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RANJIVI UČESNICI U SAOBRAĆAJU

STRUČNI RAD

Apstrakt

S razvojem saobraćaja i povećanjem mobilnosti stanovnika, sve zemlje sveta suočavaju se s problemom ugroženosti u saobraćaju, odnosno saobraćajnim nezgodama u kojima strada veliki broj lica uz ogromne materijalne štete. Svi učesnici u saobraćaju izloženi su riziku. Imajući to na umu ili ne, mi stalno donosimo odluke u vezi s rizikom. Tako ulaskom u autobus ili automobil mi prihvatamo određeni rizik, pri prelasku ulice ili vožnji bicikla takođe smo izloženi riziku, a da o tome često i ne razmišljamo. Autor se u ovom radu posebno bavi najranjivijim učesnicima u saobraćaju i predlaže osnovne smernice za rešavanje tog problema i podizanje opšteg nivoa bezbednosti u saobraćaju.

Ključne reči: saobraćaj, ranjivi učesnici u saobraćaju, saobraćajne nezgode, bezbednost.

I. Uvod

Rizik učestvovanja u saobraćaju višestruko se uvećava kada se u saobraćajnom toku nađu takozvani ranjivi učesnici, naročito deca. Ranjivi učesnici u saobraćaju su uglavnom i oni koji nisu zaštićeni spoljnim štitom, a to su pešaci i dvotočkaši (vozači bicikla, mopeda, motocikla i električnih trotineta).

Među ranjivim učesnicima u saobraćaju neki su ranjiviji od drugih, gde se izdvajaju starije osobe, hendikepirana lica i deca. Šta je još karakteristično za ranjive učesnike u saobraćaju? To je da veliki broj njih nisu ili ne moraju biti obučeni za učešće u saobraćaju (starije osobe, hendikepirana lica, deca i ostali pešaci, vozači

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trotineta), a manji broj njih su obučeni ili su prošli obuku za učešće u saobraćaju (vozači mopeda i motocikala).

II. Rizik učešća u saobraćaju

Stupanjem u saobraćajni tok, bilo kao pešaci bilo kao vozači, stalno smo izloženi određenom riziku od nastanka saobraćajne nezgode, odnosno povređivanja ili pričinjenja materijalne štete. Rizik se višestruko uvećava kada se u saobraćajnom toku nađu ranjivi učesnici, a pogotovo deca. Uočava se da ranjivi učesnici u saobraćaju ne predstavljaju jedan entitet, već okupljaju različite grupe ljudi s različitim sposobnostima, navikama, iskustvom, obrazovanjem i šablonima ponašanja, a zajedničko im je da su njihovi problemi vezani za saobraćajno okruženje, koje često nije oblikovano za njih. Veliki broj različitih faktora utiče na nastanak saobraćajnih nezgoda u kojima strada mnogo ljudi i nastaju ogromne materijalne štete. To zahteva proučavanje rizika učešća u saobraćaju i delovanje na faktore koji utiču na smanjenje i upravljanje tim rizicima. Rizik učešća u saobraćaju ne može se jednoznačno odrediti, a za potrebe upravljanja rizikom, rizik se može iskazati kao proizvod verovatnoće nastanka štetnog događaja i njegovih posledica ($\text{rizik} = \text{verovatnoća} \times \text{posledice}$), što zahteva da, pored verovatnoće nastanka štetnog događaja (nezgode), poznamo i posledice saobraćajnih nezgoda.

1. Karakteristike stradanja ranjivih učesnika u saobraćaju

1.1. Motocikli i mopedi

U periodu od 2018. do 2020. godine prema podacima² Agencije za bezbednost saobraćaja registrovano je 149 saobraćajnih nezgoda s poginulim licima motorizovanih dvotočkaša, od čega 30 sa mopedom i 120 sa motociklom. Ovde treba naglasiti da su u jednoj nezgodi s poginulim licima učestvovali moped i motocikl. U istom periodu desile su se 3.623 saobraćajne nezgode s povređenim licima u kojima su učestvovali motorizovani dvotočkaši. U tim nezgodama povređeno je 1.378 mopedista i 2.391 motociklista. Prema istom izvoru, poginuli vozači motorizovanih dvotočkaša čine 9% svih poginulih u saobraćajnim nezgodama, a povređeni čine 6% svih povređenih u saobraćajnim nezgodama za posmatrani period. Prema policijskim podacima, u polovini saobraćajnih nezgoda izazivači su vozači motocikala i mopeda usled nepoštovanja osnovnih saobraćajnih propisa, gde dominantno mesto zauzima neadekvatna brzina.

² Bezbednost vozača i putnika na mopedima i motociklima u Srbiji za period 2018–2020. godine, ABS, septembar 2021.

Statistički podaci iz drugih država su još drastičniji. Prema podacima Nacionalne agencije za bezbednost na putevima SAD, vozači motocikala su i dalje previše zastupljeni u saobraćajnim nezgodama sa smrtnim ishodom. Samo u 2022. godini, na putevima SAD poginulo je 6.218 motociklista, što je 15% svih poginulih u saobraćaju. To je najveći broj poginulih motociklista od 1975. godine, upozorila je nedavno ta agencija.³ S druge strane, izveštaj Evropske komisije pokazuje da je su 2019. godini, 19% poginulih učesnika u saobraćajnim nezgodama činili vozači motocikala i mopeda.⁴ Devet od deset poginulih motociklista su muškog pola. Od 2010. godine, po tom izveštaju, raste broj poginulih motociklista na putevima EU, a najveći broj poginulih je na putevima Grčke.

U oblasti bezbednosti saobraćaja dvotočkaši zauzimaju visoko mesto na skali rizika od stradanja. Uzroci stradanja dvotočkaša su u prvom redu nedozvoljena ili neprilagođena brzina, a zatim slede preticanja na nedozvoljenim mestima, preticanja vozila s desne strane, preticanje u slučajevima gde postoje dve ili više saobraćajnih traka za jedan smer čestim menjanjem traka (vožnja cikcak), a u pojedinim slučajevima i bahato ponašanje vozača. Osim toga, istraživanja su pokazala da su dvotočkaši teže uočljivi od ostalih motornih vozila. Vozači očekuju dva fara a kada se pojavi jedan, često ga ne opaze, pa je zbog toga vrlo česta saobraćajna nezgoda s naletanjem motocikla i mopeda na raskrsnici na bočnu stranu automobila. Činjenica je da najviše stradaju mladi vozači dvotočkaša, što ukazuje na neiskustvo, lošu obuku i nepoznavanje ili nepoštovanje saobraćajnih propisa.

