European Road Safety Partnership - Network Wide Road Safety Assessment
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EUROPEAN ROAD SAFETY PARTNERSHIP

NETWORK WIDE ROAD SAFETY ASSESSMENT

SPRING SCHOOL – WEIMAR 25-27 MARCH 2026
PROACTIVE APPROACH – RISK ASSESSMENT

GDAŃSK UNIVERSITY OF TECHNOLOGY
Università di Catania
Bauhaus-Universität Weimar
Sveučilište u Zagrebu
LUNDS UNIVERSITET

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NETWORK WIDE ROAD SAFETY ASSESSMENT

Network-Wide Road Safety Assessment
Introduction

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Directive 2019/1936/EC
Article 5 Network-wide road safety assessment

- Member States shall ensure that a **network-wide road safety assessment** (**NWRSA**) is carried out on the **entire road network** in operation covered by this Directive.
- Network-wide road safety assessments shall evaluate **accident and impact severity RISK**, based on:
  (**Proactive** - a) primarily, a **visual examination**, either on site or by electronic means, of the design characteristics of the road (in-built safety);
  (**Reactive** - b) an analysis of sections of the road network which have been in operation for more than three years and upon which a large number of **serious accidents** in proportion to the traffic flow have occurred.
- In carrying out the network-wide road safety **assessment**, Member States may take into account the indicative elements set out in **Annex III**.

These two assessments are applied to the same road sections, and the results are **INTEGRATED** *to produce the final safety rating and ranking. This ranking is used to prioritize road sections for subsequent safety management actions.*

NWRSA goal

- The primary objective of the NWRSA is to ensure a **cost-effective safety assessment of the entire network** in accordance with the directive and to assign sections to risk classes
- The assessment is intended to serve as a screening process – **a rapid, systematic identification of which sections require further attention** – rather than a full diagnosis of each location individually
- Particular emphasis has been placed on the needs of **vulnerable road users**

Network-wide road safety assessment

Proactive & Reactive

- Network-wide road safety assessments shall evaluate accident and impact severity RISK, based on:
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  (**Reactive** - b) an analysis of sections of the road network which have been in operation for more than three years and upon which a large number of **serious accidents** in proportion to the traffic flow have occurred.

Why merge Proactive and Reactive approaches?

PROACTIVE		REACTIVE	
Pro	**Cons**	**Pro**	**Cons**
Is proactive!	Qualitative	Quantitative	Is Reactive!
Can focus on VRU	challenging data collection	Availability of Historical crash data	not robust with low crash counts and low represented road users (e.g. VRU)
Cover the entire road extension	Lacks of National CMF		High accident sections cover a limited part of the road network, and account for a limited proportion of accidents
	Lacks formal statistical testing	statistically and formally well defined	
	uncertainty in the integration with the reactive results		uncertainty in the integration with the proactive results

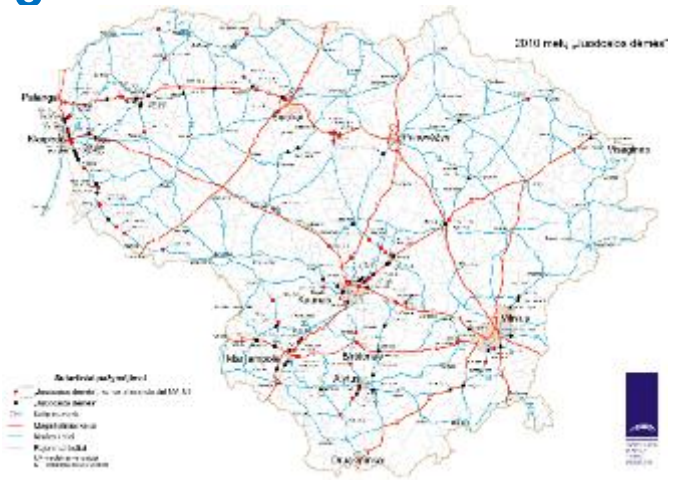
Not an exhaustive list ….

