DAN 2022

Motorizem je v zadnjih letih postal zelo popularen, motorno kolo pa relativno lahko dostopno, kar se tiče finančnega vidika. Glede na dejstvo, da se v zadnjih nekaj letih dogaja preveliko prometnih nesreč v katerih so udeleženi motoristi si želimo v smislu varnosti v prometu organizirati veliko akcijo moto varnosti. Svet za preventivo in vzgojo v cestnem prometu

Mestne občine Maribor si že leta prizadeva, z različnimi preventivnimi akcijami, izboljšati prometno varnost na območju Mestne občine Maribor.

Da bi motoriste in tiste, ki to še bodo spodbudili k razumevanju pomena prometne varnosti, k razvijanju strpnosti in odgovornemu ravnanju ter skrbi za druge udeležence v prometu, je Mestna občina Maribor, Svet za preventivo in vzgojo v cestne prometu s sodelavci pristopil k izvedbi vzgojno preventivnega dogodka "Motoristom za varno vključevanje v promet" – Mariborski moto dan.

Začetek nove zgodbe v Mariboru je bilo tudi za našo šolo vabilo na prvi skupni sestanek vseh sodelujočih akterjev na preventivni akciji MARIBORSKI MOTO DAN 2022.



Slika 5: Del vabila na zaključni sestanek SPV MOM

Vir:

<https://mail.google.com/mail/u/0/#search/denis.kocbek%40maribor.si/FMfcgzGmvnvzbLtTbhcXcJDlkrTBzhJM>

(31.5.2023)

Da se je Prometna šola Maribor znašla na seznamu sodelujočih na preventivni akciji SPV MOM je rezultat dobrega sodelovanja skozi vsa leta pri izvedbi preventivno vzgojnih akcij v Mariboru. Na zaključnem sestanku smo se srečali vsi sodelujoči na tem prvem Mariborskem moto dnevu.

Za sodelovanje so se odzvali: SPV MOM, AVP, Cona Tezno, AMZS, Fakulteta za gradbeništvo, prometno inženirstvo in arhitekturo, policija, vojska, zdravstveni dom, gasilci, medobčinska redarska služba, avto šole, ponudniki motoristične opreme in Prometna šola Maribor.

Na sestanku so se dokončno dorekle program aktivnosti na preventivni akciji. Časovna razporeditev dejavnosti na dogodku:

7.30 – 9.00: Zbiranje sodelujočih na prireditvi in razpored po posameznih lokacijah na poligonu Cone Tam.

9.00 – 9.30: Prihod in zbiranje motoristov. Pozdravni nagovor vodstva MOM (podžupan MOM).

9.30 – 9.40: Pozdravni nagovor vodstva MOM (podžupan MOM).

9.40 – 9.50: Pozdravni nagovor predsednika SPV (Vinko Virtnik).

9.50 – 10.00: Nagovor predstavnika AVP (Agencija za varnost v cestnem prometu).

10.00 – 10.10: Nagovor predstavnikov AMZS (Avto moto zveza Slovenije).

10.10 – 10.30: Zavod vozim.

10.30 – 11.30: Aktivnosti AVP poligonska vožnja in preizkus demo naprav.

11.30 - 12.30: Predavanje, motorist in infrastruktura (Fakulteta za gradbeništvo, prometno inženirstvo in arhitekturo, Direkcija RS za infrastrukturo).

12.30 – 13.30: Predstavitve policije , vojaške policije, reševalca na motorju in delovanje gasilcev.

13.30 – 13.50: Blagoslov motorjev in motoristov.

14.00 – 15.30: Panoramska vožnja po totem našem Mariboru.

15.30 – 17.30: Druženje motoristov.

17.30 – 18.00: zaključek prireditve.

Za Prometno šolo so dane zadolžitve na vhodih prireditvenega prostora in postavitve ene stojnice, kjer se predstavlja šola in predstavitve varne vožnje – očala.

