



SLOVENIAN  
TRAFFIC SAFETY  
AGENCY

Lecture at periodical RSA training courses

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# Update on Road Safety Audit practices in the European Union and internationally

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# Who we are

## ➤ NTUA Road Safety Observatory

Center of Research and Innovation Excellence on Road Safety, with global recognition [ranked: 2nd in Europe and 6th worldwide (AAP 2018)]

## ➤ Department of Transportation Planning and Engineering of NTUA

Ranked: 9th in Europe and 39th worldwide (ShanghaiRanking's 2017), scientific citations: 3rd in Europe and 19th worldwide (Pulse 2017)

## ➤ Vision:

- to contribute to the **significant reduction of the number of road accidents** and of the related casualties in Greece, in Europe and worldwide
- through the scientific support of **evidence based decision making** for the necessary road safety policies, programmes and measures





# Related Experience

## ➤ Multi-level experience in:

- Accident Prediction Modelling,
- Road Assessments,
- Identification of Hazardous Locations,
- Road Safety Audits and Inspections.

## ➤ Indicative list of related projects

1. Study on a Methodology for Network-wide Road Assessment, for the European Commission (2020-)
2. Complementary Analysis & Scientific Review for the Revision of EU Road Infrastructure Safety Management Legislation" (2018-2019),
3. Preliminary Economic Analysis for the Greek Road Rehabilitation and Safety Project (2018-2019),
4. i-safemodels Project: International Comparative Analyses of Road Traffic Safety Statistics and Safety Modeling using Accident Prediction Models and Crash Modification Factors, funded under the "Competitiveness, Entrepreneurship and Innovation" framework (2018-2021),
5. PRACT Project - Predicting road accidents - a transferable methodology across Europe for Accident Prediction Models and Crash Modification Factors, (2014-2016) funded by the Conference of European Directors of Roads (CEDR),
6. SAFETYCUBE Project - Safety Causation, Benefits and Efficiency (2015-2018) of the Horizons 2020 framework programme on transport research of the European Commission,
7. Development of Curriculum and Training Material for RSA accreditation in Greece and the Kingdom of Saudi Arabia (2019),
8. Development of methodology for identification and treatment of hazardous locations in Greece,
9. Over 15 Road Safety Audits and Inspections in Greece and internationally.



# Lecture Outline

1. Overview of international practices in RSA
  - Comparative results from RSA practices internationally (survey results)
  - Comparative results from RSA guidelines
  - RSA situation in Greece
2. The new EU Directive on road infrastructure safety management (DIR 2019/1936)
  - Road Infrastructure Safety Management (RISM) concepts
  - Changes in RISM procedures by DIR 2019/1936
  - Insights on "network wide road safety ranking"

Questions and Discussion





# 1.1 Comparative results from RSA practices



# RSA practices internationally

## Data derived from

- **NTUA questionnaire** survey in 11 countries (end of 2019)

