

Data-driven Road Infrastructure Planning for Vision Zero

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Session 5:

Leveraging road infrastructure data for Vision Zero

Brussels, 29 September 2026



Outline

1. Road Infrastructure Safety Management
2. Network-Wide Road Safety Assessment
3. Prioritising Investments – Optimising Safety Effect
4. Key Remarks

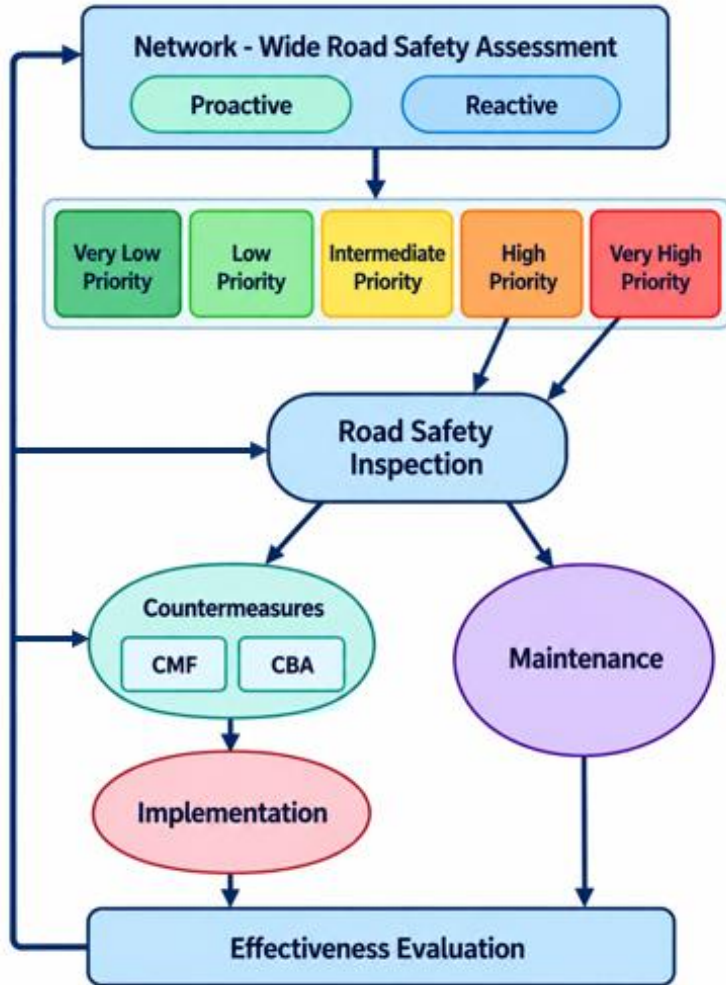


Road Infrastructure Safety Management

- Road Safety is a typical field with high risk of **important investments not bringing results**
- The European Commission introduced a **comprehensive framework** for road infrastructure safety management with the respective Directive (2008 & 2019)
- **Network-wide Road Safety Assessment** is the first cost- & time-effective screening towards identifying high risk sites whereas **Road Safety Inspection** can identify problems and respective countermeasures
- **Data-driven road infrastructure assessments** can gradually accelerate progress towards Vision Zero