Dogovorjen je program,. Vreme pa je imelo svoje načrte. V soboto 7. maja 2022 je bila prireditev na poligonu AVP na Teznu odpovedana v jutranjem času zaradi dežja in se je določil novi datum 4. junij 2022. Informacije so se podajale preko socialnega omrežja facebook.

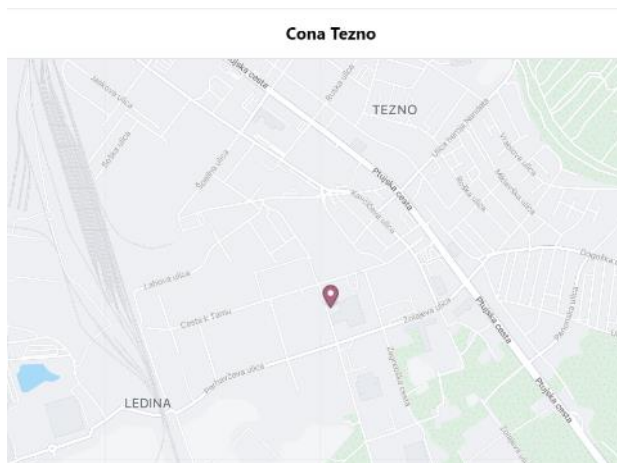


Slika 6: Vabili na dogodek

Vir: <https://www.facebook.com/events/327532592794059?ref=newsfeed> (7.6.2023)

1.1 IZVEDBA PRIREDITVE MARIBORSKI MOTO DAN 2022

Vreme nam je omogočilo v drugem poskusu, da izvedemo prireditev. Lokacija prireditve je bila na poligonu AVP na Teznu.



Slika 7: Lokacija prireditve

Vir: <https://www.facebook.com/events/327532592794059?ref=newsfeed> (7.6.2023)

Dijaki in učitelji s Prometne šole Maribor smo na prireditveni prostor prispeli že pred časom zbiranja motoristov ob 8.30. Pomagali smo pri vstopnih točkah na poligon – odpirali smo zapornice. Postavit smo morali tudi stojnico naše šole. Dijaki so imeli razdeljene naloge skozi ves čas dogodka.