Pored navedenog, uzroke stradanja motociklista treba tražiti u neadekvatnoj obuci, neiskustvu (većina stradali su dobi od 16 do 24 godine), oduzimanju prvenstva od strane drugih motornih vozila (naročito na raskrsnicama i pri skretanju motornog vozila kada ga pretiče motocikl ili mu dolazi u susret), neuočavanju motocikla od strane drugih učesnika u saobraćaju itd.

Verovatnoća povrede motocikliste koji učestvuje u nezgodi je vrlo visoka (gotovo 98% njih u toku nezgode zadobije neku povredu), a najčešće vrste povreda su:

- povrede stopala i skočnog zgloba (oko polovine svih povreda)
- kao najsmrtonosnije, povrede glave, grudnog koša i unutrašnja krvarenja
- manje povrede vrata kod motociklista koji su nosili kacigu.

Pomenuta Nacionalna agencija za bezbednost na putevima SAD upoređivala je pređenu kilometražu vozača motocikala i ostalih učesnika u saobraćaju i zaključila da je verovatnoća da će motociklista poginuti u sudaru s motornim vozilom bila oko 22 puta veća u odnosu na putnika u putničkom vozilu, dok je verovatnoća da će biti povređeni četiri puta veća.⁵

³ <https://www.nhtsa.gov/road-safety/motorcycles>, pristupljeno: 14. 5. 2024.

⁴ European Commission (2021) Facts and Figures Motorcyclist and moped riders. European Road Safety Observatory. Brussels, European Commission, Directorate General for Transport. <https://road-safety.transport.ec.europa.eu/document/download/24515fb9-a8b0-4096-b54c>; pristupljeno: 13. 5. 2024.

⁵ <https://www.nhtsa.gov/road-safety/motorcycles>; pristupljeno: 14. 5. 2024.

1.2. Bicikli

Kada govorimo o Srbiji, u istom posmatranom periodu (2018–2020. god.) registrovana je 151 saobraćajna nezgoda sa smrtnim posledicama i 4.337 saobraćajnih nezgoda s povređenim licima, u kojima su učestvovali biciklisti. U tim saobraćajnim nezgodama poginulo je 145, a povređeno 4.317 biciklista. Poginuli biciklisti čine 9% svih poginulih u saobraćajnim nezgodama i oko 7% svih povređenih lica u saobraćajnim nezgodama.⁶

Tabela 1. Raspodela poginulih i povređenih biciklista prema svojstvu učešća i polu, u periodu 2018–2020. godine.

Starosne grupe	POGINULI					POVREĐENI				
	M (broj)	M (%)	Ž (broj)	Ž (%)	Ukupno (%)	M (broj)	M (%)	Ž (broj)	Ž (%)	Ukupno (%)
0-14	3	2%	0	0%	2%	431	10%	132	3%	13%
15-24	7	5%	2	1%	11%	363	8%	140	3%	21%
25-34	7	5%	0	0%		243	6%	140	3%	
35-44	9	6%	2	1%	39%	291	7%	160	4%	42%
45-54	7	5%	3	2%		313	7%	274	6%	
55-64	30	21%	5	3%		414	10%	366	8%	
65-74	36	25%	4	3%	48%	447	10%	239	6%	24%
75-84	20	14%	2	1%		254	6%	61	1%	
85+	7	5%	1	1%		47	1%	2	0%	
Ukupno	126	87%	19	13%	100%	2.803	65%	1.514	35%	100%

Saobraćajne nezgode s biciklistima češće imaju kao posledicu smrtni ishod u poređenju sa motorizovanim učesnicima u nezgodama koji imaju zatvorenu karoseriju. Razlozi su njihova ranjivost i pri manjim brzinama drugih učesnika u nezgodama, slaba uočljivost u noćnim uslovima, okruženje koje u većini slučajeva nije oblikovano za njihovo kretanje, to što biciklisti različite starosne dobi i pola imaju različite psihofizičke sposobnosti, a deca biciklisti nemaju iskustvo i znanje, dok starije osobe imaju smanjene fizičke sposobnosti, smanjenu moć opažanja i pokretljivost.

Biciklisti najčešće stradaju u nezgodama u kojima učestvuju putnička vozila (59%), zatim u nezgodama sa učešćem teretnih vozila (20%), u saobraćajnim nezgodama gde su biciklisti jedini učesnik u nezgodi gine oko 8% njih, dok oko 2% biciklista gine u sudaru s pešacima.

Bezbednost biciklista u velikoj meri zavisi od saobraćajnog okruženja, koje im najčešće nije prilagođeno. Oni su u velikoj meri primorani da se kreću kolovozom

⁶ Bezbednost biciklista u saobraćaju, ABS, avgust 2021.

gde ih ostali vozači tretiraju kao „ometače“, a ne kao sastavni deo saobraćajnog sistema. U tim slučajevima dolazi do „sukoba brzina“ jer ostala vozila koja koriste kolovoz razvijaju veće brzine, s tim što tu treba dodati razliku u masama i nezaštićenost vozača bicikla, što dovodi do povreda ili smrtnog stradanja biciklista. Česte su saobraćajne nezgode u noćnim uslovima vožnje, gde bicikl nije osvetljen kako to propisuje ZoBS na putevima. U takvim uslovima bicikl i vozač na njemu predstavljaju neočekivanu i teško uočljivu prepreku na putu, koju vozači motornih vozila u velikom broju slučajeva ne mogu da izbegnu.

Jedan od češćih uzroka nezgoda biciklista, poslednjih nekoliko godina, jeste korišćenje mobilnih telefona tokom vožnje bicikla. Nedavno istraživanje za potrebe Evropske komisije, pokazalo je da mladi ljudi, uzrasta 12–17 godina češće koriste mobilne telefone dok voze bicikl nego odrasli.⁷ I odrasli i mladi biciklisti su izjavili da najčešće koriste svoje telefone za čitanje poruka (38% odraslih i 55,5% mladih biciklista) ili za slanje poruka (33% naspram 55%)

Istraživanja u Velikoj Britaniji⁸ koja su bazirana na podacima iz bolnica daju detaljne podatke o tipu i ozbiljnosti povreda ranjivih učesnika u saobraćaju, a kod biciklista srećemo sledeće:

- povrede glave su glavni uzrok smrti kod tri četvrtine biciklista koji su poginuli u saobraćajnim nezgodama;
- preko polovine žrtava nezgoda zadobile su umereno ozbiljne povrede lica ili lobanje, što je zahtevalo ostajanje u bolnici preko noći;
- povrede kičme, stomaka i grudnog koša bile su relativno retke, a kada su se dešavale, povrede grudnog koša bile su ozbiljne, dok su povrede kičme i stomaka bile manje;
- dve petine biciklističkih žrtava nezgoda pretrpele su povrede donjih ekstremiteta, uključujući i povrede bedrene kosti, iščašenje kukova, kolena i povrede članaka;
- preko polovine žrtava nezgoda pretrpele su povrede gornjih ekstremiteta, iako su one retko bile ozbiljne;
- tri četvrtine žrtava biciklističkih nezgoda bile su zadržane u bolnici duže vreme (u proseku 21 dan).

