

XXVIITH WORLD
ROAD CONGRESS
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MEASURES TO IMPROVE MOTORCYCLISTS' SAFETY - SLOVENIAN APPROACH

NEW CHALLENGES AND INITIATIVES FOR IMPROVING SAFETY AND SUSTAINABILITY

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BACKGROUND

KNOWLEDGE AND STANDARDS

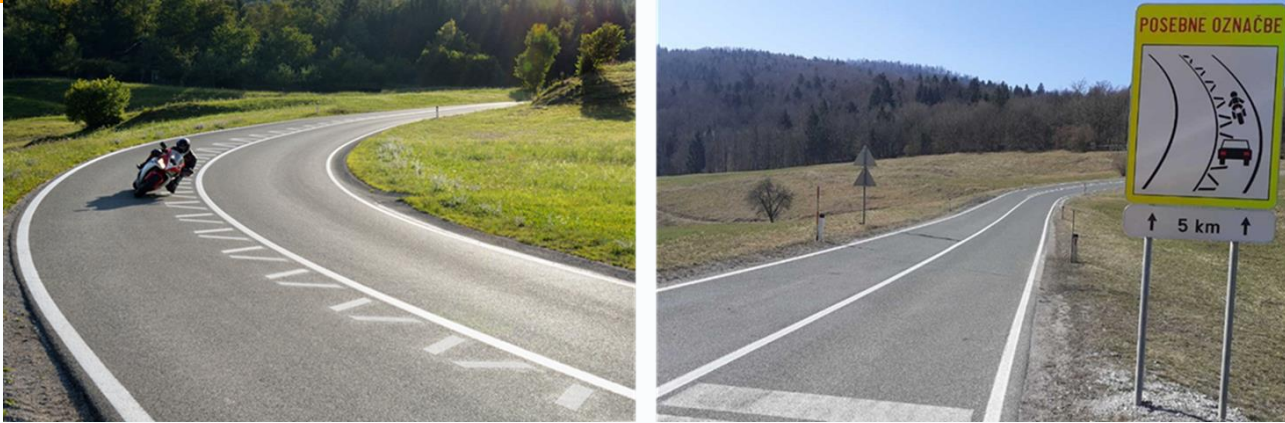
The European Commission has also recognized this, which is why in the amendment to Directive 2008/96 (Directive 2019/1936) it explicitly classifies motorcyclists as a group of vulnerable road users:

- special attention must be paid to the safety of pedestrians, cyclists and motorcyclists ("...in all phases... projects should be checked for all groups of vulnerable road users...") – the new article 6b;
- vulnerable road users are precisely defined in the new Article 2 (10);
- Annex II: new requirements (n and h) are included, especially for powered two-wheelers

EU Directive, the public, road users, experts, politicians, road safety auditors, etc., expect the road operator to provide safe road infrastructure that will do all the magic considering Vision Zero, even though we (road operators) do not have at our disposal proper proactive solutions in the form of standards, technical specifications, products, etc. Mostly what we have are some solutions to mitigate the consequences of accidents (such as continuous and discontinuous motorcyclist protection systems - **CEN/TS 17342:2019 Road restraint systems – Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers**). Meaning that a mistake has already been made and an accident can be expected to happen.

PILOT PROJECTS BEFORE A WIDER SYSTEMATIC APPROACH

1st PILOT PROJECT – SPECIAL ROAD MARKING ON THE ROAD TO “RAKITNA”





















Monitoring the effectiveness of implemented measures (special markings), the implemented measures in 15 bends on the section of the Podpeč-Rakitna road had a positive impact on the traffic safety of motorcyclists.

The number of accidents decreased by more than two-thirds in the comparable period before and after the implemented measures (3 years before and 3 years after implementation).

PILOT PROJECTS BEFORE A WIDER SYSTEMATIC APPROACH

2nd PILOT PROJECT – REDUCING SPEED AND RAISING DRIVERS’ PERCEPTION OF “STARI LOG” CURVES

	Before	After	Intervention	Impact on perception
1 st phase			Relocation of information sign "Dangerous Road Section"	Important positive impact 
			Replacement of existing chevron signs with passive safe chevrons and bollards for guidance true the curve	Significant positive impact 
			Replacement of existing chevron signs with passive safe bollards for guidance true the curve	Important positive impact 
2 nd phase			Adding red/white elements in the groove of road safety barrier	Important positive impact 
			Adding red/white markings on the edge of the road	Little positive impact 
			Adding chevron signs on the bollards	No impact 

- test subjects (passenger car drivers and motorcyclists), both during the day and at night, focused their gaze most on the center line, then on the inner part of the bend, and least on the outer part of the bend
- after the installation of additional elements of traffic signals and equipment, a greater number of fixations and rapid movements between fixations were recorded, from which we can conclude that the subject's eyes were more active during the second and third drives and that they focused their gaze more on the added elements, as they wanted to get as much as possible more visual information or to perceive the course of the road as clearly as possible
 - the red/white reflective elements placed in the Road Safety Barrier (outside of the curve) attracted more driver eyes during the third run compared to the red/white curb marker placed on the inside of the curve
 - the installation of additional elements affected the speed of driving through the curve, both for drivers of passenger cars and motorcyclists. Speed decreased by an average of 11%
 - directional bollards and traffic signs "Directing traffic in bends" and red/white reflective elements placed on the Road Safety Barrier proved to be the best solution for warning and directing drivers when driving into and through the curve
- the installation of a red/white marking at the edge of the carriageway is suggested in similar dangerous curves, as an additional element to improve safety, as it will be in the driver's central field of vision while driving and in this way indirectly warn the driver of a dangerous situation (sharper or broken curve)

PILOT PROJECTS BEFORE A WIDER SYSTEMATIC APPROACH

3rd PILOT PROJECT – IMPLEMENTING PASSIVE SAFE ELEMENTS FOR GUIDANCE THROUGH 5 CURVES NEAR THE TOWN “LAŠČE PRI DVORU”



The results of monitoring showed us that motorcyclists tend to slow down and position themselves away from the middle lane, and more towards the middle of the traffic lane, so that they lean into the opposite traffic lane less.