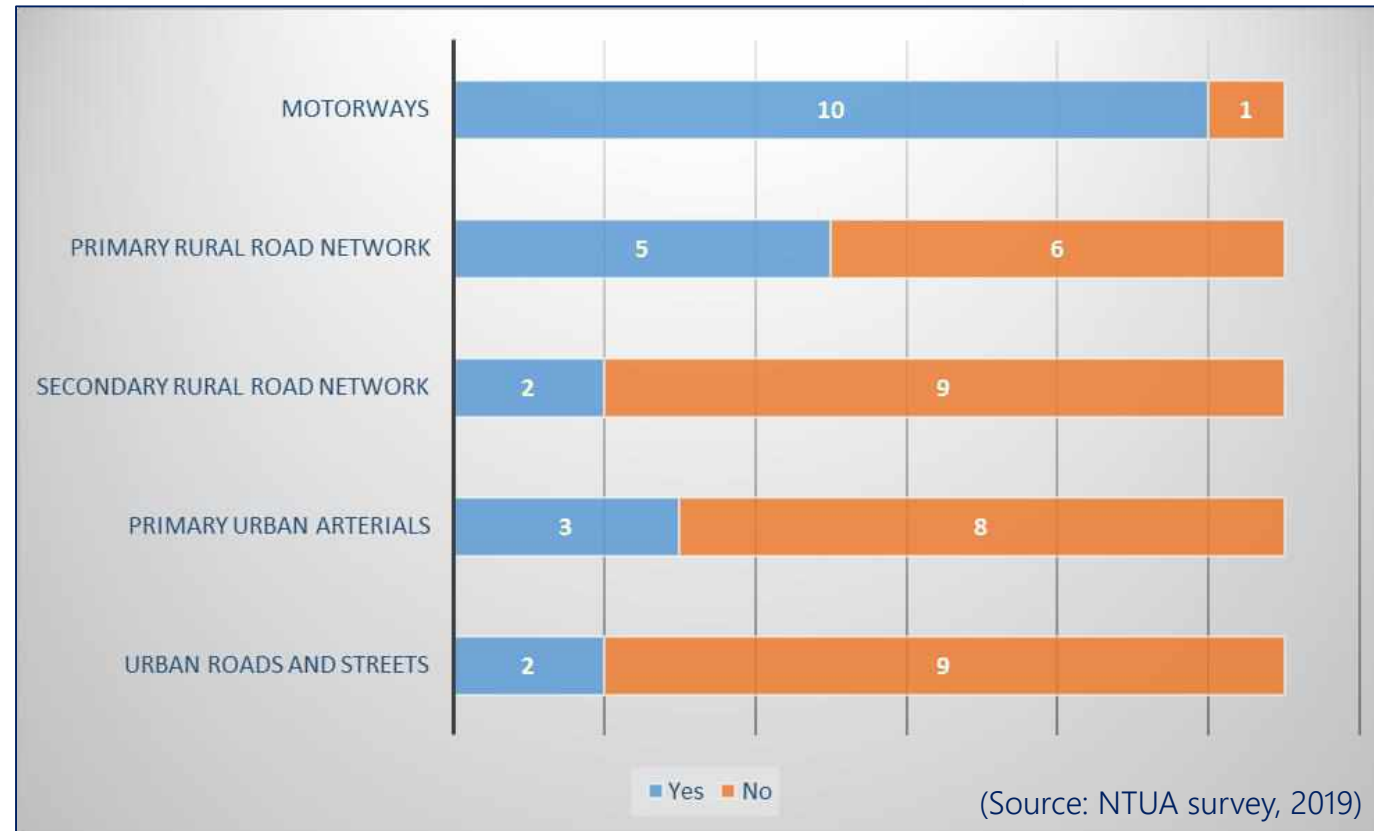
Australia, Austria, Belgium, Germany, Greece, Italy, Portugal, Qatar, Slovenia, Spain and USA (state of Kentucky)

- **ETSC survey** in 17 countries (early 2020)

Austria, Bosnia and Herzegovina, Croatia, Czech Republic, Finland, Hungary, Ireland, Italy, Germany, Greece, Netherlands, Portugal, Slovenia, South Africa, Sweden, Switzerland, UK



# Projects for which the conduct of a RSA is obligatory (1/4)



- RSAs are mostly implemented on the design of **motorways** and major interurban road projects
- On the design of roads in the **Trans-European Road Network**



# Projects for which the conduct of a RSA is obligatory (2/4)

COUNTRY	ROAD TYPES / STAGES				
	Motorways	Primary rural road network	Secondary rural road network	Primary urban arterials	Urban roads and streets
<b>Australia</b>	All stages	No	No	No	No
<b>Austria</b>	All stages	No	No	No	No
<b>Belgium</b>	Preliminary design, detailed design, before opening, one year after opening	No	No	No	No
<b>Germany</b>	Preliminary planning, preliminary design, detailed design, before traffic release, after traffic clearance	Preliminary planning, preliminary design, detailed design, before traffic release, after traffic clearance	No	No	No
<b>Greece</b>	<u>TERN network only:</u> although all stages are desired, final design stage or prior to opening is audited.	<u>TERN network only:</u> although all stages are desired, final design stage or prior to opening is audited.	No	<u>TERN network only:</u> although all stages are desired, final design stage or prior to opening is audited.	No

(Source: NTUA survey, 2019)