Road Infrastructure Safety Management



1. Network-Wide Road Safety Assessment

leading to safety ranking of road segments

2. Road Safety Inspection

in high-risk road sites

3a. Maintenance

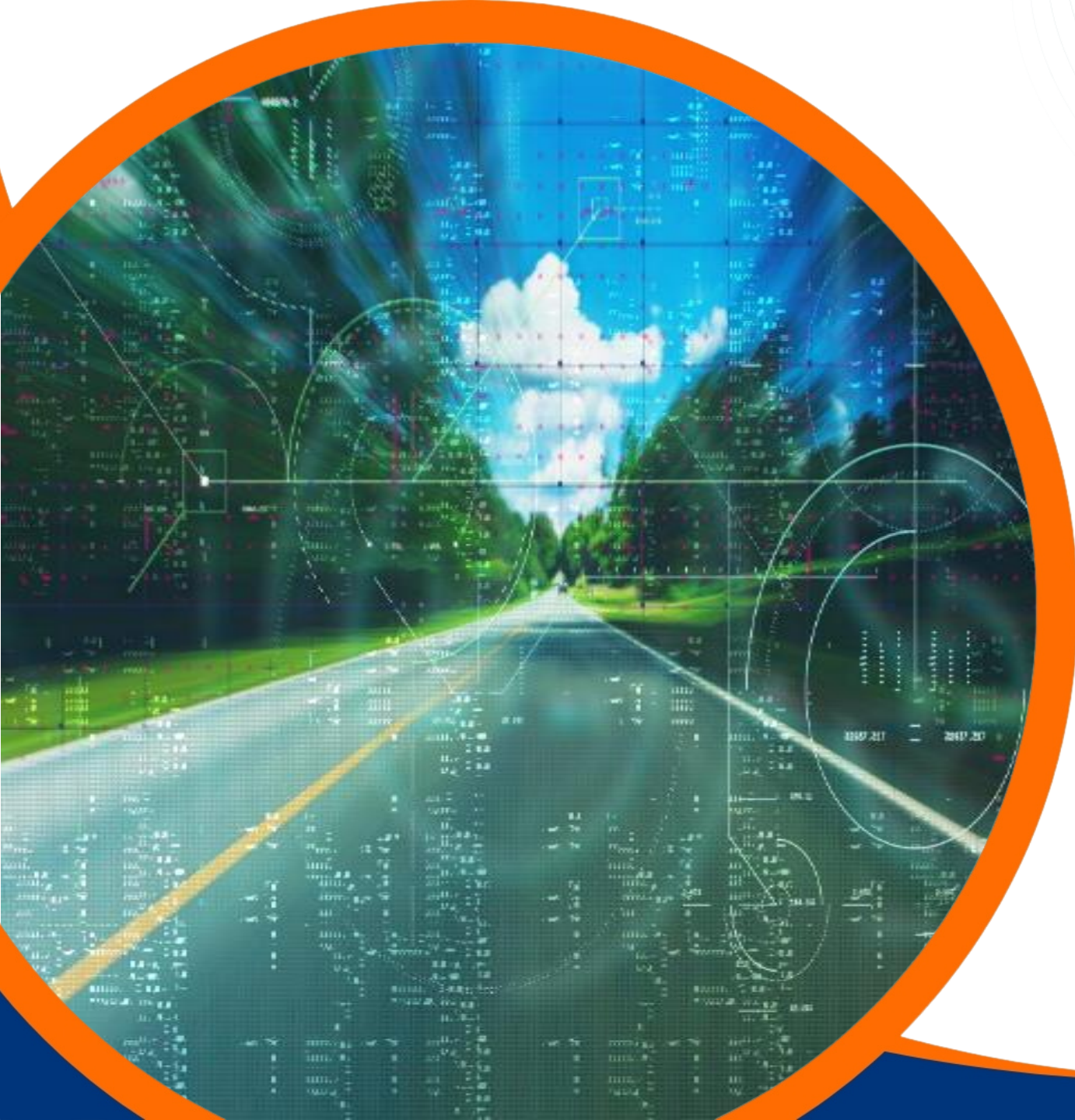
3b. Selection of countermeasures

safety effect, cost benefit analysis

4. Effectiveness evaluation

before and after





Network-Wide Road Safety Assessment

Network-wide Road Safety Assessment (1/2)

- **A systematic, network-level screening process** that combines the assessment of in-built road safety with crash occurrence analysis to classify road sections and prioritize further action.
- **Proactive assessment** - "In-built" road safety
 - assessment of road sections using infrastructure safety parameters;
 - calculation of a safety score using parameter-specific Reduction Factors;
 - classification as **High**, **Intermediate** or **Low** Risk.
- **Reactive assessment** - Crash occurrence
 - analysis of at least three years of injury and fatal crash data;
 - comparison of crash density and crash rate with category-specific reference thresholds;
 - classification as **High**, **Unsure** or **Low** Risk.
- **Integrated assessment** - Final safety ranking
 - combination of proactive and reactive results through a rule-based matrix;
 - final priority classes: **Very High**, **High**, **Intermediate**, **Low** and **Very Low**.



Network-wide Road Safety Assessment (2/2)

- provides a cost- and time- effective road infrastructure safety screening, at network level, to identify potentially hazardous road sections with the highest priority for further investigation,
- supports the prioritization of detailed (but costly) Road Safety Inspections (RSIs),

but on the other hand:
 - does not replace detailed Road Safety Inspections,
 - does not identify specific infrastructure deficiencies,
 - does not select/design the most effective countermeasures.



