Road User related risk factors and countermeasures in the European Road Safety DSS

Research Team: KFV, Loughborough University, NTUA, Vias, SWOV, CTL, TOI, IFSTTAR, VTI, MUH, AVP

Read more : Aigner-Breuss, E., Kaiser, S., Usami, D., Reed, S., & Weijermars, W. (2017). **Deliverable 4.4** of the H2020 project SafetyCube.







Abstract

Road safety risk factors are strongly connected to the humand in terms of – intended or unintended – unsafe behaviour, limited capacities and inherent characteristics such as age or diseases. But also the solution to mitigating risks can be the human (e.g. training). SafetyCube's work related to the Road User aimed at gathering and (re-) analyzing the scientific evidence on risks and measures. The DSS currently contains about **450 individual study outcomes and 49 synopses dealing with Road Users'** risks (speeding, distraction, fatigue etc.) and measures (fitness to drive, education, enforcement, campaigns and licensing) associated with all kinds of road users (vehicle drivers, cyclists, pedestrians, elderly, young, commercial drivers).

Methodology

To arrive at an inventory of evaluated risks and measures, a method was developed and applied in a standardized manner across the topics *road user*, *infrastructure*, *vehicle* and *serious injuries* – including these steps:

- Identification of human related risk factors and measures and creation of taxonomies
- Stakeholder consultation to identify *hot topics*
- Systematic search for studies on safety effects
- Coding of identified studies
- Analysis of safety effects on basis of coded studies
- Summarised effects and conclusion in synopses per analysed risk factor or measure

Risk factor assessment

Risky	Probably risky	Unclear
• Driving under the influence – legal and illegal drugs • Traffic rule violations – red light running • Distraction – cell phone use – Handheld • Distraction – cell phone use –Texting • Fatigue – sleep disorders – sleep apnea	• Risk taking – overtaking • Risk taking – close following • Functional impairment – vision loss • Diseases and disorders –diabetes • Personal factors – sensation seeking • Emotions – aggression, anger • Fatigue – not enough sleep, driving while tired • Distraction – conversation with passengers • Distraction – cognitive overload, inattention	• Functional impairment – hearing loss (few studies) • Distraction – music – entertainment systems • Distraction – operating devices

Countermeasures assessment

Topics	Effective	Probably effective	Unclear results	Ineffective or counterproductive
Law and Enforcement	• General police enforcement, speeding • DUI checkpoints, selective and random breath testing • Laws and enforcement for seatbelt wearing • Licence suspension	• BAC limits, BAC limits for novice drivers • Increasing traffic fines • Hours of service regulations for commercial drivers • Demerit points systems • Red light cameras	• Laws and enforcement for mobile phone use (handheld, hands-free)	
Education and voluntary training/programmes	• Hazard perception training	• Child pedestrian training	• Non-statutory training for novice drivers	
Driver training and licencing		• Formal pre-licence training, graduated driver licencing and probation		
Fitness to drive assessment and rehabilitation	• Alcohol interlock • Rehabilitation	• Medical referrals		• Age-based screening of elderly drivers
Awareness raising and campaigns	• Seatbelt campaigns	• Campaigns in general • Child restraint campaigns • DUI campaigns • Speeding campaigns • Aggressive and inconsiderate behaviour campaigns		

Measuring the Road User!?

It is crucial to note that quantifying human aspects in traffic can be a challenging endeavor, for many reasons. Some risk factors involve deliberate behaviours (e.g. drink-driving); others are generic (e.g. age). Oftentimes, such risk factors are hard to link to actual accidents, since their presence is not always objectively identifiable in retrospect (e.g. emotions) or it is unclear to what extent a particular factor contributed to an accident. Furthermore, some human related risk factors tend to be inter-related and evoke further risks (e.g. age, alcohol, speed). There is the additional challenge of combined activities such as increased enforcement accompanied by campaigns, where the isolated effect of either measure is hard to determine.

Ultimately, these challenges highlight the importance of evidence based decision making as well as the provision of background knowledge (as provided in the synopses) beyond mere numbers – especially when it comes to modification of human behaviour.

Hot topics and stakeholders' priorities

Risk factors	Measures
Speed choice	Law and enforcement
Drunk/drugged driving/riding	Education & training
Fatigue	Driver training & licensing
Cell phone use	Fitness to drive assessment
Cognitive impairment	Screening
Aggression and anger	Rehabilitation
Elderly road users	Road safety campains
Children & young adult drivers	

safetycube-project.eu | roadsafety-dss.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 633485.