# Projects for which the conduct of a RSA is obligatory (3/4)

COUNTRY	ROAD TYPES / STAGES				
	Motorways	Primary rural road network	Secondary rural road network	Primary urban arterials	Urban roads and streets
Italy	All stages	All stages	No	No	No
Portugal	All stages	All stages	All stages	All stages	<u>Interurban roads across small villages only:</u> all stages
Qatar	Concept, preliminary design, detailed design and preopening	Concept, preliminary design, detailed design and preopening	Concept, preliminary design, detailed design and preopening	Concept, preliminary design, detailed design and preopening	Concept, preliminary design, detailed design and preopening
Slovenia	All stages	No	No	No	No
Spain	<u>TERN network only:</u> all stages	No	No	No	No
USA (Kentucky)	No	No	No	No	No

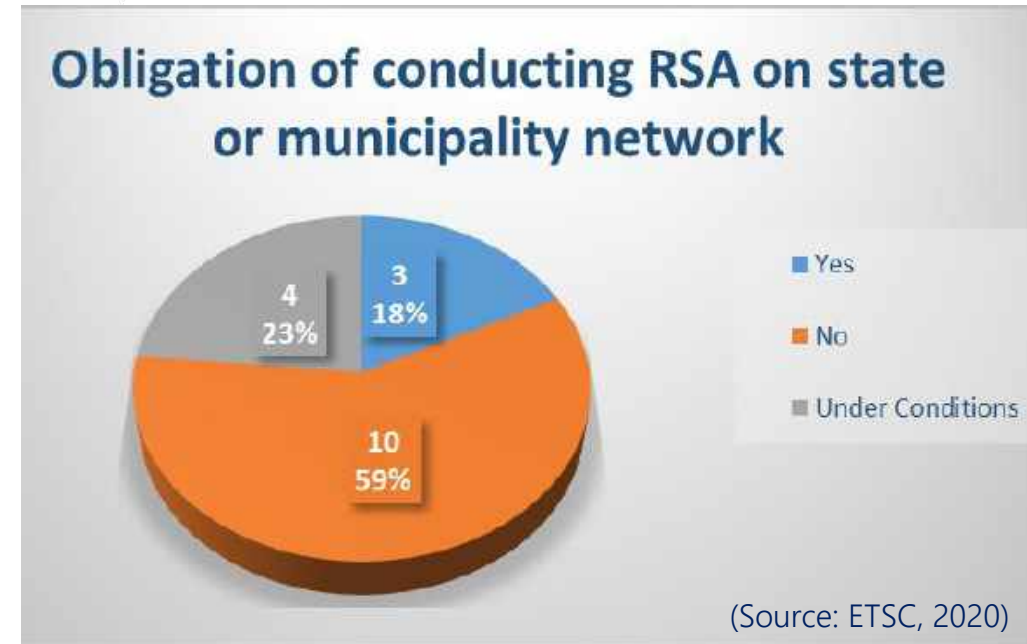
(Source: NTUA survey, 2019)