Oktobra 2023. godine, Evropska komisija predstavila je predlog za Evropsku deklaraciju o biciklizmu u cilju poboljšanja bezbednosti na putevima i kvaliteta i kvantiteta biciklističke infrastrukture širom EU. Nacrt deklaracije prepoznaje bicikl kao održivo, dostupno, inkluzivno, pristupačno i zdravo prevozno sredstvo, sa sna-

⁷ *European Commission (2024). Road safety thematic report – Cyclists. European Road Safety Observatory. Brussels, European Commission, Directorate General for Transport, 2024, https://road-safety.transport.ec.europa.eu/european-road-safety-observatory/data-and-analysis/thematic-reports_en pristupljeno: 13. 5. 2024. str. 12*

⁸ Scientific Expert Group on the Safety of Vulnerable Road Users (RS7), 1998.

žnom dodatnom vrednošću za ekonomiju EU.⁹ Jedna od glavnih poruka predložene deklaracije jeste fizičko razdvajanje biciklista i motornih vozila. Tamo gde moraju da se sretnu, na primer na putevima bez odvojenih staza za bicikle ili na raskrsnicama, brzina motornih vozila mora biti veoma mala.

1.3. Električni trotineti

Što se tiče vožnje električnih trotineta, to pitanje donedavno u Srbiji nije bilo regulisano. Korisnici trotineta mogli su da učestvuju u saobraćaju i upravljaju svojim dvotočkašima bez propisanih pravila i zakonskih odredaba. Izmenama i dopunama Zakona o bezbednosti saobraćaja na putevima koje su stupile na snagu 15. septembra 2023. godine, u velikoj meri propisano je njihovo kretanje u saobraćaju i toga će vozači električnih trotineta morati da se pridržavaju.

Tim izmenama, između ostalog, propisano je sledeće:

- vožnja električnih trotineta zabranjena je po trotoarima (mogu se voziti po biciklističkim stazama, pešačko-biciklističkim stazama, biciklističkim trakama, a u slučaju kada tih staza nema kreću se putevima na kojima je brzina ograničena na 50 km/h, zauzimajući maksimalno 1 m od desne ivice kolovoza izuzev ispred raskrsnice ako vrše npr. skretanje ulevo);
- brzina kretanja električnih trotineta limitirana je na 25 km/h, a masa je ograničena na 35 kg;
- upravljanje električnim trotinetima zabranjeno je za mlađe od 14 godina;
- osobama od 14 do 18 godina dozvoljena je vožnja na putevima na kojima je brzina ograničena na 30 km/h;
- nošenje biciklističkih kaciga obavezno je za sve vozače električnih trotineta, a nošenje reflektujućeg prsluka obavezno je za maloletna lica u svim uslovima, dok ih ostali moraju nositi kada se kreću po putevima;
- vozači električnih trotineta ne smeju za vreme vožnje imati slušalice u ušima, a prilikom prelaska kolovoza na pešačkim prelazima moraju sići sa trotineta i kolovoz preći kao pešaci;
- na električnim trotinetima mora postojati nalepnica koju izdaje Agencija za bezbednost saobraćaja.

Nema podataka o broju električnih trotineta u Srbiji. U MUP-u procenjuju da ih je između 250.000 i 400.000, ali podataka o broju saobraćajnih nezgoda sa učešćem električnih trotineta za sada nema. Međutim, ima saobraćajnih nezgoda pa se mogu videti naslovi u novinama kao što su: „Vozite oprezno, sve više teških

⁹ European Commission (2024). Road safety thematic report – Cyclists. European Road Safety Observatory. Brussels, European Commission, Directorate General for Transport, 2024, https://road-safety.transport.ec.europa.eu/european-road-safety-observatory/data-and-analysis/thematic-reports_en pristupljeno: 13. 5. 2024. str. 5

nesreća sa e-trotinetima“ ili „Vozači električnih trotineta opasni po sebe i sve ostale“ ili „Vozač e-trotineta udario Novosađanku“ i sl.

Rezultati ankete koja je sprovedena na portalu Mondo¹⁰ kažu da 44% ispitanika smatra da su vozači električnih trotineta bahati i da ih nerviraju, 22% ispitanika smatra da je to odličan vid prevoza, dok 34% njih razmišlja da ih kupi.

1.4. Pešaci

Pešaci za svoje kretanja obično biraju najkraće putanje i na tom putu ne žele da provedu više vremena nego što je neophodno. Razmišljajući o najkraćoj putanji, pešaci često ne koriste pešačke prelaze i podzemne prolaze, a čekanje na pojavu zelenog svetla za njih je često, izgleda, predugo, pa se ni semafor ne poštuje. Tako pešaci, krećući se poznatim i ustaljenim putanjama, poklanjaju manje pažnje saobraćajnoj signalizaciji i saobraćaju uopšte nego kada se kreću manje poznatim putevima.

U proseku, u Srbiji, godišnje pogine oko 150 pešaka, a bude povređeno oko 2.900.¹¹ Broj poginulih pešaka čini oko 25% svih poginulih u saobraćajnim nezgodama, a broj teško povređenih pešaka čini oko 24% svih teško povređenih u saobraćajnim nezgodama, dok broj lako povređenih pešaka doseže 13%. Treba naglasiti da najveći broj pešaka strada u naselju (oko 95%), a najčešće mesto pogibije je van raskrsnice (85%), dok u raskrsnici pogine oko 15% pešaka. Najugroženija kategorija pešaka su lica starija od 65 godina, a zatim se kao druga po ugroženosti izdvaja grupa dece, gde oko 30% poginule dece stradaju kao pešaci.

Ponašanje dece vrlo često je nepredvidivo i zavisi od raznih faktora koji su posledica ponašanja kod kuće ili u školi. Po izlasku iz škole deca često trče, igraju se ili guraju, tako da neoprezno stupaju na kolovoz. Neretko se javlja i međusobno dokazivanje i takmičenje dece, ko će brže da pretrči kolovoz itd.

Od 2016. do 2018. godine poginulo je 41 dete, a prikaz stradanja dece po svojstvima učešća u saobraćaju prikazan je u Tabeli 2:¹²

¹⁰ NG portal, „U čemu je problem sa električnim trotinetima“, pristupljeno: 10. 10. 2020.

¹¹ Bezbednost pešaka u saobraćaju, ABS, oktobar 2018.

¹² Analiza stradanja dece u periodu 2016–2018. godine na teritoriji Republike Srbije, ABS, maj 2019.