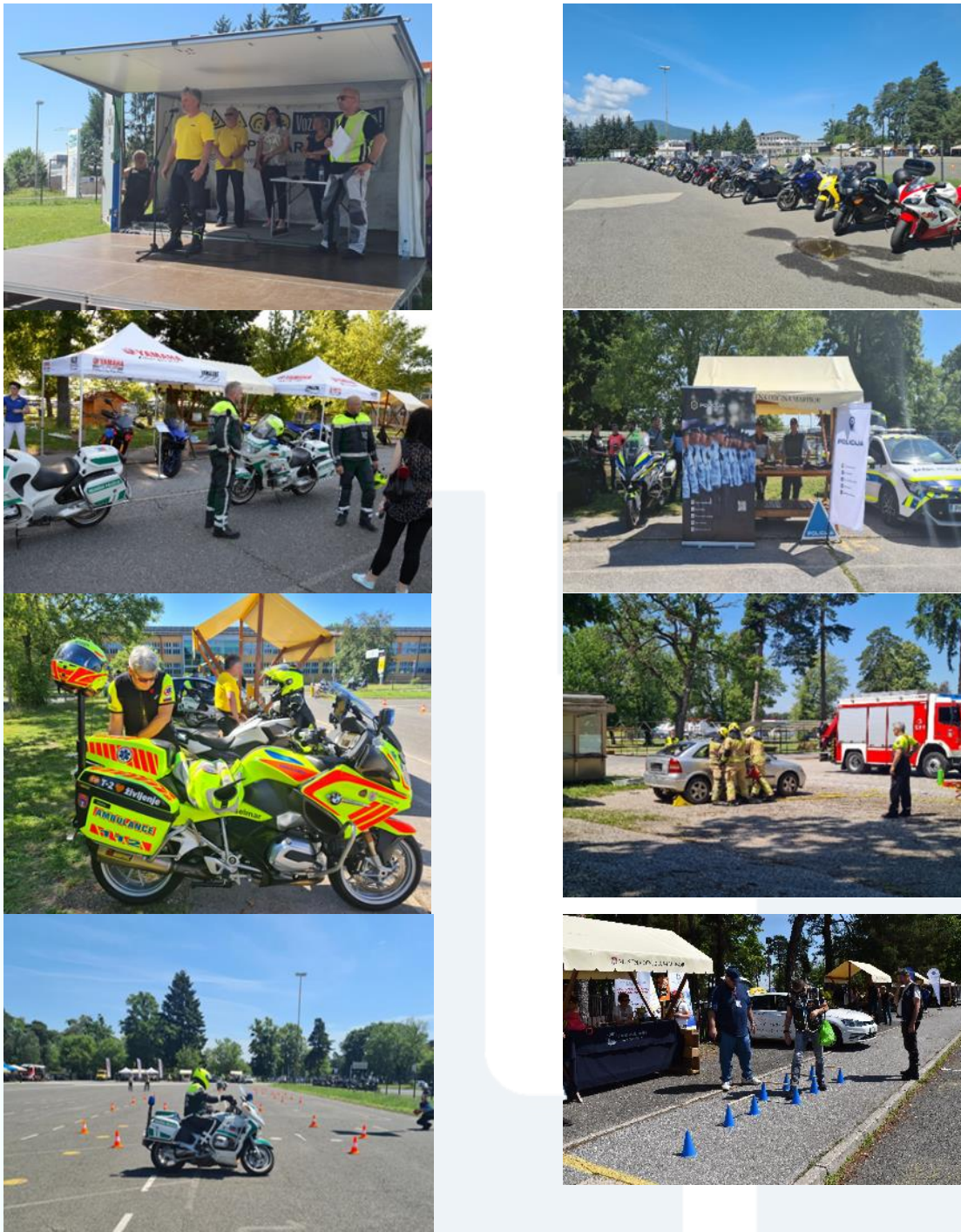
Slika 8: Stojnica Prometne šole Maribor

Vir: *lasten*

Osnovni namen vzgojno preventivne akcije Mariborski moto dan je bil čim večjemu številu motoristov in dijakov srednjih šol ozavestiti o pomenu varne mobilnosti (varna vožnja z motorji in skuterji, uporaba čelade in druge zaščitne opreme), ustreznem ravnanju v cestnem prometu, kulturi vedenja v cestnem prometu in pozitivnem odnosu do okolja.

Prvega mariborskega moto dneva se je udeležilo okoli 100 motoristov in kar nekaj ljubiteljev motorjev.

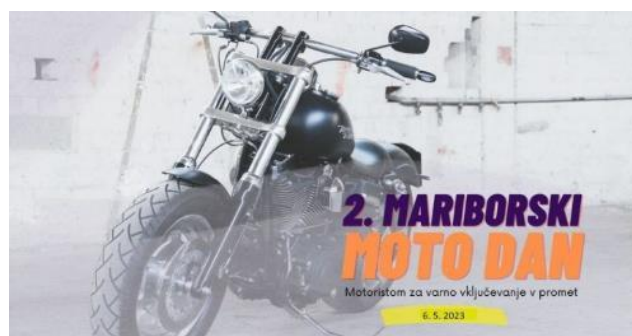
Na prireditvenem prostoru je potekal pester program. Na stojnicah so se poleg Sveta za preventivo in vzgojo predstavili še Srednja prometna šola Maribor, Zavod VOZIM, Javna agencija RS za varnost prometa, AMDT TAM šola vožnje, šola vožnje PRIHAJAM, trgovini z motoristično opremo NATURMAR in MOTONAUTIKA, Policija. Predstavili so se še tudi Gasilska brigada Maribor, Vojaška policija, ZD Maribor – OE Nujne medicinske pomoči, AMZS – PE Maribor.



