European Commission

Speed and Speed Management 2018

Summary

European Road Safety Observatory
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Transport

What is the problem?

Speed is at the core of the road safety problem. In fact, speed is involved in all accidents: no speed, no accidents. In around 30% of fatal accidents, speed is an essential contributory factor. Firstly, speed affects the risk of being involved in an accident. At a higher speed, it is more difficult to react in time and prevent an accident. Secondly, speed affects the injury consequences of an accident. At a higher (impact) speed, more energy is released when colliding with another vehicle, road user or obstacle. Part of this energy will need to be absorbed by the vulnerable human body.

How big is the problem?

Risk exposure: Exceeding the speed limits is very common. Typically, 40 to 50% of the drivers travel faster than the speed limit, and 10 to 20% exceed the speed limit by more than 10Km/h. In addition, drivers adapt their speed insufficiently to local and temporary conditions related to traffic and weather.

Risk of accident involvement: As an average, a 1Km/h increase in speed results in 3% increase in accidents. However, the larger the increase in speed, the steeper the increase in accident risk. In practice the exact relationship is more complex, as it depends among many other things on original speed level and road environment.

Size of accident injury problem: Speed is considered a major contributory factor in around 10% of all accidents around the world and in around 30% of all fatal accidents.

What does science say?

How does road environment affect speed - accident risk relation?

Research in Sweden indicated that a change in average speed of 1Km/h results in a change in serious injury accidents of just over 2% for a 120Km/h road and around 3% for a 50Km/h road. Similar research in the UK indicated that a 1Km/h change in speed results in between 1% and 4% for urban roads and 2.5% and 5.5% for rural roads, with the lower value reflecting good quality roads and the higher value poorer quality roads.

How does initial speed affect speed - accident risk relation?

The relationship between speed and accident risk generally has been considered to be a power function. Given a particular road, with increasing speed, the accident risk increases more as the absolute speed gets higher.

Speed, injury risk and mass differences

The adverse effect of speed in injury risk is more pronounced when there is significant mass difference between the involved road users. The fatality risks of pedestrians struck by the front of a passenger car range approximately from 5% for an impact speed of 30Km/h to 20% for an impact speed of 50Km/h and 60% for an impact speed of 80Km/h.

How does speed affect travel time?

In principle, higher speeds result in a reduction of the travel time. However, higher speeds lead to more accidents and accidents are an important cause of congestion. In addition, in particular on short journeys, the perceived gain of time is much larger than the objective gain of time, which is in fact only marginal: the extra time required for a 10Km journey when speed is reduced

by 5Km/h is 1,33 minutes for 50Km/h original speed, 0,39 minutes for 90Km/h and only 0,18 minutes for 130Km/h original speed.

What are the solutions?

There is no single solution to the problem of excess and inappropriate speed. A package of countermeasures is necessary, increasing the effectiveness of each individual measure. In principle, effective speed management requires an integrated, systematic and stepwise approach. Within the current system of largely fixed speed limits, the following steps are important:

Step 1: Setting appropriate speed limits

The basis for any speed management policy is setting speed limits. Speed limits need to reflect the safe speed on that particular road, related to road function, traffic composition, and road design characteristics. Furthermore, speed limits need to be credible, i.e. they must be logical in the light of the characteristics of the road and the road environment.

Step 2: Information about the speed limit

The driver must know, always and everywhere, what the speed limit is. The conventional way is to use roadside signing and road markings. In-vehicle systems to inform drivers about the speed limit in force are being introduced progressively, e.g. via navigation systems.

Step 3: Road engineering measures

At particular locations low speeds may be crucial for safety (perceived or actual), for example near schools or homes for the elderly, at pedestrian crossings, at intersections. At these locations, physical speed reducing measures such as speed humps, road narrowing's and roundabouts help to ensure that cars maintain a safe speed.

Step 4: Police enforcement to control the intentional speeder

If steps 1 to 3 are applied, it can be assumed that the unintentional speed violations are an exception. Drivers who still exceed the speed limit do so intentionally. Police enforcement will remain necessary to control and punish that group of drivers.

Step 5: Information and education for drivers

All of steps 1 to 4 have to be accompanied by information to the driver on the problem of speed and speeding, what the speed limit system is based on and why, what additional measures are taken and why, and preferably also on the (positive) outcomes of these measures.

New technologies that can make speed management more intelligent and flexible are:

- Intelligent Speed Adaptation (ISA): An in-vehicle system that uses information on the position of the vehicle in a network in relation to the speed limit in force at that particular location, and supports drivers in complying with the speed limit everywhere in the network.
- Dynamic speed limits: Variable speed limits that take account of the real time traffic, road and weather conditions. They can better reflect the safe speed and are also expected to increase the credibility of the speed limit system in general.

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 2018 edition of Traffic Safety Synthesis on Speed and Speed Management updates the previous versions produced within the EU co-funded research projects SafetyNet (2008) and DaCoTA (2012). This Synthesis on Speed and Speed Management was originally written in 2008 by Ingrid van Schagen, SWOV and David Lynam, TRL and then updated in 2012 and in 2015 by Ingrid van Schagen, SWOV and Rune Elvik, TØI.

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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