Tabela 2. Prikaz stradanja dece u periodu 2016–2018. godine
prema svojstvu učešća u saobraćaju

Godina	POGINULA DECA					POVREĐENA DECA				
	Vozač bicikla	Vozač mot. ili zaprežnog vozila	Putnik	Pešak	Ukupno POG	Vozač bicikla	Vozač mot. ili zaprežnog vozila	Putnik	Pešak	Ukupno POV
2016	1	0	7	4	12	211	18	879	526	1634
2017	2	0	10	5	17	171	16	805	507	1499
2018	0	0	5	7	12	170	12	813	468	1463
Total	3	0	22	16	41	552	46	2497	1501	4596

Posmatrano po svojstvima učešća u saobraćaju, deca putnici čine 54%, deca pešaci 39%, a deca biciklisti 7% od ukupnog broja poginule dece. Kod povređene dece, putnici čine 54%, pešaci 33%, biciklisti 12%, a vozači motornog vozila 1% od ukupnog broja povređene dece.

Gorenavedena strana istraživanja koja su bazirana na obradi podataka iz bolnica ukazuju na dva najdominantnija faktora ozbiljnosti povreda pešaka, a to su:

- povrede glave se najčešće dešavaju i glavni su uzrok smrti i smeštanja u bolnicu;
- sledeće po učestalosti su povrede nogu i ruku.

III. MERE ZA UNAPREĐENJE BEZBEDNOSTI RANJIVIH UČESNIKA U SAOBRAĆAJU

Prvi korak je proces identifikacije lokacija ili oblasti na kojima je potrebno poboljšati bezbednost usled velikog broja saobraćajnih nezgoda s ranjivim učesnicima u prošlosti, kao i zbog mogućnosti da se to nastavi i u budućnosti. Obeležavanje tih lokacija s prijavljenim saobraćajnim nezgodama u kojima stradaju ranjivi učesnici u saobraćaju daje mogućnost da se utvrde inženjerske, edukativne i zakonske metode i mere koje bi bile najefikasnije.

Kod vozača mopeda i motocikala prvenstveno treba raditi na boljoj obuci. Naime, vozači mopeda dobijaju dozvolu samo na osnovu poznavanja saobraćajnih propisa, dok kod vozača motocikala gotovo da nema auto-škole gde instruktor s drugim motociklom prati i usmerava kandidata za vozača motocikla, već kandidat posle teoretske nastave dobija „L“ tablicu i instruktor ga prati iz putničkog vozila obučavajući ponekad istovremeno i drugog kandidata. Osim toga, potrebno je posvetiti veću pažnju da bi im se ukazalo na opasnosti kojima su izloženi, na uticaj

brzine na težinu posledica, na značaj zaštitne opreme i na to da su oni manje uočljivi od vozača putničkih, teretnih vozila i autobusa. Takođe, potrebno je podići svest o značaju poštovanja saobraćajnih propisa pogotovo kada je u pitanju brzina, preticanje i promena pravca kretanja.

Vozači bicikala i električnih trotineta ne prolaze nikakvu obuku, a učestvuju u saobraćaju, često u okruženju koje im nije prilagođeno. Zato je neophodno edukovati te učesnike u saobraćaju, putem sredstava javnog informisanja, putem tribina i preko udruženja ili klubova biciklista o opasnostima kojima su izloženi i značaju poštovanja saobraćajnih propisa (nepoznavanje saobraćajnih propisa ih ne oslobađa odgovornosti). Osim toga, ukazivati im na značaj izreke „Videti i biti viđen“, što se naročito odnosi na noćne uslove vožnje. U infastruktornom smislu obezbediti što veći broj i dužinu biciklističkih staza i biciklističkih traka, a iznalaziti mogućnost, kada je to ostvarljivo, razdvajanja biciklističkog saobraćaja od ostalih motorizovanih učesnika u saobraćaju, smanjiti broj ukrštanja ovog i motornog saobraćaja (smanjiti broj potencijalnih konfliktnih tačaka) uz ukazivanje na značaj nošenja zaštitne opreme.

Kad je o pešacima reč, treba im, prvenstveno kroz razne akcije i preko sredstava informisanja, ukazivati na potrebu poštovanja saobraćajnih propisa i na opasnosti kojima su kao najranjiviji učesnici u saobraćaju izloženi. Kada je reč o uvažavanju saobraćajnih propisa, treba im ukazati da na pešački prelaz ne stupaju iznenadno i bez provere stanja saobraćaja na kolovozu (postoje situacije gde vozač, bez obzira na brzinu kretanja, ne može da spreči nezgodu), da po izlasku iz autobusa ne prelaze kolovoz iza autobusa jer tada vozač ne može da ih uoči na vreme, da ne istrčavaju na kolovoz, da budu strpljivi na semaforu i ne prelaze kolovoz kada im to nije dozvoljeno, da na kolovozu sa više saobraćajnih traka ne prelaze celu kolovoznu traku bez provere, bez obzira na to što je vozilo u prvoj traci stalo, pri kretanju pešaka duž kolovoza u noćnim uslovima da nose fluorescentnu odeću ili svetlo... Treba ukazivati pešacima, pogotovo kad je reč o noćnim uslovima kretanja, da oni imaju daleko veće mogućnosti da uoče vozilo nego što to ima vozač da uoči pešaka, te da odustajanjem od prelaska kolovoza, dok se ne stvore bezbedni uslovi, mogu sprečiti mogući udes. Kod infastrukturalnih mera, treba voditi računa o tome da se obezbede odgovarajući kapaciteti za pešake, kao što su trotoari i pešački prelazi, a gde je to moguće, treba denivelisati pešačke i motorne tokove, primeniti kontrolne i inženjerske mere, kao što su uređaji za kontrolu saobraćaja, osvetljenje, konstrukcija kolovoza (suženje kolovoza, ležeci policajci) za kretanje vozila i pešaka. Treba posvetiti pažnju i konstrukciji vozila koja se odnosi na pasivnu bezbednost prilikom udara u pešaka, kako bi se minimizirale povrede pešaka. Tu se pre svega misli na oblik prednjeg dela karoserije (zaobljeni plastični branici i farovi od lako deformitabilnog materija, kako bi se amortizovao udar), plastični retrovizori koji se sklapaju prilikom udara, uvučene brave na vratima i sl.

Posebnu pažnju treba posvetiti deci pešacima i osobama starijim od 65 godina. Kao što je poznato, kod starijih osoba opada sposobnost da se izbore sa

složenim saobraćajnim situacijama i gustim saobraćajem. To stanje se pogoršava s godinama, a u skladu s tim menja se i njihovo ponašanje u saobraćaju. Vežba i rutina pomažu da se to ublaži i uspori.