Slika 9: Foto utrinki s prireditve
Vir: lasten

Prireditve je potekala v lepem vremenu in se je končala v dobrem sporočilu za motoriste.
MARIBORSKI MOTO DAN 2023

V letošnjem letu je organizatorjem spet ponagajalo vreme in se je prvi datum prireditve moral prestaviti na kasneje. Name dogodka je opomnil motoriste na nevarnosti na cesti in kako se pripraviti na sezono voženj z motorjem.



Slika 10: Vabilo na dogodek
Vir: <https://www.facebook.com/denis.kocbek> (8.6.2023)

Način obveščanja je ostal enak kot leto prej. Informacije o dogodku so bile na facebooku in ustno informiranje. Zaradi odpovedi prvega termina izvedbe in napoved novega termina je ta način nekako dosegel vse zainteresirane. Sodelujoči na dogodku pa smo imeli informacije od g. Denisa Kocbeka, koordinatorja vse te prireditve pri Mestni občini Maribor in SPV MOM. Program prireditve je letos bil malo spremenjen, krajši. Tudi letos so k sodelovanju povabili Prometno šolo Maribor, ki s svojimi dijaki zagotavlja pretočnost na vstopnih točkah in ima svojo stojnico.

1.2. IZVEDBA PRIREDITVE MARIBORSKI MOTO DAN 2023

Drugega mariborskega moto dneva se je udeležilo okoli 200 motorističnih navdušencev in kar nekaj ljubiteljev jeklenih konjičkov.

Dogodek se je pričel z kratkim pozdravnim nagovorom predsednika Odbora dogodka Denisa Kocbeka, predsednika Sveta za preventivo Vinka Vrtnika in Anamarijo Hren vodjo Sektorja za razvoj in koordinacijo varnosti cestnega prometa.

Na prireditvenem prostoru je potekal pester program. Na stojnicah so se poleg sveta za preventivo predstavi še: Javna agencija RS za varnost prometa - AVP, Prometna šola Maribor, mariborska Policija, AMZS – AMD TAM, šola vožnje Prihajam in Prometna šola MB, trgovine z moto opremo – SELMAR MARIBOR in MOTO-NAUTIKA. Dodatno so se predstavili še Gasilska brigada Maribor, Vojaška policija, ZD Maribor – OE Nujne medicinske pomoči, AMZS Vransko in AVP-izpitni center Maribor.

Dogodek so obiskali tudi novinarji, ki so objavili novico o izvedbi 2. Mariborskega moto dneva v Poslovni Coni Tezno MB, katerih poročanje si lahko pogledate na spodnjih povezavah:

- <https://www.facebook.com/100056868558927/posts/pfbid02Ro7cr1hBup6vukDfXd6n2j7VD3FwXLWYDTdb4qX23cWn9b98pn5Zo2ACzmg1PvLI/?sfnsn=mo>
- <https://www.facebook.com/179491109142658/posts/pfbid0Td3s54Kqho2wiBVAaitX3BaGJqG7yNVvrAAAd51kB5nHbbFp41LBegxNgPRce4KrPI/?sfnsn=mo>
- <https://www.avp-rs.si/mariborski-moto-dan-je-privabil-okrog-200-motoristov/>
- <https://maribor24.si/lokalno/foto-v-mariboru-motoristi-preizkusali-svoje-sposobnosti>
- <https://vecer.com/maribor/aktualno/foto-motoristi-mnozicno-obiskali-2-mariborski-moto-dan-osrednja-tema-bila-varnost-motoristov-10332303>
- <https://kontakt-conatezno.si/revija-kontakt/>

ZAKLJUČEK

Dijaki na Prometni šoli Maribor se pri akcijah Mestne občine Maribor navadijo drugačnega načina učenja. Učenje odraslih ali mladoletnih na preventivnih akcijah SPV MOM je na bazi demonstracij vaj, ki so uporabne in blizu sodelujočim na akcijah.