EU/2008 Directive RISM: Road Network in Operation
Reactive or Proactive

REACTIVE

Article 5

Management of the road network



Ranking of road sections with high accident

↓

Site visit

PROACTIVE

Article 6

Safety Inspection



Identify road safety issues to prevent accidents

EU Directive RISM 2008/96/EC

REACTIVE or PROACTIVE

- (**Reactive**): Network safety ranking has a high potential immediately after its implementation

than …

- (**Proactive**) Once **road sections with a high accident concentration** have been treated and remedial measures have been taken, safety inspections as a preventive measure should assume a more important role. Regular inspections are an essential tool for **preventing** possible dangers for all road users, including vulnerable users, and also in case of roadworks.

EU 2018 amended new DIRECTIVE RISM

REACTIVE and PROACTIVE=NWRSA

introducing a **network-wide road safety assessment**, a systematic and proactive risk mapping procedure to assess the 'in-built', or inherent, safety of roads across the EU;

Network-wide road safety assessment

RISK

Network-wide road safety assessments shall evaluate **accident and impact severity RISK**

Risk

Definition



- The **Risk** is defined by the combination of three components:

RISK = Exposure x Likelihood x Severity

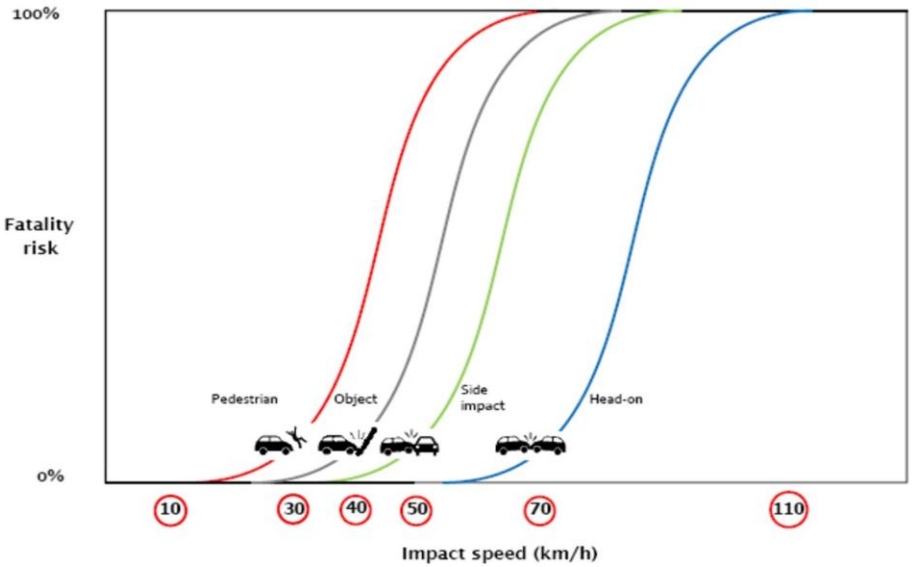
1) **EXPOSURE** of road users to road hazards (Exposure factor)

2) **LIKELIHOOD** of a vehicle being involved in an accident (Accident Frequency factor)

3) **SEVERITY** should an accident occur (Accident Severity factor)

RISK: Probability of crash vs Severity of outcome





		Severity outcome			
		Non-injury	**Minor**	**Serious**	**Fatal**
		Property damage only (PDO)	Injury which is not 'serious' but requires first aid, or which causes discomfort or pain to the person injured.	Injury (fracture, concussion, severe cuts or other injury) requiring medical treatment or removal to and retention in hospital.	A death occurring as the result of injuries sustained in a road crash within 30 days of the crash.
Probability of a crash	**Very likely**	Minor	Moderate	Serious	Serious
	Likely	Minor	Moderate	Serious	Serious
	Unlikely	Minor	Minor	Significant	Serious
	Very unlikely	Minor	Minor	Significant	Significant

Safe System injury threshold

Risk
Assessment



- Member States shall ensure that a **network-wide road safety assessment** (**NWRSA**) is carried out on the **entire road network** in operation covered by this Directive.

- ……..

- In carrying out the network-wide road safety assessment, Member States may take into account the indicative elements set out in **Annex III**.

ANNEX III
INDICATIVE ELEMENTS OF NETWORK-WIDE ROAD SAFETY ASSESSMENTS (1/4)

1. General:

(a) type of road in relation to the type and size of regions/cities it connects;
(b) length of road section;
(c) area type (rural, urban);
(d) land use (educational, commercial, industrial and manufacturing, residential, farming and agricultural, undeveloped areas);
(e) property access points density;
(f) presence of service road (e.g. for shops);
(g) presence of road works;
(h) presence of parking.