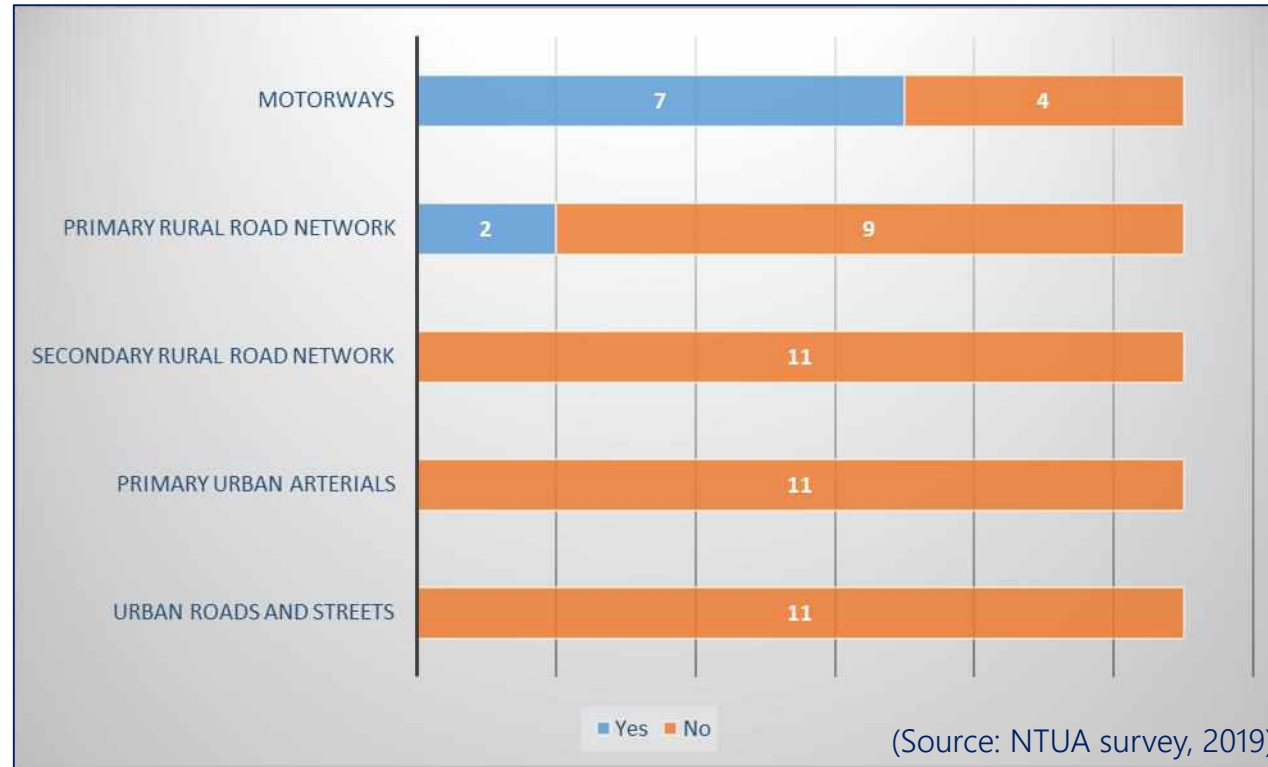
# Projects for which the conduct of a RSA is obligatory (4/4)

According to the recent **ETSC survey**

- In most of the countries RSAs are **not obligatory** on state or municipality network.
- In **Germany** the RSAs are obligatory on the **Federal Trunk Road Network**. On secondary and municipality roads it depends on local authorities.
- In **Hungary** the RSAs are obligatory on national main roads and on all roads exceeding 10,000 pcu/day
- In **Ireland** on all National Routes and schemes funded by National Transport Authority
- In **UK** the RSAs are obligatory on strategic state network. Some local road authorities require RSAs on some of their road schemes.



# Projects for which the conduct of a RSI is obligatory



- The conduct of **Road Safety Inspection (RSI)** is compulsory mainly in **motorways** and in **primary rural road network**
- In Greece, Portugal and Spain, the RSIs are compulsory only in roads which are part of the **TERN**





# Frequency of the Road Safety Inspections

COUNTRY	ROAD SAFETY INSPECTION	
	Motorways	Primary rural road network
Australia	No	No
Austria	At least once in 10 years	No
Belgium	Several inspections every year	No
Germany	No	No
Greece	TERN network only: not systematically	Not systematically
Italy	Every 2 years	Every 2 years
Portugal	TERN network only; no frequency reported	TERN network only; no frequency reported
Qatar	No	No
Slovenia	Every 5 years	No
Spain	TERN network only; no frequency reported	No
USA (Kentucky)	No	No

(Source: NTUA survey, 2019)

- In state of Kentucky it is an ad hoc process especially for projects initiated for safety improvements
- **Work zone temporary traffic management** designs are audited only if the proposed schemes concern major roads and involve temporary changes that will affect the network for a considerable period



# Authorities responsible for performing the RSAs/RSIs (1/2)



- In most of the countries, **public authorities** are responsible for performing Road Safety Audits or Inspections
- In Australia, Austria, Italy and Portugal **both private** road operators **and public** authorities are responsible for RSA/ RSI implementation