Za nas šolo in za naše dijake so pa ti dogodki izzivi za drugačno delo pri pouku. Učitelji mentorji sodelujemo z občino in na dijake prenašamo navodila. Na preventivni akciji pa se potem dijaki lahko zanesejo na svoje sošolce in na mentorje. Delo med starejšimi obiskovalci je za dijake izziv in ga sprejmejo zelo dobro. Pridobijo pogled na rezultat svojega dela, kot doprinos k izvedbi akcije takoj in sproti. Za oba dogodka lahko dijake pohvalim in izpostavim, da so v tretjem in četrtem letniku dijaki že dovolj samostojni, odgovorni in usposobljeni da delajo naloge ki so jim zaupane.





PROMETNA ŠOLA MARIBOR, SLOVENIJA

Authors:

Dušan Veršec, dipl. inž. prom.

Benjamin Pivec, mag. inž. prom

29. MARIBOR MOTTO DAY

Summary:

Motorcyclists must take care of their own safety in the first place. Today, motorcyclists have become frequent participants in traffic, whose purpose of travel is entertainment and change after the end of the working week. For the weekend, when the sun predicts a beautiful day, on Slovenske ceste we meet motorcyclists with different qualifications - real motorcyclists and weekend motorcyclists. Traffic accidents are a warning of the danger of poor visibility of the motorcyclist on the road for other participants. Riding a motorcycle requires riding fitness, a perfect motorcycle and the rider's equipment. At the beginning of the motorcycling season, various motorcycle clubs decide on gatherings of motorcyclists, there are safe driving trainings at the AMZS training ground. The municipality of Maribor - the Municipal Road Traffic Prevention and Education Council - set themselves the task of holding an event for motorcyclists. The Maribor Traffic School with students also participates in the creation and implementation of an educational and preventive event for motorcyclists in Maribor.

Keywords: traffic safety, safe mobility, driving license, AVP, SPV

INTRODUCTION

Between motorcycle drivers, mutual relations are interwoven, which are unknown among other groups of drivers. In Slovenia, motorcycle associations are being established, which invite motorcycle drivers to join them. Riding a motorcycle is becoming a way of life. Panoramic rides by groups of motorcyclists on our roads are no longer isolated events, but we meet them on weekends in all corners of the country.



Figure 11: MK Lake Spirits panoramic ride

Source: <https://www.prlekija-on.net/lokalno/10044/na-panoramsko-voznjo-izpred-gajsevskega-jezera-se-je-podalo-okoli-stiristo-motoristov.html> (obtained 31.5.2023)

Motorcycle events are harbingers of good weather and long days. Most motorcyclists start preparing for the annual adventures on the steel horse with spring gatherings. For greater protection, priests also take part in the blessing of motorcycles and bikers at the meetings.



Figure 2: Meeting of motorcyclists at the blessing of motorcycles

Source: <https://www.rtvsllo.si/zabava-in-slog/zanimivosti/blagoslov-motorjev-ob-zacetku-nove-sezone-prometna-varnost-se-vedno-nezadostna/664335> (obtained 31.5.2023)

In Slovenia, the president of the country, Nataša Pirc Musar, also advocates for the safety of motorcyclists as a motorcyclist. She started the season at the preparation of motorcyclists

with Ljubljana police officers and instructors at the traffic training ground Jarše near Domžale. She reminded that it would be good for every motorcyclist to undergo safe driving training at the beginning of the season.