- ❑ Proactive
- ❑ Reactive
- ❑ Miscellaneous

2. Traffic volumes:

(a) traffic volumes;
(b) observed motorcycle volumes;
(c) observed pedestrian volumes on both sides, noting “along” or “crossing”;
(d) observed bicycle volumes on both sides, noting “along” or “crossing”;
(e) observed heavy vehicle volumes;
(f) estimated pedestrian flows determined from adjacent land use attributes;
(g) estimated bicycle flows determined from adjacent land use attributes.

ANNEX III
INDICATIVE ELEMENTS OF NETWORK-WIDE ROAD SAFETY ASSESSMENTS (2/4)

3. **Accident data**:

(a) number, location and cause of fatalities by road user group;
(b) number and location of serious injuries by road user group.

4. **Operational characteristics**:

(a) speed limit (general, for motorcycles; for trucks);
(b) operating speed (85th percentile);
(c) speed management and/or traffic calming;
(d) presence of ITS devices: queue alerts, variable message signs;
(e) school zone warning;
(f) presence of school crossing supervisor at prescribed periods.

5. **Geometric characteristics**:

(a) cross section characteristics (number, type and width of lanes, central median shoulders layout and material, cycle tracks, foot paths, etc.), including their variability;
(b) horizontal curvature;
(c) grade and vertical alignment;
(d) visibility and sight distances.

- ❑ **Proactive**
- ❑ **Reactive**
- ❑ **Miscellaneous**

ANNEX III
INDICATIVE ELEMENTS OF NETWORK-WIDE ROAD SAFETY ASSESSMENTS (3/4)

6. **Objects, clear zones and road restraint systems**:

(a) roadside environment and clear zones;
(b) fixed obstacles at the roadside (e.g. lighting poles, trees, etc.);
(c) distance of obstacles from roadside;
(d) density of obstacles;
(e) rumble strips;
(f) road restraint systems.

- ❑ **Proactive**
- ❑ **Reactive**
- ❑ **Miscellaneous**

7. **Bridges and tunnels**:

(a) presence and number of bridges, as well as relevant information concerning them;
(b) presence and number of tunnels, as well as relevant information concerning them;
(c) visual elements representing hazards for the safety of the infrastructure.

8. **Intersections**:

(a) intersection type and number of arms (noting in particular the type of control and the presence of protected turns);
(b) presence of channelisation;
(c) intersection quality;
(d) intersecting road volume;
(e) presence of level crossings (noting, in particular, the type of crossing and whether they are manned, unmanned, manual or automated).

ANNEX III
INDICATIVE ELEMENTS OF NETWORK-WIDE ROAD SAFETY ASSESSMENTS (4/4)