Road Infrastructure Safety Maps



- Following the requirements of the **Directive 2008/96/EC**, as amended by Directive (EU) 2019/1936, most EU Countries carried out Network-wide Road Safety Assessment on all primary roads of their network
- The **EU common methodology** supported Member States
- National Road Administrations produced **safety ranking of road segments all primary roads**, with the respective maps, available at:

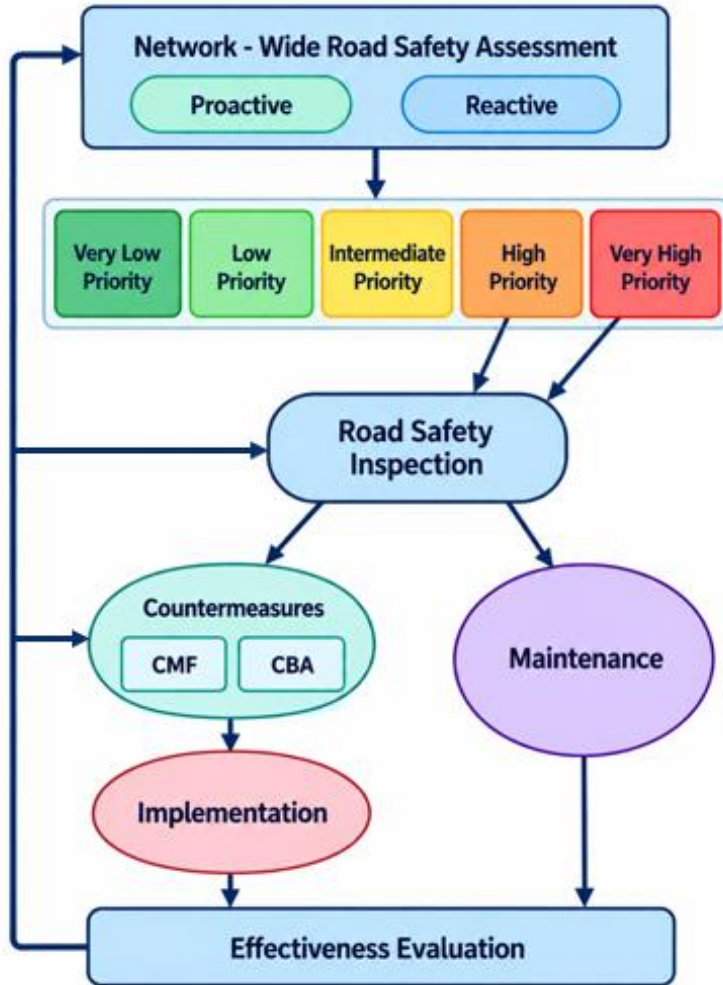
<https://webgate.ec.europa.eu/tentec-maps/web/public/screen/home>





Prioritising Investments - Optimising Safety Effect

Road Infrastructure Safety Management



1. Network-Wide Road Safety Assessment

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High Effectiveness Infrastructure Interventions

- **Roadside safety treatments:** e.g. wide clear zones, EN-1317 safety barriers, PTW-friendly barriers, EN-12767 passively safe posts, etc.
- **Speed management:** e.g. traffic calming measures, redefinition of speed limits, etc.
- **Junction improvements:** e.g. roundabouts, re-alignment, staggering, channelization, etc.
- **Traffic control at junctions:** e.g. traffic signs, traffic signals, etc.
- **Infrastructure for VRUs:** e.g. pedestrian crossings, cycle tracks, etc.



Prioritising Investments - Optimising Safety Effect

- **Identify** road safety problems through Road Safety Inspection
- **Match** problems with countermeasures
- **Estimate** road safety impact from countermeasure implementation
- **Translate** all costs and benefits into monetary values
- **Carry out** cost benefit analysis (NPV, ERR)
- **Consider** non-monetary criteria (regional development, environment, etc.)
- **Rank & select** the most cost efficient road safety measures



Effectiveness Evaluation

- **Safety Effect:**
 - Estimation of the safety effect: "Before-after studies"

- **Cost-effectiveness analysis:**

$$\frac{\text{Number of crashes prevented by a given measure}}{\text{Unit costs of implementation of measure}}$$

- **Cost-benefit analysis:**

$$\frac{\text{Present value of all benefits}}{\text{Present value of implementation costs}}$$





Key Remarks

**Challenges &
Opportunities**

Key Remarks

- NWRSA provides **a cost-effective yet systematic assessment** of road safety across the network, considering all road users.
- The combination of proactive and reactive assessments produces a final **safety ranking** and identifies priority road sections.
- The NWRSA ranking guides further investigation, while detailed **Road Safety Inspections** remain necessary to identify specific deficiencies and appropriate countermeasures.
- **Reliable and complete data** are essential for effective road infrastructure safety planning (crash, exposure, infrastructure, traffic and safety performance indicators).



Challenges & opportunities

- **Harmonised implementation** of NWRSA across EU countries is needed
- Need to expand and adapt NWRSA at **secondary rural & urban roads** & cycle tracks
- Data from **new digital systems** (geolocation, traffic, etc.) and tools (AI, etc.) can increase NWRSA reliability
- **Sufficient funding** should be secured for the necessary assessments and inspections but also for the measures' implementation at both interurban and urban roads
- **Monitoring NWRSA** over time & identification of good practice can boost its efficiency



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