The results of the human factors evaluation show that the innovative use of passive safe bollards can reduce the likelihood of accidents on a road section, as bollards give proper information regarding road alignment so that motorcyclists can adjust their speed and driving behavior according to the geometrical elements of the given



PILOT PROJECTS BEFORE A WIDER SYSTEMATIC APPROACH

4th PILOT PROJECT – TRAFFIC CALMING MEASURES IN “ČRNI KAL” CURVES

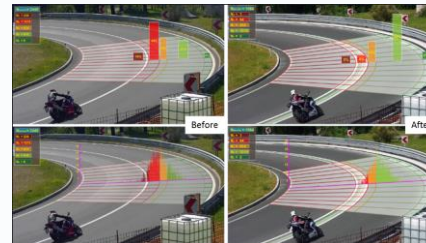


During the project we also introduced new solutions:

- an ITS information sign for motorcyclists before a dangerous curve (only activated by single-track vehicles when the speed limit is exceeded), showing a bilingual text: “PREHITRO / SLOW DOWN” and a silhouette of a motorcyclist driving;
 - a motorcycle-friendly curb (in the event a motorcyclist falls, he or she will not be injured by it).

In the left curve (where a motorcycle-friendly curb was implemented), and where traffic accidents often occurred, we succeeded in slowing down motorcyclists, and positioning them away from the centre line, and more towards the middle of the traffic lane. Thereby, they lean less toward or into the opposite traffic lane, and consequently we managed to reduce possible frontal or side collisions of motorcyclists with opposing traffic.

<https://youtu.be/upiH00RMw8c?si=IE1YFwpSrAAAb6Tld>



PILOT PROJECTS BEFORE A WIDER SYSTEMATIC APPROACH

5th PILOT PROJECT – IMPLEMENTATION OF TRAPEZOIDAL MESH PANELS ON TWO ROAD SECTIONS



During the period of one year from the installation, no maintenance work was required on the banks in the areas with laid grid panels. We did not incur any costs with the maintenance and repair of the grid panels. By laying the grid panels, deposits of sand in corners are eliminated, which means improved safety for all road users, especially motorcyclists and cyclists.

ADDITIONAL MEASURES

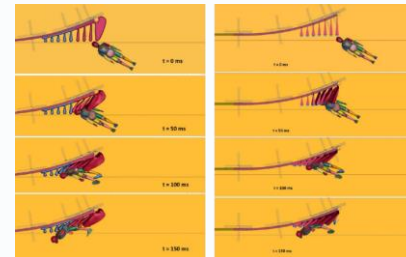
- DESIGN OF THE INFORMATION SIGN “STAY ON YOUR SIDE”
- BILINGUAL INFORMATION SIGNS WITH LED PANELS SHOWING EXCESSIVE NOISE LEVELS AND SPEEDING
- TWO SHORT FILMS „WHEN SECONDS COUNTS“
- NUMERICAL SIMULATION OF A MOTORCYCLE CRASH CUSHION



#moto_sos112

https://www.youtube.com/watch?v=nSZT_yU45sg

<https://www.youtube.com/watch?v=HCTXeEMjGBQ>

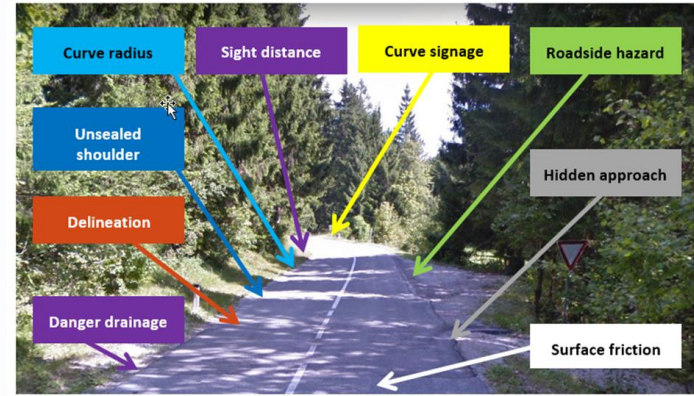


A SYSTEMATIC APPROACH TO IMPROVING MOTORCYCLIST SAFETY

[HTTPS://WWW.GOV.SI/ZBIRKE/STORITVE/SMERNICE-ZA-VARNOST-MOTORISTOV](https://www.gov.si/zbirke/storitve/smernice-za-varnost-motoristov)

In the Slovenian infrastructure guidelines for PTWs in the road maintenance phase the following situations/locations/elements are defined as dangerous and need to be eliminated as soon as possible:

- obstructed visibility in bends,
- guardrails with no underrun protection in dangerous bends,
- dangerous draining systems,
- altitude difference between carriageway and shoulder,
- damaged pavements,
- slippery pavements,
- road patches,
- obstructed visibility in bends,
- dangerous patchwork,
- serious flaws in the road pavement: patches of varying grip, lane ruts and patchwork repairs.





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