

WORKSHOP THEMATIC AREA 3 - ITS AND OTHER SPEED MANAGEMENT STRATEGIES

BUDAPEST, NOVEMBER 21ST, 2019.

ITS and Speed Management in Europe



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Presentation Structure



- Introduction
- Applied ITS Speed Management Measures
- In-Vehicle Safety Systems
- Telematics
- Vehicle Automation





Speeding

Speeding

- is a highly critical issue for road safety
- increasing accident risk and severity
- certainly highly misunderstood by all
- Observed vehicle speeds above the speed limit in the EU are (ETSC):
 - on urban roads: 35% 75%
 - on rural roads: 9% 63%
 - on motorways: 23% 59%
- 2.100 lives could be saved each year in the EU if average speed dropped by 1Km/h





• Steps of effective speed magement

- policies (restrictive or not):
- Step 1: Setting speed limits
- Step 2: Informing drivers about the speed limit
- Step 3: Road engineering measures
- Step 4: Enforcing speed limits
- ITS applications are particularly appropriate for Steps 2 & 4





Speed Management





Speed enforcement



- Systematic enforcement (low fines, high nr of controls)
- Increased perception of enforcement
- Driver behaviour change
- Lower traffic speeds
- Improvement of trafic safety culture
- Reduction of traffic accidents and casualties







Applied ITS Speed Management Measures

- Variable Message Signs (VMS)
- Variable Speed Limit Signs (VSLS)
- Automated enforcement: Cameras
- Automated enforcement: Section control
- ADAS (Cruise Control, Intelligent Speed Adaptation)

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Variable Message Signs (VMS)



- Speed management messages can be communicated through text VMSs.
- Commonly used to inform drivers for speed limit reductions due to unusual conditions ahead:
 - Workzones
 - Incidents (e.g. crash)
 - Adverse weather conditions





Variable Speed Limit Signs (VSLS)



- Variable speed limits are adjusted according to the current environmental and road conditions.
- Posted limits are usually determined through Active Traffic Management (ATM), to maximize safety and stabilize traffic flow.





Radar Speed Signs



- Radar speed signs are a special type of VMS that aims to slow traffic by alerting drivers of their speed.
- The immediate and personalized feeback, as well as the impression of speed surveillance, causes drivers to respond by slowing down.





Automated Speed Cameras (1/2)



- Mobile speed cameras manually controlled by traffic police are gradually supplemented by automated (fixed) speed cameras.
- Fixed cameras have a larger safety effect per location, whereas hidden mobile cameras have a larger area of influence.
- Estimated effect of fixed cameras (Elvik & Vaa, 2004; Høye, 2014): 15% 20% crash reduction



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Automated Speed Cameras (2/2)



Barriers for fixed automated speed cameras:

- Installation cost.
- Politically undesirable measure, due to low acceptance by road users
- Violation processing (usually manually) can be a challenge, often resulting in dismissed violations.



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Section Control

- Estimates the average speed over a road section, by automatically identifying each vehicle when entering and leaving.
- Estimated effect (Stefan, 2006; Soole et al., 2014; Høye (2014): approximately 30% reduction in injury crashes and 45% - 80% reduction in crashes with killed or seriously injured.
- Processing challenges as in speed cameras.

In-vehicle Safety Systems Revised EU Policy

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Adaptive Cruise Control

- Adaptive Cruise Control automatically adjusts the vehicle speed to maintain a safe distance from vehicles ahead.
- Based on **sensors**: radar or laser sensor or a camera setup.
- Available by most vehicle manufacturers.
- Studies on safety impact are inconclusive largely affected by set parameters (Li et al., 2017).

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Intelligent Speed Adaptation (ISA)

- In-vehicle technology that **identifies** the speed limit, **advises** driver and/ or **limits** engine power.
- Uses speed sign-recognition video camera and/or GPS-linked speed limit database.
- Types of ISA:
 - informative: giving information to the driver
 - voluntary supportive: driver can choose to set the maximum speed
 - mandatory supportive intervenes at all times when the vehicle exceeds the speed limit

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Revised General Safety Regulation

- EU institutions have recently reached a provisional political agreement on the revised General Safety Regulation.
- As of 2022 new safety technologies will become mandatory in European vehicles.
- The Commission expects that the proposed measures will help save over 25,000 lives and avoid at least 140,000 serious injuries by 2038.

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New Mandatory Safety Features

- Intelligent Speed Assistance is amongst the mandatory safety features for all vehicle types, from 2022:
 - cars
 - vans
 - trucks
 - buses

Telematics & Speed Management

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Telematics & Speed Management

- Telematics applications may be used extensively in the future for speed management practices.
- Speed monitoring of drivers by means of smartphone technology is already used to inform, notify, motivate and train the drivers.

Telematics & Speed Management

- Incentives for obeying the speed limits can be provided in terms of insurance cost premiums, or other approaches (e.g. social gamification)
- In the future, big data from such applications could also be used for dynamic speed management schemes

Vehicle Automation & Speed Management

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SAE Levels of Automation

Speed Management - L4-L5 Automation

Danube Transnational Programme RADAR

- Fully autonomous vehicles (Level 4 & 5) may eliminate the need for speed enforcement.
- They will obey the posted speed limit, or even decide on the most appropriate speed for prevalent conditions.
- The focus could be shifted from speed enforcement to the appropriate definition of the vehicle's AI speed decision algorithm.

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Connected Vehicles

- V2V and V2I communication will increase the **precision** and **effectiveness** of speed management.
- Examples of anticipated future:
 - Infrastructure communicates reduced speed limits to vehicles in case of incidents,
 - Vehicle in front informs following vehicles prior to sudden braking,
 - Platoons of connected vehicles operating in close headways increase the traffic efficiency of intersections, etc.

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