European Commission

Roads 2016

Summary

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Transport

Designing for road function

The safe planning, design, operation and use of the road network is a key intervention strategy in the Safe System approach. Roads should be designed to cater for a defined function: flow, area distributor or access. Within a sustainable and safe system, the relation between function (as intended by road authorities), form and actual usage is considered critical. In order to match driver behaviour to road design, the concept of "self-explaining" roads is utilised. According to this concept, different classes of roads should be distinctive, and within each class characteristic features (e.g. width of carriageway, road markings, signing, and use of street lighting) should be consistent throughout the route. Thus the driver is encouraged to naturally adopt behaviour consistent with design and function of the road.

30Km/h zones in urban roads

The construction of 30Km/h zones in urban roads (extensively applied in the Netherlands, Germany and the UK) are in line with the Safe System approach, according to which the safe speed for areas where pedestrians interact with vehicles is 30Km/h. Physical measures are applied, mostly vertical deflections (e.g. road humps, plateaus, uneven road texture etc.) but also horizontal deflections, road narrowing, central islands or a combination of the above, to ensure that the 30Km/h speed limit is "self-enforcing".

Safety design principles

Optimization of road design aims at the selection of geometric design parameters resulting in "non-surprising" road environment, in the sense that users are not faced with unexpected situations, as well as "forgiving", in the sense that users' mistakes can be, if not avoided, corrected. A synthesis of road design good practice refers to horizontal and vertical alignment and their combination, cross-sections' characteristics and roadside treatments, junction layout and lighting.

In addition, specific guidelines and recommendations to address the needs of all road users are often proposed, with emphasis on the most vulnerable ones: pedestrians, cyclists, motorised two-wheelers, young drivers and older drivers.

Infrastructure safety management processes

The following groups of analysis tools, covering all different stages of road life, are recommended as good practice in infrastructure safety management:

Impact assessment

The impact of transport projects or land use development on safety should be evaluated at an early stage. The analysis aims to assess impacts on the safety of surrounding roads or other transport networks, and involves network models to estimate potential casualty levels associated with different network layouts and traffic patterns.

Road safety audit of initial designs
Road safety audits aim to identify in advance safety deficiencies of a road project and propose suitable treatments, typically at three stages - preliminary design, detailed design, and pre-opening. The audit is not a check of compliance to the design guidelines, but it involves the examination of the integration of design features, as far as safety is concerned, taking also human factors into account.

Regular casualty reduction remedial treatment
Based mainly on the statistical analysis of accident data, these programs involve treatment of high-risk sites, route management over longer lengths of road, area treatment covering a network of roads, and mass action programmes which treat all sites at risk rather than just those where accidents have occurred in the past.

Network safety management
At its basic level it involves identification and treatment of high-risk sites. More advanced approaches involve modelling of expected accident rates related to specific geometric or operational features of each site.

Audit (inspection) of existing roads
Similar to the road safety audit, a well-qualified team examines the safety level of existing roads, identifies safety deficiencies and proposes suitable countermeasures.

Managing safe road operation

Aspects of road operation management with particular importance to road safety are:

Speed limits and enforcement
Ensuring speed limits are set at levels consistent with the function and design of the road and effective enforcement strategies are very important.

Road and pavement maintenance
The skid resistance of a road pavement is an important road safety factor, especially when the road surface is wet. The risk of accidents is elevated even more where the problem is at a location where the friction requirement is high (e.g. approach to a junction, horizontal curve, downhill slope) or where the problem is isolated (e.g. road surface contamination).

Work zones safety
The driving conditions within work zones differ from normal and can result in violations of road user expectancy, which can lead to an increase in accident risk. Work zone safety measures should ensure the safety of both road users and construction workers.

eSafety and infrastructure

Research on Vehicle-to-Infrastructure (V2I) technologies is rapidly progressing and aims to provide systems such as: curve speed warning, traffic signal violation warning, lane or road departure warning, right turn and give way junction assistance, intersection collision warning, rail crossing collision warning, road works warning, motorway merge assistance, pre-crash sensing etc.

There still however a variety of challenges that may affect the deployment of V2I technologies including:

- ensuring that possible sharing with other wireless users of the radio-frequency spectrum used by V2I communications will not adversely affect V2I technologies' performance,
- developing technical standards to ensure interoperability,
- developing and managing data security and addressing public perceptions related to privacy,
- ensuring that drivers respond appropriately to V2I warnings, and
- addressing the uncertainties related to potential liability issues posed by V2I

Notes

1. Country abbreviations

	Belgium	BE		Italy	IT		Romania	RO
	Bulgaria	BG		Cyprus	CY		Slovenia	SI
	Czech Republic	CZ		Latvia	LV		Slovakia	SK
	Denmark	DK		Lithuania	LT		Finland	FI
	Germany	DE		Luxembourg	LU		Sweden	SE
	Estonia	EE		Hungary	HU		United Kingdom	UK
	Ireland	IE		Malta	MT			
	Greece	EL		Netherlands	NL		Iceland	IS
	Spain	ES		Austria	AT		Liechtenstein	LI
	France	FR		Poland	PL		Norway	NO
	Croatia	HR		Portugal	PT		Switzerland	CH

2. This 2016 edition of Traffic Safety Synthesis of Roads updates the previous versions produced within the EU co-funded research projects SafetyNet (2008) and DaCoTA (2012). This Synthesis on Roads was originally written in 2008 by David Lynam, TRL and George Yannis, NTUA and then updated in 2012 by David Lynam, TRL and in 2016 by Anastasios Dragomanovits, NTUA.

3. All Traffic Safety Syntheses of the European Road Safety Observatory have been peer reviewed by the Scientific Editorial Board composed by: George Yannis, NTUA (chair), Robert Bauer, KFV, Christophe Nicodème, ERF, Klaus Machata, KFV, Eleonora Papadimitriou, NTUA, Pete Thomas, Un.Loughborough.

4. Disclaimer

5. Please refer to this Report as follows:
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