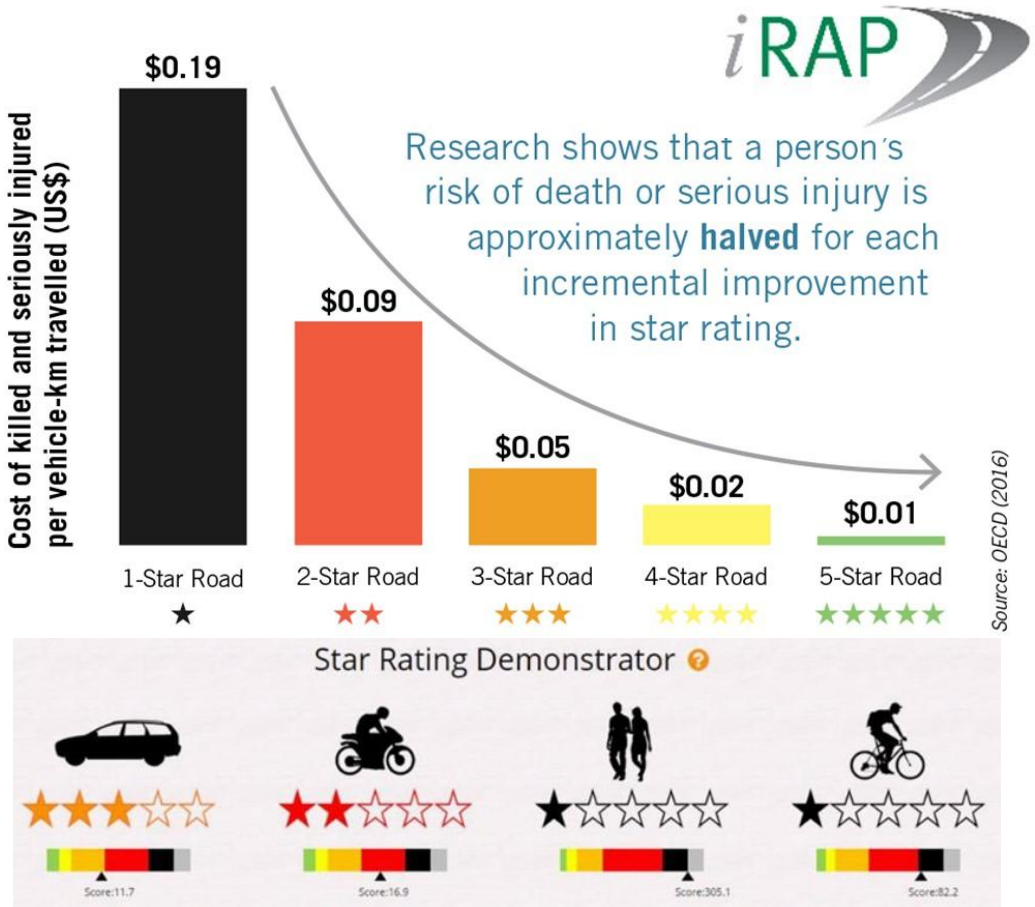
9. **Maintenance**:
(a) pavement defects;
(b) pavement skid resistance;
(c) shoulder condition (including vegetation);
(d) condition of signs, markings and delineation;
(e) condition of road restraint systems.

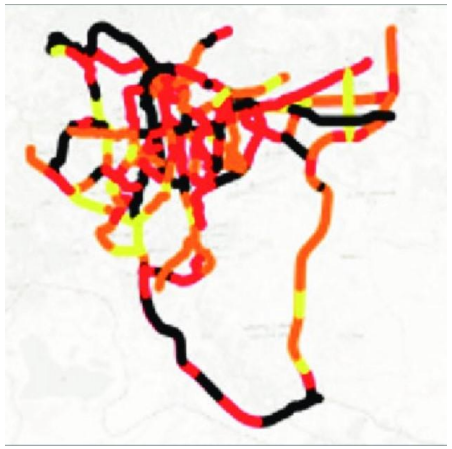
- ❑ **Proactive (42 items)**
- ❑ **Reactive (2 items)**
- ❑ **Miscellaneous (15 items)**

10. **Vulnerable road users' facilities**:
(a) pedestrian and cycling crossings (surface crossings and grade separation);
(b) cycling crossings (surface crossings and grade separation);
(c) pedestrian fencing;
(d) existence of sidewalk or separated facility;
(e) bicycle facilities and their type (cycle paths, cycle lanes, other);
(f) quality of pedestrian crossings with regard to the conspicuity and signposting of each facility;
(g) pedestrian and cycling crossing facilities on entry arm of minor road joining network;
(h) existence of alternative routes for pedestrians and cyclists where there are no separated facilities.

11. **Pre/post-crash systems for traffic injury and gravity mitigation elements**:
(a) network operational centres and other patrolling facilities;
(b) mechanisms to inform road users of driving conditions in order to prevent accidents or incidents;
(c) AID (automatic incident detection) systems: sensors and cameras;
(d) incident management systems;
(e) systems for communicating with emergency services.

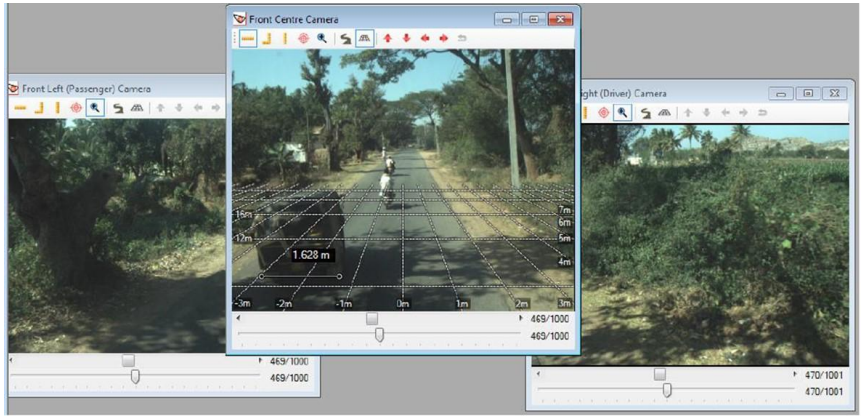
Network-wide road assessment







The star rating for cars combines several attributes (more than 25) for a road section in rural areas!