Deca predškolskog i ranog školskog uzrasta predstavljaju najranjivije učesnike u saobraćaju. U tom uzrastu počinju da se osamostaljuju kao pešaci, vozači bicikla, rolera, sanki, skejta... Bez pratnje odraslih počinju da izlaze na igrališta, trotoare, obezbeđene i neobezbeđene terene za igru, počinju da idu u prodavnicu, vrtić, školu, bez pratnje odraslih osoba, a od šeste godine njihovo pojavljivanje postaje masovnije, detetu ovog uzrasta otežano je donošenje ispravnih odluka, pogotovo u složenim saobraćajnim situacijama. Pored brojnih utisaka koji mu odvlače pažnju, dete ne ume da odvoji bitno od nebitnog. Usmeravanje pažnje na bitne i ignorisanje nebitnih informacija može se očekivati tek u uzrastu od 11 godina. Zato dete treba osposobiti da izdvoji najvažnije podatke kako bi moglo doneti ispravnu odluku. Tu je najvažnije naglasiti:

- lični primer roditelja i dosledno ponašanje odraslih
- usvajanje znanja i formiranje osnovnih pojmova iz saobraćajne kulture
- praktično vežbanje i ponavljanje
- podsticanje razvoja misaonih procesa i sposobnosti kojima se stvara osnova za povećanje sigurnosti dece u saobraćaju, i
- izgradnja stava kod dece „Moja bezbednost je važnija od svih nagrada i kazni“.

Lični primer roditelja i odraslih osoba je značajan izvor informacija za dete.

Kada u prisustvu deteta roditelj ili druga odrasla osoba donese odluku i postupi protivno saobraćajnim pravilima, ona mu šalje skrivene poruke:

- ništa se neće desiti ako kolovoz prelaziš van pešačkog prelaza;
- pravila postoje, ali ona nisu toliko važna;
- ne moraš sam da vodiš računa, vozač mora da pazi; i
- neće se baš meni desiti.

Nasuprot ovome, kada odrasli poštuju pravila saobraćaja, detetu šalju poruke:

- moram da poštujem pravila saobraćaja, jer moja bezbednost je najvažnija; i
- ne postoji dovoljno dobar razlog da sebe dovedem u opasnost.

Obuka za bezbedno učešće dece u saobraćaju mora početi od najranijeg dečjeg uzrasta, kroz igru u vrtićima, popunjavanje (bojenje) slika u brošurama koje su namenjene bezbednom učešću dece u saobraćaju („Saobraćajko“, video-igrice i crtani i drugi filmovi za tu namenu...). Sistem vrednosti dete izgrađuje poštujući zahteve roditelja i drugih odraslih osoba. Veoma rano od njega se traži odgovornost u odnosu na lične stvari (obuću, odeću, igračke) i postupke (ne smeš da kasniš, moraš da se vratiš u dogovoreno vreme). Za sigurnost u saobraćaju važno je da dete nauči da svoj život ne sme dovesti u opasnost spasavajući kućnog ljubimca, loptu ili kliker. Primeri roditelja i drugih odraslih osoba detetu šalju skrivene poruke koje mogu imati odlučujući uticaj na dete i njegovo ponašanje u saobraćaju.

IV. ZAKLJUČCI I PREPORUKE

Dva ključna aspekta problema učešća ranjivih učesnika u saobraćaju ogledaju se u sledećem:

- prvo, kako motorizovani učesnici u saobraćaju vide potrebe ranjivih učesnika u saobraćaju, kakav je njihov stav prema ovim učesnicima i kakve su im odgovornosti prema njima; zatim kako sve to uzeti u obzir pri njihovoj edukaciji, obuci i javnim kampanjama;
- kakve obaveze imaju ranjivi učesnici u saobraćaju u smislu sopstvene bezbednosti i kako njihovu bezbednost povećati kroz edukaciju, obuku i javne kampanje.

Sagledavanjem i proučavanjem tih aspekata i ocenom rizika donosimo odluke o sprovođenju mera za unapređenje bezbednosti ovih učesnika u saobraćaju, a one se grubo mogu podeliti na dve komplementarne grupe:

- infrastrukturne, koje se zasnivaju na planiranju puteva, saobraćaja i okruženja, i
- neinfrastrukturne, koje utiču na ponašanje učesnika u saobraćaju (obrazovanje, obuka, usvajanje znanja, formiranje stavova o bezbednom učešću u saobraćaju...).

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VULNERABLE ROAD USERS

PROFESSIONAL PAPER

Abstract

With the development of traffic and increased mobility of their population, all the countries in the globe have faced the problem of vulnerability in traffic, that is, traffic accidents involving large number of injuries and significant material damages. All road users are exposed to risk. Whether consciously or not, we constantly make risk-related decisions. By getting on a bus or into a car, we accept to be exposed to a particular risk. Crossing over the street or riding a bicycle makes us exposed to a risk, often without even thinking about it. In this paper, the author specifically addresses the most vulnerable road users and proposes basic guidelines for solving that problem and raising the overall level of traffic safety.

Keywords: *traffic, vulnerable road users, traffic accidents, safety.*

I. Introduction

The risk of using a road increases multiple times when the so-called vulnerable road users, especially children, are involved. Vulnerable road users are primarily those who are not protected by an external shield, meaning the pedestrians and two-wheelers (bicyclists, moped riders, motorcyclists, and electric scooter riders).

Amongst the vulnerable road users, some are more vulnerable than others, and these include the elderly adults, disabled individuals, and children. What else is a characteristic of vulnerable road users? Many of them are not or may not be trained for participating in traffic (elderly adults, disabled individuals, children, and other

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pedestrians, scooter riders), while a smaller number are trained or have undergone training for taking part in the traffic (moped and motorcycle riders).

II. Risk of using the road

By entering the traffic flow, either as pedestrians or drivers, we are constantly exposed to a certain risk of incurring the traffic accidents, injuries, or material damages. The risk increases significantly when vulnerable road users are present, especially children. It may be observed that vulnerable road users do not represent a single entity, but encompass various groups of people with different abilities, habits, experience, education, and behaviour patterns, united by their problems related to the traffic environment - often not designed for them. A large number of different factors bring about the occurrence of traffic accidents, with many people injured, and significant material damage incurred. This necessitates studying the risk of participating in traffic and acting on factors that spur the risk mitigation and management. The risk of participating in traffic cannot be unambiguously established, and for risk management purposes, the risk can be expressed as the product of the probability of the occurrence of an adverse event and the consequences of its occurrence (risk = probability x consequences), which requires knowledge of both the probability of occurrence of accidents and the consequences thereof.