# Authorities responsible for performing the RSAs/RSIs (2/2)

COUNTRY	RESPONSIBLE AUTHORITIES
<b>Australia</b>	Road countrolling authorities or agencies across states, territories (i.e. Northern Territory and the Australian Capital Territory), and local governments
<b>Austria</b>	Motorways: ASFINAG (Motorways Operator) Secondary network: Local Authorities
<b>Belgium</b>	Road Safety Audits: Project Development Authority Road Safety Inspections: Roads Administration
<b>Germany</b>	Road Traffic Authority - Road Construction Authority - Police
<b>Greece</b>	Ministry of Transport and Infrastructure / Road Infrastructure Safety Agency
<b>Italy</b>	TERN & road network of national interest: Ministry of Infrastructure and Transport (the Ministry uses the organisational structure of ANAS S.p.a. - Motorways Operator)
<b>Portugal</b>	Road Operator / Instituto da Mobilidade e dos Transportes
<b>Qatar</b>	Ashghal Public Works Authority
<b>Slovenia</b>	Slovenian Traffic Safety Agency
<b>Spain</b>	Ministry of Public Works / General Directorate of Roads. There are other regional road authorities for a minimum part of TERN
<b>USA (Kentucky)</b>	Kentucky Office of Highway Safety

(Source: NTUA survey, 2019)