Source: https://irap.org/

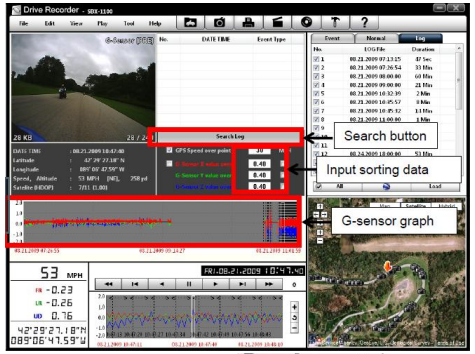
Proactive Risk Estimation: the IASP approach (EU founded project)

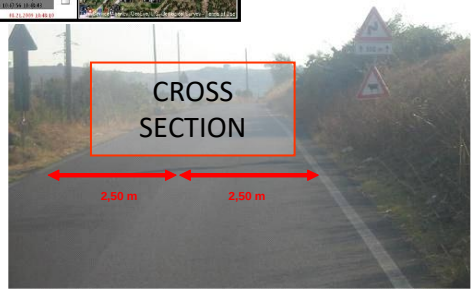
10 road attributes: (8) safety issues + (1) horizontal alignment + (1) Operating speed



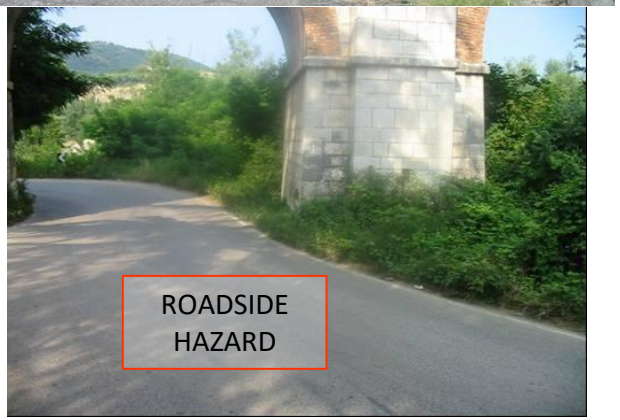












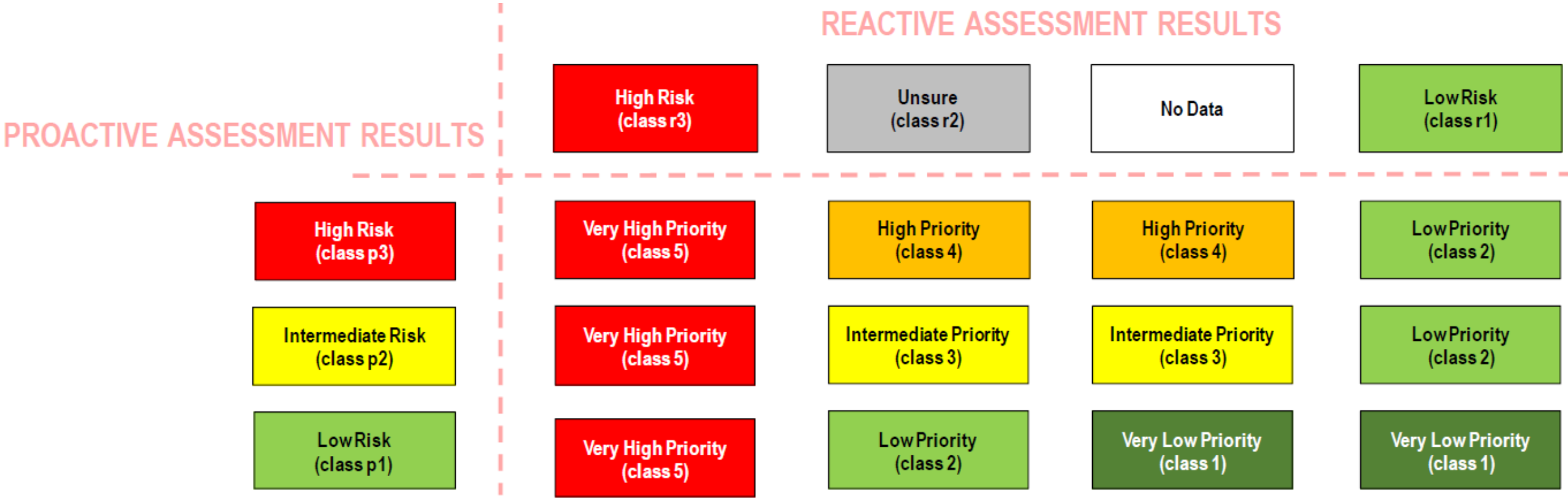
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Risk

