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POSTER SESSION

A methodology for the network-wide, in-built safety assessment of primary roads

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INTRODUCTION

- Crash-based analysis is the most common way of assessing road safety.
- This approach has several limitations, such as availability and accuracy of crash data, need for high crash numbers for statistical validity, etc.
- Detailed proactive approaches, such as Road Safety Inspection (RSI), involve specific, site-based analysis, and are thus not appropriate for large scale implementation.
- A network-wide, in-built safety assessment methodology has the potential to screen a network and proactively detect potentially high-risk parts, allowing more efficient targeting of detailed inspections.

OBJECTIVE

The development of a network-wide, in-built safety assessment methodology for motorways and primary roads, in accordance to DIR.2019/1936/EU, with minimal data requirements and assessment workload.

BACKGROUND

1. A literature review was conducted to synthesize current knowledge regarding the in-built safety assessment of roads.
   - The AASHTO Highway Safety Manual's Predictive Method and iRAP are the most widely applied methodologies; however, both are data intensive.
   - Across all reviewed methodologies, some common parameters are used.
   - These parameters represent design and operational road elements (e.g., lane width and horizontal curve radius).
   - There is no consistency on how the safety level of each parameter is measured or how the final safety score is estimated.

2. A new methodology for the network-wide, in-built safety of roads should have the following components:
   a. A set of road design and operational elements that are related to the road's safety performance.
   b. A way to quantify their safety level.
   c. A way to quantify and rank the road's safety level.

CONCEPTUAL FRAMEWORK

- A road section is assessed by examining a set of geometric and operational characteristics (parameters).
- An ideally perfect road section is rated with a maximum score of 100 points.
- Reduction factors (RF) lower than 1,00 are applied for each identified unsafe condition:

$$Score_i = 100 \times RF_{1i} \times RF_{2i} \times \cdots \times RF_{ni}$$

- RFs are estimated for each parameter based on:
  - existing research on Crash Modification Factors (CMFs),
  - applied practices (e.g., in iRAP models),
  - expert consultation (EC EGRIS group).
- Based on the total score, each road section is classified in one out of 3 classes:
  - Low Risk (class 1)
  - Intermediate Risk (class 2)
  - High Risk (class 3)

Number	Parameter
	MOTORWAYS
1	Lane width *
2	Roadside (clear zone width, obstacles, presence of barriers)
3	Curvature *
4	Interchanges *
5	Conflicts between pedestrians/ bicyclists and motorized traffic
6	Traffic operation centers and / or mechanisms to inform users for incidents
	PRIMARY ROADS
1	Lane width **
2	Roadside (clear zone width, obstacles, presence of barriers) **
3	Curvature
4	Density of property access points **
5	Junctions
6	Conflicts between pedestrians/ bicyclists and motorized traffic
7	Shoulder type and width **
8	Passing lanes **
9	Signs and markings

- Parameters with one asterisk are treated differently for urban and rural motorways.
- Parameters with two asterisks are treated differently for divided and undivided primary roads.

CONCLUSIONS & FUTURE WORK

This study proposes a methodology for the network-wide, in-built safety assessment of motorways and primary roads, as an alternative approach to crash-based analysis. The methodology has been pilot tested in several EU roads and the analysis of pilot results is used as feedback on how to further improve the technical and practical aspects of the proposed methodology.

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