# Authorities responsible for training Auditors

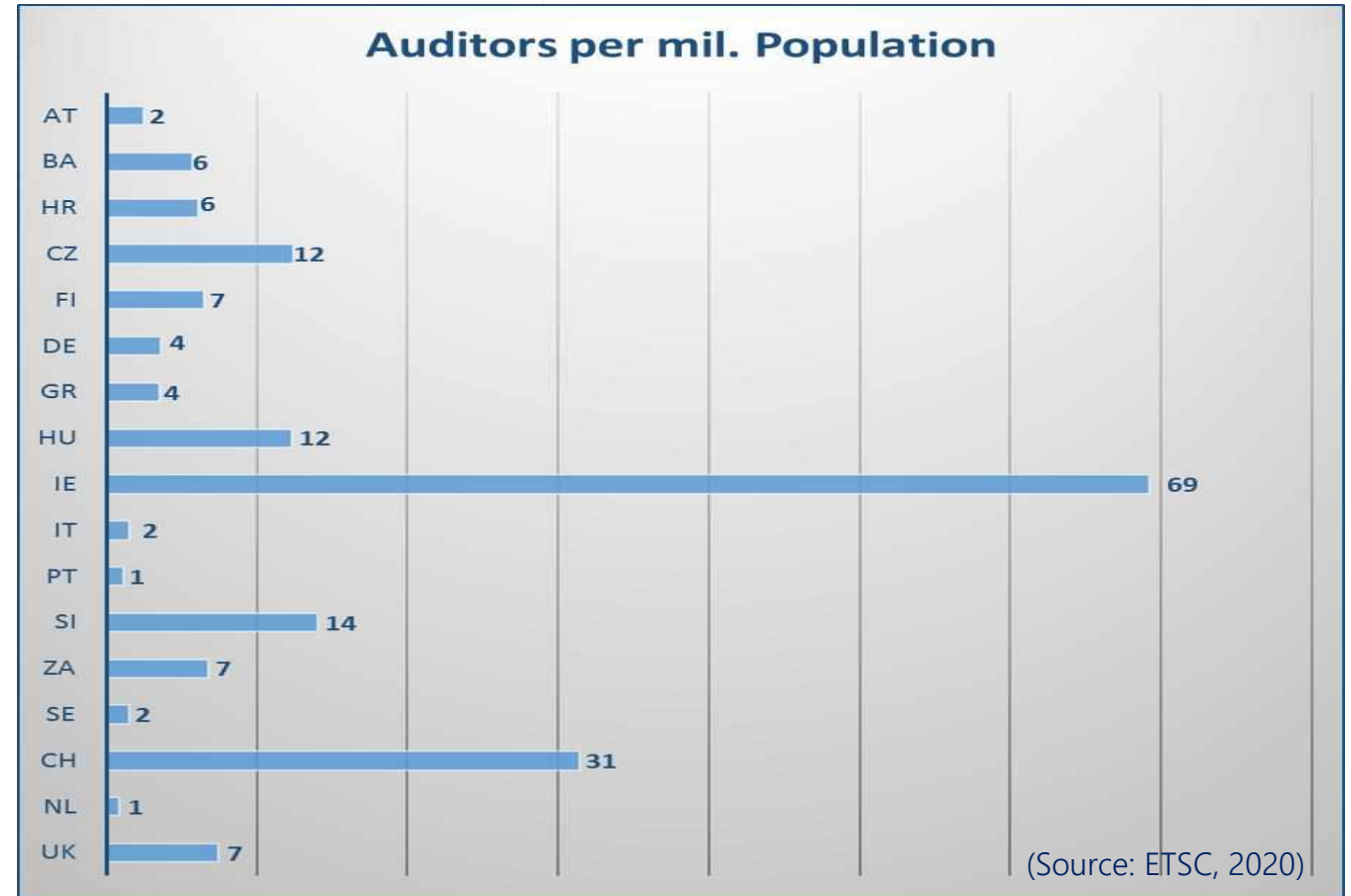
According to the recent **ETSC survey**

- In **most** of the countries (10/17) public agencies and ministries are responsible for the training.
- In **UK** TMS Consultancy run RSA training courses. The Cert Comp training course is run by TMS with an alternative "portfolio" method run by SoRSA.
- Other authorities responsible for training are universities, chambers, accredited institutions and organizations.



# Number of existing Auditors

Country		Number of road safety auditors
AT	Austria	22
BA	Bosnia and Herzegovina	20
HR	Croatia	25
CZ	Czech Republic	132
FI	Finland	36
DE	Germany	>300
GR	Greece	38
HU	Hungary	120
IE	Ireland	341
IT	Italy	91
PT	Portugal	12
SI	Slovenia	29
ZA	South Africa	400
SE	Sweden	16
CH	Switzerland	268
NL	Netherlands	15
UK	United Kingdom	500



- First is **Ireland**, with the most accredited auditors per million of population - 341 auditors in total.
- Second is **Switzerland**, with 268 auditors. Third is **Slovenia**.



# Who is responsible for the Selection of the Road Safety Auditors

According to the recent **ETSC survey**

- In most of the countries (7/17) the Road Safety Auditors are selected by the **Road Operator**
- In **South Africa & Germany** responsible is the Road Authority
- In **UK, Greece & Portugal** it is either the Road Operator or the Road Authority
- In **Czech Republic & Italy** responsible is the Ministry of Transport
- In **Portugal** the Institute for Mobility and Transport has the right to reject the selected auditor





# Selection of the Road Safety Audit team (1/2)

COUNTRY	WAYS OF SELECTING RSA TEAM	Request for Tenders	Selection from a list of certified	Authority delegates
Australia	Some jurisdictions require that road safety auditors be formally accredited and/or registered.		X	
Austria	Using a tender between certified auditors	X		
Belgium	Selected by the organization that takes the initiative for the project		X	
Germany	The authorities have delegates and sometimes they invite road safety experts in addition		X (on occasion)	X (mostly)
Greece	Selected by the Project Owner from a list of certified auditors.		X	
Italy	The road authorities must request the General Directorate for Infrastructure Supervision and Safety to identify the auditor(s). The selection procedure starts within 10 days. Auditors are identified by the competent body from a special list established at the Ministry of Infrastructure and Transport		X	
Portugal	The procedure depends on the road concessionaire. Infraestruturas de Portugal (private company owned by the State) issues a bidding procedure. Other private concessionaires make invitations	X	X	
Qatar	They must be on the list of approved RSAs held by Public Works Authority		X	
Slovenia	Determined by the Agency		X	
Spain	Using a tender between certified auditors	X		
USA (Kentucky)	The Kentucky Office of Highway Safety uses a team of experts that review design plans and conduct a road inspection. They are full-time employees of the DOT			X

(Source: NTUA survey, 2019)



# Selection of the Road Safety Audit team (2/2)

- In **UK** it depends on price, how quickly the audit can be delivered. There is a local arrangement to carry out audit under contract with a specific supplier.
- In **Ireland** it is selected by Client and Approved by TII (Transport Infrastructure Ireland )
- In **Portugal** it is a free choice of road concessionaire



# Responsible Authority for the payment of the RSA

According to the **ETSC survey**:

- In **most** of the countries (9/17) the RSA is payed by the **Road Operator**.
- In **South Africa & Germany** it is the **Road Authority**.
- In **UK, Greece & Portugal** it is either the Road Operator or the Road Authority.
- In **Italy** responsible is the Ministry.
- In **Hungary** for large projects responsible is usually the National Infrastructure Company (NIF), for some projects the Hungarian Public Roads Co (MK), for local roads the municipalities.