combining proactive with reactive risk

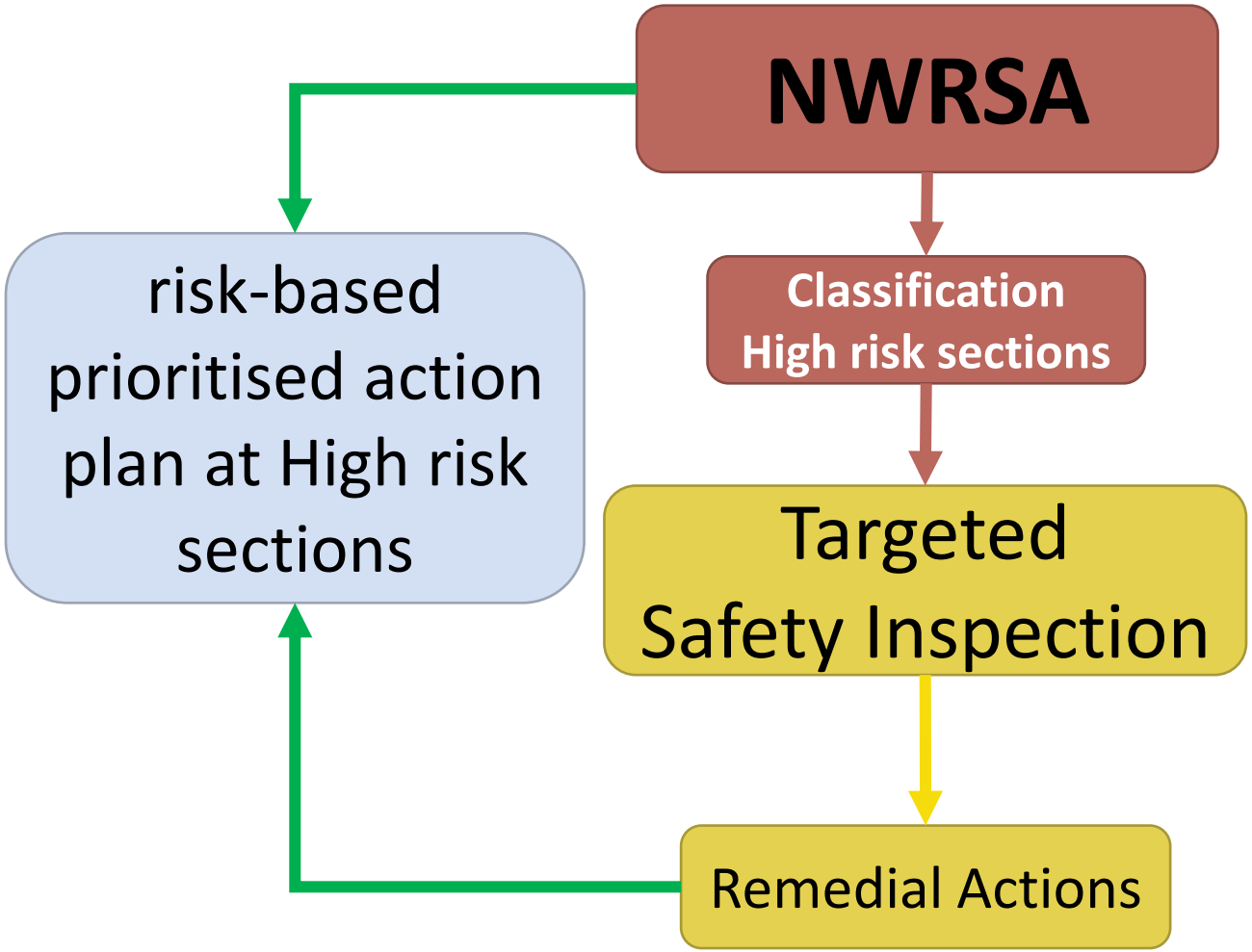


source: Network Wide Road Safety Assessment - Methodology and Implementation Handbook (EU Commission, 2023)