1. Typical accidents affecting vulnerable road users

1.1. Motorcycles and mopeds

In the period 2018 to 2020, observed from the data² obtained from the Traffic Safety Agency, there were 149 traffic accidents involving fatalities of motorized two-wheelers, of which 30 involved mopeds and 120 involved motorcycles. It is worth noting that one accident involving fatalities concerned both a moped and a motorcycle. During the same period, there were 3,623 traffic accidents involving injuries to individuals, the motorized two-wheelers. In these accidents, 1,378 moped riders and 2,391 motorcyclists were injured. According to the same source, fatalities of motorized two-wheeler drivers accounted for 9% of all fatalities in traffic accidents, while injuries accounted for 6% of all injuries in the traffic accidents during the observed period. According to police data, the causative factors in half of the traffic accidents were motorcycle and moped drivers who failed to comply with basic traffic rules, the excessive speed being the predominant factor.

² Safety of riders and passengers on mopeds and motorcycles in Serbia for the period 2018–2020, ABS, September 2021.

Statistical data from other countries are even more alarming. According to the National Highway Traffic Safety Administration (NHTSA) data from the USA, motorcycle riders are still too much present in fatal traffic accidents. In 2022 alone, 6,218 motorcyclists were killed on the US roads, accounting for 15% of all traffic fatalities. This is the highest number of motorcycle fatalities since 1975, as recently warned by the Agency.³ On the other hand, the report from the European Commission shows that in 2019, 19% of fatalities in traffic accidents were accounted for by the motorcycle and moped riders.⁴ Nine out of ten motorcycle fatalities were male. According to the report, since 2010, the number of motorcycle fatalities on the EU roads has been increasing, with the highest number of fatalities occurring on the Greek roads.

In the field of traffic safety, two-wheelers rank high on the risk scale of fatalities. The causes of two-wheeler fatalities primarily involve speeding, followed by illegal or improper passing, passing vehicles on the right side, passing in cases where there are two or more traffic lanes in one direction with frequent lane changes (weaving), and in some cases, reckless driving. Additionally, research has shown that two-wheelers are less visible than other motor vehicles. Drivers expect to see two headlights, and when only one appears, they often fail to notice it, which leads to frequent accidents where motorcycles and mopeds collide with the side of the vehicles at intersections. It is a fact that young motorcycle riders are most affected, which points to the inexperience, poor training, and lack of knowledge or disregard of traffic regulations.

In addition to the above mentioned, the causes of motorcycle rider fatalities might be found in the inadequate training, inexperience (most fatalities occur between the ages of 16 and 24), failure to yield by other motor vehicles (especially at intersections and when turning when a motorcycle is passing or approaching), failure to spot the motorcycles by other road users, etc.

The probability of injury for a motorcycle rider involved in an accident is very high (almost 98% of them sustain some form of injury in an accident), and the most common types of injuries are:

- Foot and ankle injuries (accounting for about half of all the injuries),
- Head injuries, chest injuries, and internal bleeding (which are the most lethal)
- Minor neck injuries in motorcycle riders wearing helmets.

The mentioned National Highway Traffic Safety Administration (NHTSA) conducted a comparison of the mileage travelled by motorcycle riders and other road users and concluded that the probability of a motorcycle rider being killed in a collision with a motor vehicle was about 22 times higher than that of a passenger in a passenger vehicle, while the probability of being injured was four times higher.⁵

³ <https://www.nhtsa.gov/road-safety/motorcycles>, accessed on 14 May 2024.

⁴ European Commission (2021) Facts and Figures Motorcyclist and moped riders. European Road Safety Observatory. Brussels, European Commission, Directorate General for Transport. <https://road-safety.transport.ec.europa.eu/document/download/24515fb9-a8b0-4096-b54c>; accessed on: 13 May 2024.

⁵ <https://www.nhtsa.gov/road-safety/motorcycles>; accessed on: 14. 5. 2024.

1.2. Bicycles

When it comes to Serbia, during the same observed period of 2018 to 2020, there were 151 traffic accidents resulting in fatalities and 4,337 traffic accidents resulting in injuries involving cyclists. In these traffic accidents, 145 cyclists were killed, and 4,317 were injured. The fatalities of cyclists account for 9% of all fatalities in traffic accidents and approximately 7% of all the injured individuals in traffic accidents.⁶

Table 1. Distribution of fatalities and injuries among cyclists by status of participation and gender, during the period 2018–2020.

Age groups	Fatalities					Injured				
	M (number)	M (%)	F (number)	F (%)	Total (%)	M (number)	M (%)	F (number)	F (%)	Total (%)
0-14	3	2%	0	0%	2%	431	10%	132	3%	13%
15-24	7	5%	2	1%	11%	363	8%	140	3%	21%
25-34	7	5%	0	0%		243	6%	140	3%	
35-44	9	6%	2	1%	39%	291	7%	160	4%	42%
45-54	7	5%	3	2%		313	7%	274	6%	
55-64	30	21%	5	3%		414	10%	366	8%	
65-74	36	25%	4	3%	48%	447	10%	239	6%	24%
75-84	20	14%	2	1%		254	6%	61	1%	
85+	7	5%	1	1%		47	1%	2	0%	
Total	126	87%	19	13%	100%	2.803	65%	1.514	35%	100%

Traffic accidents involving cyclists more often result in fatalities relative to motorized participants in the accidents who are riding in a kind of an enclosed body. The reasons for this comprise the following: their vulnerability, leading to more severe consequences even at lower speeds of other accident participants, poor visibility in nighttime conditions, environmental conditions that are often not designed for their movement, and the fact that cyclists of different ages and genders have varying psychophysical abilities. Children cyclists lack experience and knowledge, while older individuals possess reduced physical capabilities, diminished perception and mobility.

Cyclists most often get killed in the accidents involving passenger vehicles (59%), followed by accidents involving commercial vehicles (20%). In accidents where cyclists are the sole participant, approximately 8% of them are killed, while about 2% of cyclists are killed in collisions with pedestrians.

The safety of cyclists largely depends on the traffic environment, which is often not tailored to their needs. They are frequently forced to travel on roads

⁶ Safety of cyclists in traffic, ABS, August 2021.

where car drivers treat them as an “obstacle” rather than integral parts of the traffic system. In such cases, there is a “conflict of speeds” because other vehicles on the road are traveling at higher speeds and coupled with the difference in mass and lack of protection for cyclists, that leads to injuries or fatalities.

Accidents involving cyclists are frequent in nighttime conditions when bicycles are not illuminated as required by road regulations. In such conditions, bicycles and their riders become unexpected and difficult-to-spot obstacles on the road, impossible to avoid by many vehicle drivers.

One of the more common causes of cyclist accidents in recent years is the use of mobile telephones while cycling. A recent study conducted for the European Commission revealed that young people aged 12–17 are more likely to use mobile telephones while riding a bicycle than the adults.⁷ Both the adults and young cyclists stated that they primarily used their phones for reading messages (38% of adults and 55.5% of young cyclists) or sending messages (33% and 55%, respectively).