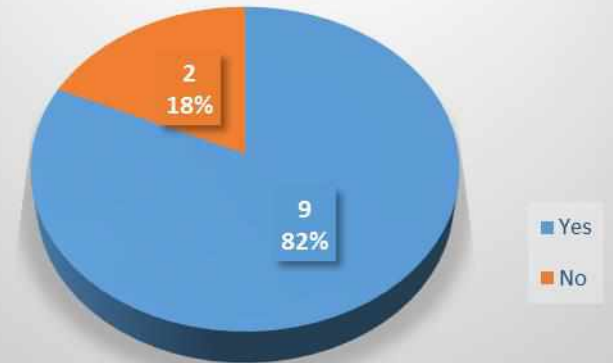


# RSA practices internationally

## Current Road Safety Audit Guidelines or Manuals

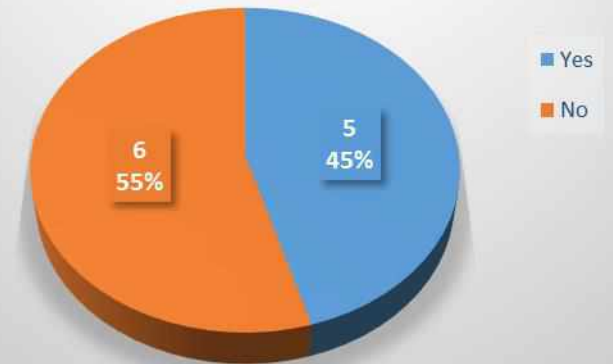
- Most of the countries have **officially approved Road Safety Audit Guidelines or Manuals**, with the exceptions of Spain and US - State of Kentucky.
- Almost half of the responded countries do not use other Road Safety Audit Guidelines or Manuals

### Officially approved current Road Safety Audit Guidelines or Manuals



(Source: NTUA survey, 2019)

### Other Road Safety Audit Guidelines or Manuals



(Source: NTUA survey, 2019)



# 1.2 Comparative results from RSA guidelines



# Comparative results from RSA guidelines

Data derived from

- **Review** of international Road Safety Audit **guidelines** and **manuals** from the United Kingdom, Australia, USA, European countries and Gulf States



# Definition of Road Safety Audit

RSA Definition Element	UK	AU	US	EU	DE	GR	Abu Dhabi
Restricted to road safety problems	X	X	X	X	X	X	X
Formal process		X	X	X	X	X	
Performed by qualified and experienced auditors		X					
Auditors are independent		X	X	X		X	
Consideration of all stages	X			X		X	X
Consideration of all road users	X		X				X

- A formal examination of an existing or future road or traffic project by an independent and suitably qualified team, reporting on the project's crash potential and safety performance and how it can be improved, considering all road users and at all stages of the project development.





# Projects requiring a Road Safety Audit

Road types	UK	AU	US	AT	BE	DE	GR	IT	PT	SI	ES	Abu Dhabi
Motorways	X	X (2)	(3)	X	X	X	X	X	X	X	X (4)	X (6)
Primary rural road network	X (1)	(2)	(3)			X	(4)	X	X			X (6)
Secondary rural road network		(2)	(3)						X			
Primary urban arterials	X (1)	(2)	(3)				(4)		X			X (6)
Urban roads and streets		(2)	(3)						(5)			

## Notes:

1. RSA is mandatorily performed on all trunk road Highway Improvement Schemes in the UK.
2. The decision is made by jurisdictions, usually related to project cost. Any project with cost above 5-10 million \$AU is usually audited.
3. RSA implementation is a State DOT's decision. In Kentucky, only projects initiated specifically for the improvement of road safety are audited.
4. In European Countries, EU Directive 2008/96/EC defines as mandatory the implementation of RSAs on roads which are part of the trans-European road network.
5. Only for interurban roads crossing small villages.
6. All "new major road projects" are audited in Abu Dhabi.