Obligations of partner countries

- Member States should treat the NWRSA as an integral part of the mandatory RISM on the network covered by the Directive.
- In legal terms, this means that a network assessment must be carried out across the entire network falling within the scope of the Directive, that sections must be classified into at **least three safety categories**, and that the results must be used to prioritise **further actions**.
- The Directive also stipulates that the first assessment was to be carried out by **2024** at the latest, with subsequent assessments taking place at **least every five years**.

Directive 2019/1936/EC
Not only NWRSA for the road network in operation

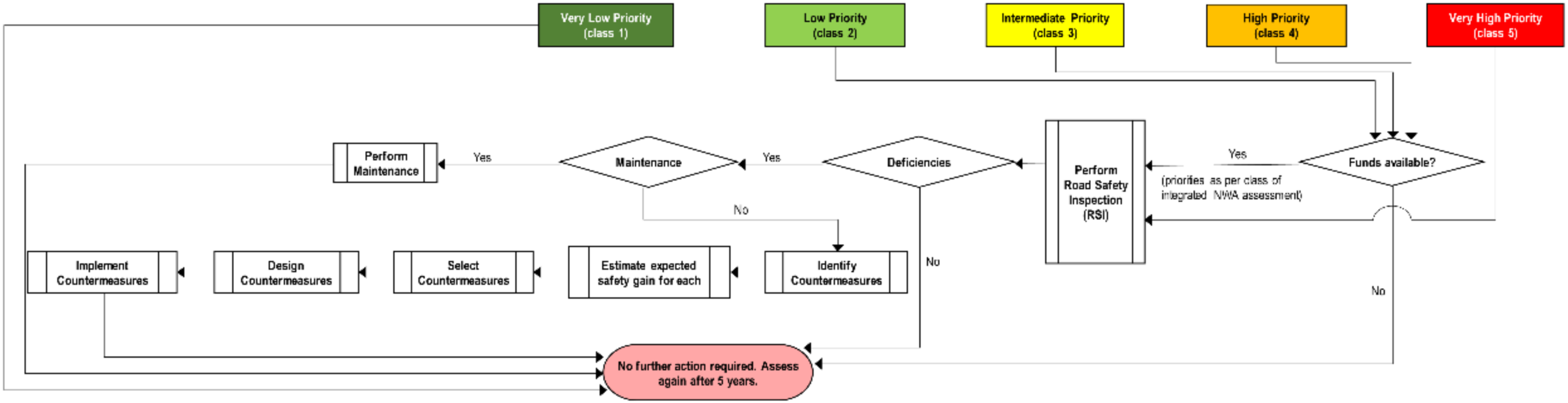


Safety Inspection

- Routine Maintenance
- Mass action plan
- Route action plans

Obligations of partner countries

- Once the NWA is complete, the methodology itself comes to an end, but the follow-up phase begins
- Class 1 sections (Very Low Priority) do not require action and are reassessed **after five years**
- Sections in classes 2–4 (Low Priority, Intermediate Priority, High Priority) should, depending on **available resources**, undergo a Targeted Road Safety Inspection (T-RSI)
- Sections in class 5 (Very High Priority) **should definitely be subject to a T-RSI**
- Further actions are then determined based on the inspection results



source: Network Wide Road Safety Assessment - Methodology and Implementation Handbook (EU Commission, 2023)

Roads covered by NWRSA

- The NWRSA covers roads forming part of the **TEN-T network**, urban and inter-urban **motorways**,
- other major roads outside urban areas, and other roads outside urban areas that do not directly serve adjacent properties and were constructed using **EU funds**.
- The Directive also allows for the **voluntary application** of the methodology to **other roads outside urban areas**

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To be continued …….

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