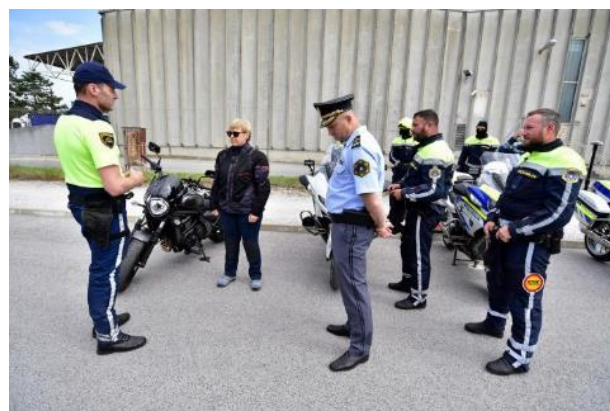


Figure 3: The President of the Republic of Slovenia Nataša Pirc Musar at the safe driving training
Source: <https://www.rtvsl.si/zabava-in-slog/avtomobilnost/natasa-pirc-musar-ozavesca-o-varni-voznji-z-motorjem-najprej-trening-nato-krajse-razdalje/670037> (obtained 31.5.2023)

In Slovenia, the largest motorcycle association AMZS - Auto Moto Association of Slovenia also conducts safe driving trainings. In the spring, motorcyclists are invited to safe driving training at their training ground in Vrana. In their training offer, they have different programs that are adapted to the different structure of motorcyclists. They have information on a variety of programs on their website.



Figure 4: The offer of safe driving training for AMZS motorcyclists
Figure: <https://www.amzs.si/cvv/programi/za-motoriste> (obtained 31.5.2023)

The municipality of Maribor also has an ear for greater safety of motorcyclists in traffic.

MARIBOR MOTO DAY 2022

Motorcycling has become very popular in recent years, and a motorcycle is relatively affordable from a financial point of view. Considering the fact that in the last few years there have been too many traffic accidents involving motorcyclists, we would like to organize a large motorcycle safety campaign in terms of traffic safety. The Road Traffic Prevention and

XIII. INTERNATIONAL SYMPOSIUM *Interdisciplinarity of logistics and traffic*

Education Council of the Municipality of Maribor has been working for years to improve traffic safety in the area of the Municipality of Maribor with various preventive actions.

In order to encourage motorcyclists and those who will continue to do so to understand the importance of traffic safety, to develop tolerance and responsible behavior and care for other road users, the Municipality of Maribor, the Road Traffic Prevention and Education Council and its colleagues have started to carry out an educational of the preventive event "Motorists for safe integration into traffic" - Maribor motorcycle day.

The beginning of a new story in Maribor was also for our school an invitation to the first joint meeting of all participating actors at the preventive campaign MARIBORSKI MOTO DAN 2022.



Figure 5: Part of the invitation to the final meeting of SPV MOM

Source:

<https://mail.google.com/mail/u/0/#search/denis.kocbek%40maribor.si/FMfcgzGmvnvzbLtTbhCxcJDlkrTBzhJM>

(obtained 31.5.2023)

The fact that the Traffic School Maribor was on the list of participants in the SPV MOM preventive campaign is the result of good cooperation throughout the years in the implementation of preventive educational campaigns in Maribor. At the final meeting, all the participants of this first Maribor Motorcycle Day met.

The following responded to cooperation: SPV MOM, AVP, Cona Tezno, AMZS, Faculty of Civil Engineering, Traffic Engineering and Architecture, police, army, health center, firefighters, inter-municipal police service, driving schools, providers of motorcycle equipment and Traffic School Maribor.

At the meeting, the program of activities for the preventive campaign was finalized. Timing of activities at the event:

7:30 a.m. – 9:00 a.m.: Gathering of participants at the event and arrangement by individual locations at the Cone Tam training ground.

9.00 a.m. – 9.30 a.m.: Arrival and collection of motorcyclists. Welcome address by MOM management (MOM Deputy Mayor).

9:30 a.m. – 9:40 a.m.: Welcome address by MOM management (MOM Deputy Mayor).