Research in the United Kingdom,⁸ relying on the data from hospitals, provides detailed information on the type and severity of injuries sustained by vulnerable road users, including the cyclists. The following are some common injuries among cyclists:

- Head injuries are the leading cause of death in three-quarters of cyclists getting killed in traffic accidents.
- Over half of the accident victims sustain moderately serious injuries to the face or skull, requiring overnight hospital stays.
- Injuries to the spine, abdomen, and chest are relatively rare, but when they do occur, chest injuries are serious, while spinal and abdominal injuries are less common.
- Two-fifths of cyclist accident victims sustained lower limb injuries, including fractures of the femur, hip dislocations, knee injuries, and ankle injuries.
- Over half of the accident victims sustained the upper limb injuries, although they were rarely severe.
- Three-quarters of cyclist accident victims were hospitalized for an extended period (on average 21 days).

In October 2023, the European Commission presented a proposal for the European Cycling Declaration aimed at improving road safety and the quality and quantity of cycling infrastructure across the EU. The draft declaration recognizes cycling as a sustainable, accessible, inclusive, affordable, and healthy mode of transportation,

⁷ European Commission (2024). *Road safety thematic report – Cyclists*. European Road Safety Observatory. Brussels, European Commission, Directorate General for Transport, 2024, https://road-safety.transport.ec.europa.eu/european-road-safety-observatory/data-and-analysis/thematic-reports_en accessed on: 13. 5. 2024, p. 12.

⁸ Scientific Expert Group on the Safety of Vulnerable Road Users (RS7), 1998.

with significant added value for the EU economy⁹. One of the key messages of the proposed Declaration is the necessity of physical separation between the cyclists and motor vehicles. Where they must intersect, for example on roads without separate bike lanes or at intersections, the speed of motor vehicles must be very low.

1.3. Electric Scooters

The issue of the use of electric scooters has not been regulated in Serbia, until recently. The electric scooter users could participate in traffic and operate their two-wheelers without prescribed rules and legal provisions. With the amendments to the Law on Road Traffic Safety that came into force on September 15, 2023, their movement in traffic has been largely regulated, and electric scooter riders will have to adhere to these regulations.

Among other things, these amendments prescribe the following:

- Riding electric scooters is prohibited on sidewalks (they can be ridden on bike lanes, pedestrian-cycling paths, bike tracks and in cases where these tracks are not available, they can be ridden on roads with a speed limit of 50 km/h, occupying a maximum of 1 m from the right edge of the road except in front of intersections if they are making a left turn, for example).
- The speed limit for electric scooters is capped at 25 km/h, and the weight limit is set at 35 kg.
- Operating electric scooters is prohibited for the younger than 14.
- Individuals aged 14 to 18 are allowed to ride on roads with a speed limit of 30 km/h.
- Wearing bicycle helmets is mandatory for all electric scooter riders, and wearing a reflective vest is mandatory for minors in all conditions, while others must wear them when riding on roads.
- Electric scooter riders are not allowed to wear headphones while riding. When crossing roads at pedestrian crossings, they must dismount from the scooter and cross the road as pedestrians.
- Electric scooters must have a sticker issued by the Traffic Safety Agency.

There is no data on the number of electric scooters in Serbia. The Ministry of Interior estimates that there are between 250,000 and 400,000, but there is currently no data on the number of traffic accidents involving electric scooters. However, there are traffic accidents, as seen in the newspaper headlines such as “Drive carefully, an increasing number of serious accidents with e-scooters” or “Electric scooter drivers

⁹ *European Commission (2024). Road safety thematic report – Cyclists. European Road Safety Observatory. Brussels, European Commission, Directorate General for Transport, 2024, https://road-safety.transport.ec.europa.eu/european-road-safety-observatory/data-and-analysis/thematic-reports_en accessed on: 13. 5. 2024, p. 5.*

dangerous to themselves and everyone else” or “E-scooter driver hits a woman in Novi Sad”, and so on.

The results of a survey conducted on the Mondo¹⁰ portal show that 44% of respondents believe that electric scooter drivers are reckless and annoying, 22% believe that it is an excellent mode of transportation, while 34% are considering purchasing one.

1.4. Pedestrians

Pedestrians usually choose the shortest routes for their walk and do not want to spend more time on their way than necessary. Thinking about the shortest route, pedestrians often do not use pedestrian crossings and underpasses, and waiting for the green light seems too long for them, so even traffic lights are often disregarded. Thus, the pedestrians, moving along familiar and established paths, pay less attention to traffic signals and traffic in general than when they move along less familiar paths.

On average, in Serbia, around 150 pedestrians die annually, and about 2,900 get injured.¹¹ The number of pedestrian fatalities accounts for about 25% of all fatalities in traffic accidents, and the number of seriously injured pedestrians accounts for about 24% of all seriously injured people in traffic accidents, while the number of lightly injured pedestrians reaches 13%. It should be highlighted that the majority of pedestrians get killed in urban areas (about 95%), with the most common place of death being outside intersections (85%), while about 15% of pedestrians are killed within intersections. The most vulnerable category of pedestrians is individuals over 65 years of age, followed by children, with about 30% of all the deceased children are killed in traffic, as pedestrians.

Children's behaviour is often unpredictable and depends on various factors that result from behaviour at home or at school. After leaving school, children often run, play, or push each other, so they inadvertently step onto the road. There is often mutual proving and competition among children, such as who can cross the road faster, etc.

From 2016 to 2018, 41 children died, and the breakdown of child fatalities by traffic participation type is shown in Table 2:¹²

¹⁰ NG portal, “What’s the problem with electric scooters”, 10 October 2020.

¹¹ Pedestrian safety in traffic, ABS, October 2018.

¹² Analysis of child fatalities in the period 2016–2018 in the territory of the Republic of Serbia, ABS, May 2019.

Table 2. Share of Child Fatalities in Traffic Accidents from 2016 to 2018, by Participation Type

Year	DEATH					INJURIES				
	Bicycle rider	Driver of a motor or animal-drawn vehicle	Passenger	Pedestrian	Total fatalities	Bicycle rider	Driver of a motor or animal-drawn vehicle	Passenger	Pedestrian	Total fatalities
2016	1	0	7	4	12	211	18	879	526	1634
2017	2	0	10	5	17	171	16	805	507	1499
2018	0	0	5	7	12	170	12	813	468	1463
Total	3	0	22	16	41	552	46	2497	1501	4596

According to the type of participation in traffic, children as passengers constitute 54%, pedestrians 39%, and cyclists 7% of the total number of child fatalities. Among injured children, passengers constitute 54%, pedestrians 33%, cyclists 12%, and motor vehicle drivers 1% of the total number of injured children.