9:40 a.m. – 9:50 a.m.: Welcome speech by the President of SPV (Vinko Virtnik).
9:50 a.m. – 10:00 a.m.: Address of the representative of AVP (Agency for Road Safety).
10:00 – 10:10: Address by representatives of AMZS (Auto Moto Association of Slovenia).
10:10 a.m. – 10:30 a.m.: I drive the institute.
10:30 a.m. – 11:30 a.m.; AVP activities Polygon drive and test of demo devices.
11.30 a.m. - 12.30 p.m.: Lecture, motorcyclist and infrastructure (Faculty of Civil Engineering, Traffic Engineering and Architecture, Directorate of Infrastructure of the Republic of Slovenia).
12:30 p.m. – 1:30 p.m.: Presentations of the police, military police, ambulance on a motorcycle and the operation of the fire brigade.
13:30 p.m. – 13:50 p.m.: A blessing to motorbikes and motorcyclists.
14:00 p.m.– 15:30 p.m.: A panoramic drive through our totem Maribor.
15:30 p.m. – 17:30 p.m.: The gathering of motorcyclists.
17:30 p.m. – 18:00 p.m.: conclusion of the event.

For the Traffic School, tasks have been given at the entrances of the event space and the setting up of one stand where the school is presented and demonstrations of safe driving - glasses.

The program has been agreed. But the weather had its own plans. On Saturday, May 7, 2022, the event at the AVP training ground in Tezno was canceled in the morning due to rain, and a new date of June 4, 2022 was set. Information was provided via the Facebook social network.



Figure 6: Invitations to the event

Source: <https://www.facebook.com/events/327532592794059?ref=newsfeed> (obtained 7.6.2023)

1.3 IMPLEMENTATION OF THE MARIBOR MOTO DAY 2022 EVENT

In the second attempt, the weather allowed us to hold the event. The location of the event was at the AVP training ground in Tezno.

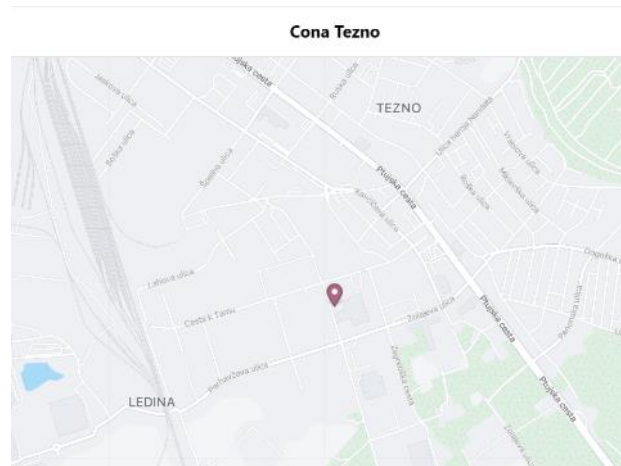


Figure 7: Event location

Source: <https://www.facebook.com/events/327532592794059?ref=newsfeed> (obtained 7.6.2023)

The students and teachers from the Maribor Traffic School arrived at the venue before the motorcyclists were supposed to gather at 8:30 a.m. We helped with the entry points to the training ground - we opened the floodgates. We also had to set up our school's stand. Students were assigned tasks throughout the event.



Figure 8: Stand of the Maribor Traffic School

Source: own

The basic purpose of the educational and preventive campaign Maribor Motorcycle Day was to make as many motorcyclists and high school students aware of the importance of safe mobility (safe driving with motorcycles and scooters, use of helmets and other protective equipment), appropriate behavior in road traffic, culture of behavior in road traffic and a positive attitude towards the environment.

About 100 motorcyclists and quite a few motorcycle enthusiasts took part in the first Maribor Moto Day.

A varied program took place at the venue. In addition to the Council for Prevention and Education, the Maribor High School of Traffic, the VOZIM Institute, the RS Public Agency for Traffic Safety, the AMDT TAM driving school, the PRIHAJAM driving school, the NATURMAR and MOTONAUTIKA motorcycle equipment shops, and the Police presented themselves at the stands. Maribor Fire Brigade, Military Police, ZD Maribor - OE Emergency Medical Services, AMZS - PE Maribor also presented themselves.