The aforementioned research based on hospital data processing indicates two predominant factors in the severity of pedestrian injuries:

- Head injuries are the most common and the main cause of death and hospitalization.
- Following in frequency are injuries to the legs and arms.

III. Measures to improve safety of vulnerable road users

The first step is the process of identifying locations or areas where safety needs to be improved due to a high number of traffic accidents involving vulnerable road users in the past, as well as the possibility of this continuing in the future. Marking these locations with reported traffic accidents involving vulnerable road users provides an opportunity to determine the most effective engineering, educational, and legislative methods and measures.

For moped and motorcycle riders, the focus should primarily be on improving training. Currently, moped riders only receive a license based on their knowledge of traffic regulations, while there are almost no motorcycle driving schools where an instructor accompanies and guides the candidate on another motorcycle. Instead, after theoretical instruction, the candidate receives an "L" plate and the instructor follows them from a passenger vehicle, sometimes simultaneously instructing another candidate. Additionally, greater attention needs to be paid to educating these traffic participants about the dangers they face, the impact of speed on the severity of consequences, the importance of protective equipment, and the fact that

they are less visible than drivers of passenger cars, trucks, and buses. Furthermore, awareness should be raised about the importance of respecting traffic regulations, especially regarding speed, overtaking, and changing direction.

Bicycle and electric scooter riders do not undergo any training but they do nevertheless participate in traffic, often in environments not adapted to them. Therefore, it is necessary to educate them in traffic safety through campaigns for raising public awareness, seminars, and associations or cycling clubs about the dangers they face and the importance of respecting traffic regulations (lack of knowledge of traffic regulations does not exempt them from responsibility). Additionally, they should be informed about the importance of the saying "To see and be seen", especially in nighttime riding conditions. In terms of infrastructure, efforts should be made to provide a greater number and length of bicycle lanes and paths, and where possible, to separate bicycle traffic from other motorized traffic, reduce the number of intersections between bicycle and motor traffic (reduce the number of potential conflict points), while emphasizing the significance of wearing protective equipment.

When it comes to pedestrians, they should primarily be informed through various campaigns and media about the need to respect traffic regulations and the dangers they face as the most vulnerable participants in traffic. Regarding compliance with traffic regulations, pedestrians should be reminded not to step onto pedestrian crossings suddenly and without checking the traffic on the road (there are situations where a driver, regardless of their speed, cannot prevent an accident), nor to cross the road behind a bus after exiting the bust because the driver may not spot them in time, or dash onto the road, to be patient at traffic lights and not to cross the road when it is not allowed, not to cross the entire road with multiple lanes without checking, regardless of whether a vehicle in the first lane has stopped, and when walking along the road at night, to wear fluorescent clothing or carry a light. Pedestrians should be reminded, especially in nighttime conditions, that they have much greater chances of spotting a vehicle than a driver has of spotting a pedestrian, and that potential accidents can be prevented by refraining from crossing the road until safe conditions are met. In terms of infrastructure measures, care should be taken to provide adequate facilities for pedestrians, such as sidewalks and pedestrian crossings, and where possible, pedestrian and motor traffic flows should be separated, and control and engineering measures applied, such as traffic control devices, lighting, road construction (narrowing the road, speed bumps) for the movement of vehicles and pedestrians. Attention should also be paid to vehicle design related to passive safety in pedestrian impacts to minimize pedestrian injuries. This primarily includes the shape of the front of the body (rounded plastic bumpers and headlights made of easily deformable material to absorb impact), folding plastic mirrors upon impact, recessed door locks, etc.

Special attention should be paid to child pedestrians and elderly individuals over 65 years of age. As is known, the elderly have a diminished ability to cope with complex traffic situations and heavy traffic. This condition worsens with age, and accordingly, their behaviour in traffic changes. Practice and routine help mitigate and slow down these changes.

Children of preschool and early school age are the most vulnerable participants in traffic. At this age, they begin to become independent as pedestrians, cyclists, roller skaters, sledders, skateboarders, etc. Without adult supervision, they start going to playgrounds, sidewalks, supervised and unsupervised play areas. They begin to go to shops, kindergartens, school, without adult supervision, and from the age of six, their presence becomes more common. Children of this age find it difficult to make correct decisions, especially in complex traffic situations. Besides the numerous distractions that divert their attention, children cannot distinguish between what is important and what is not. Focusing attention on important information and ignoring irrelevant information can be expected only around the age of 11. Therefore, children need to be trained to identify the most important information so they can make the right decisions. The following points are crucial:

- Personal example of parents and consistent behaviour of adults,
- Acquisition of knowledge and formation of basic concepts of traffic culture,
- Practical training and repetition,
- Encouragement of the development of cognitive processes and abilities that form the basis for increasing children's safety in traffic, and
- Instilling in children the attitude "My safety is more important than any rewards or punishments."

The personal example of parents and adults is a significant source of information for children. When a parent or another adult decides and acts contrary to traffic rules in the presence of a child, they send hidden messages:

- Nothing will happen if you cross the road outside of a pedestrian crossing,
- Rules exist, but they are not that important,
- You don't have to be careful yourself, the driver must watch out, and
- It won't happen to me.

In contrast, when adults respect traffic rules, they send messages to the child:

- I must respect traffic rules because my safety is the most important, and
- There is no good reason to put myself in danger.

Training for safe participation of children in traffic must start from the earliest childhood, through play in kindergartens, filling in (colouring) pictures in brochures designed for safe participation of children in traffic ("Traffic buddy", video games, cartoons, and other films for this purpose). The child builds their value system by respecting the demands of parents and other adults. Very early on, they are required to take responsibility for personal belongings (footwear, clothing, toys) and actions

(you must not be late, you must return at the agreed time). For safety in traffic, it is important for children to learn not to endanger their lives by saving a pet, a ball, or marbles. Examples set by parents and other adults send hidden messages to the child that can have a decisive influence on the child's behaviour in traffic.

IV. CONCLUSIONS AND RECOMMENDATIONS

We may outline two crucial aspects of the problem of vulnerable road users' participation in traffic, as follows:

- First, the way in which motorized road users perceive the needs of vulnerable road users, what their attitude towards these participants is, and what responsibilities they have towards them. Then, how to take all of this into account in their education, training, and public campaigns;
- Second, what obligations vulnerable road users have in terms of their own safety and how to increase their safety through education, training, and public campaigns.

By considering and studying these aspects and assessing the risks, we make decisions regarding the implementation of measures to improve the safety of these participants in traffic. These measures can broadly be split divided into two complementary groups:

- Infrastructure-measures, which are based on road, traffic, and environmental planning.
- Non-infrastructure-related measures, which affect the behaviour of road users (education, training, knowledge acquisition, formation of attitudes about safe participation in traffic, etc.).

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