Figure 9: Photo highlights from the event
Source: own

The event took place in good weather and ended with a good message for motorcyclists.

MARIBOR MOTTO DAY 2023

This year, the weather again troubled the organizers and the first date of the event had to be moved to a later date. The purpose of the event is to remind motorcyclists of the dangers on the road and how to prepare for the motorcycle riding season.



Figure 10: Invitation to an event

Source: <https://www.facebook.com/denis.kocbek> (obtained 8.6.2023)

The method of notification remained the same as last year. Information about the event was on Facebook and word of mouth. Due to the cancellation of the first performance date and the announcement of a new date, this method somehow reached all interested parties. Participants in the event had information from Mr. Denis Kocbek, coordinator of all these events at the Municipality of Maribor and SPV MOM.

The program of the event was slightly changed this year, shorter. Also this year, the Traffic School Maribor was invited to participate, which with its students ensures fluidity at the entry points and has its own stand.

1.4 IMPLEMENTATION OF THE MARIBOR MOTO DAY 2023 EVENT

The second Maribor Moto Day was attended by around 200 motorcycle enthusiasts and quite a few fans of steel horses.

The event began with a short welcome speech by the chairman of the event committee, Denis Kocbek, the chairman of the Prevention Council, Vinko Vrtnik, and Anamarija Hren, head of the Sector for Development and Coordination of Road Traffic Safety.

A varied program took place at the venue. In addition to the council for prevention, the following will be presented at the stands: Public Agency of the Republic of Slovenia for Traffic Safety - AVP, Maribor Traffic School, Maribor Police, AMZS - AMD TAM, Prihajam Driving School and MB Traffic School, motorcycle equipment stores - SELMAR MARIBOR and MOTO- NAUTICAL. In addition, the Maribor Fire Brigade, Military Police, ZD Maribor - OE Emergency Medical Services, AMZS Vransko and AVP-examination center Maribor also presented themselves.

The event was also visited by journalists who published the news about the 2nd Maribor Moto Day in the Tezno MB Business Zone, whose reporting can be viewed at the links below:

- <https://www.facebook.com/100056868558927/posts/pfbid02Ro7cr1hBup6vukDfXd6n2j7VD3FwXLWYDTdjb4qX23cWn9b98pn5Zo2ACzmq1PvLI/?sfnsn=mo>
- <https://www.facebook.com/179491109142658/posts/pfbid0Td3s54Kqho2wiBVAaitX3BaGJqG7yNVvrAAAd51kB5nHbbFp41LBeqxNgPRce4KrPI/?sfnsn=mo>
- <https://www.avp-rs.si/mariborski-moto-dan-je-privabil-okrog-200-motoristov/>
- <https://maribor24.si/lokalno/foto-v-mariboru-motoristi-preizkusali-svoje-sposobnosti>

- <https://vecer.com/maribor/aktualno/foto-motoristi-mnozicno-obiskali-2-mariborski-moto-dan-osrednja-tema-bila-varnost-motoristov-10332303>
- <https://kontakt-conatezno.si/revija-kontakt/>

CONCLUSION

Students at Prometna šoli Maribor get used to a different way of learning during the actions of the Municipality of Maribor. The learning of adults or minors at SPV MOM preventive actions is based on demonstrations of exercises that are useful and close to those participating in the actions.

For us as a school and for our students, these events are challenges for a different way of working in lessons. As teacher mentors, we work with the municipality and pass on instructions to the students. During the preventive campaign, students can then rely on their classmates and mentors. Working among older visitors is a challenge for students and they accept it very well. They get a view of the result of their work, as a contribution to the implementation of the action immediately and on the fly. I can praise the students for both events and point out that in the third and fourth year the students are already independent, responsible and qualified enough to do the tasks entrusted to them.



СКОПЈЕ
28-30 СЕПТЕМВРИ 2023

SKOPJE
28-30 SEPTEMBER, 2023

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