# Stages of Road Safety Audit

Project Lifecycle Stage	RSA Stage	Country
<b>Planning</b>	Feasibility Stage or Preliminary Planning Stage	AU, DE, USA, Abu Dhabi
<b>Design</b>	Preliminary Design	AU, UK, EU, DE, GR, USA, Abu Dhabi
	Detailed Design	AU, UK, EU, DE, GR, USA, Abu Dhabi
<b>Construction</b>	Changes in design during construction	USA
	Temporary (Work zone) traffic management schemes	AU, GR, USA, Abu Dhabi
	Pre-Opening	AU, UK, EU, DE, GR, USA, Abu Dhabi
	Opening or Early Operation	AU, EU, DE, Abu Dhabi
<b>Monitoring</b>	Post Opening, on 12 months and 36 months (mostly crash investigation)	UK, Abu Dhabi
<b>Existing Roads</b>	Road Safety Inspection	AU, EU (planned revised DIR), DE, GR, USA, Abu Dhabi
<b>Other</b>	Land Use Development RSAs	AU, USA



# When should a project be audited

- If an inappropriate concept or treatment is chosen at a feasibility stage and not audited
  - it may be **difficult to treat** the resulting safety problems at a later design stage
  - even more when the project has been constructed
  - the design stage after which **expropriation limits are set** is **critical** for the RSA process
- **Early auditing** can assist in the timely elimination of road safety deficiencies, leading to a minimization of wasted design time at later stages



# Roles and responsibilities

- Road Safety Audit Team
  - **independence** from the design team and the team responsible for the project development
  - dependences between the audit team and the Client team should also be **avoided**
- Design Team
- Client / Project Owner / Project Sponsor
- Overseeing Organization
  - roads authority, road operator** or dedicated **road safety agency**
- Traffic Police
  - advisory** and **consulting** role
- Roles and responsibilities should be **clearly** and **unambiguously defined**





# Audit team requirements

	UK	AU	US	EU	DE	GR	Abu Dhabi
<b>Minimum size (no. of persons)</b>	2	2	3	-	1	2	2
<b>Certificate required</b>	Yes, at least by one	Yes, by all	Not specified	Yes, at least by one	Yes, by all	Yes, by all	No, only registration
<b>Presence of Team Leader</b>	Yes	Yes	Yes	No	No	Yes	Yes
<b>Presence of Observers</b>	Yes	Yes	No	No	No	No	Yes (2 max.)

- The Road Safety Audit Team should consist of **at least two persons**
- diverse backgrounds and **different approaches** of different people
  - different **skill sets** for different aspects of the project
  - **cross-fertilisation of ideas** which can result from discussions
  - having more than one pair of eyes



# Steps of Road Safety Audit process (1/3)

- **Preparing Background Information & Audit Brief**
  - gathering of all required information
  - clear statement of the expected outcome
- **Selecting the Road Safety Audit Team**
- **Commencement Meeting**
- **Assessing the Audit Brief**
  - explicitly confined to road safety aspects
  - RSA is not a check of compliance with standards
  - use of checklists
  - consideration of crash data



# Steps of Road Safety Audit process (2/3)

## ➤ Site Visit

- a **daytime visit** is required for all audit stages
- a **night time inspection** is required for pre-opening and post-opening stage audits and for audits of existing roads

## ➤ Writing the Road Safety Audit Report

- Project information
- Background information
- Findings and recommendations
- Formal statement of the Audit Team



# Steps of Road Safety Audit process (3/3)

## ➤ Responding to the Audit Report

- the finding and the recommendation is **accepted**, or
- the finding is accepted, but an **alternative recommendation** is suggested with appropriate reasoning, or
- the finding is **not accepted** giving appropriate reasoning

## ➤ Exception Report

- initiated in cases of disagreement
- the final decision rests with the Overseeing Organization

## ➤ Closing the Audit





# Embedding Safe System Principles in RSAs

- **Safe System**  
create **a forgiving road system** that acknowledges that people make mistakes and have limited ability to withstand crash forces without being killed or seriously injured
- **Managing the key crash types**
- **Setting Safe System Speeds**
- **Ranking system**
  - consider crash severity, crash exposure and crash likelihood
  - rate the risks identified in an RSA



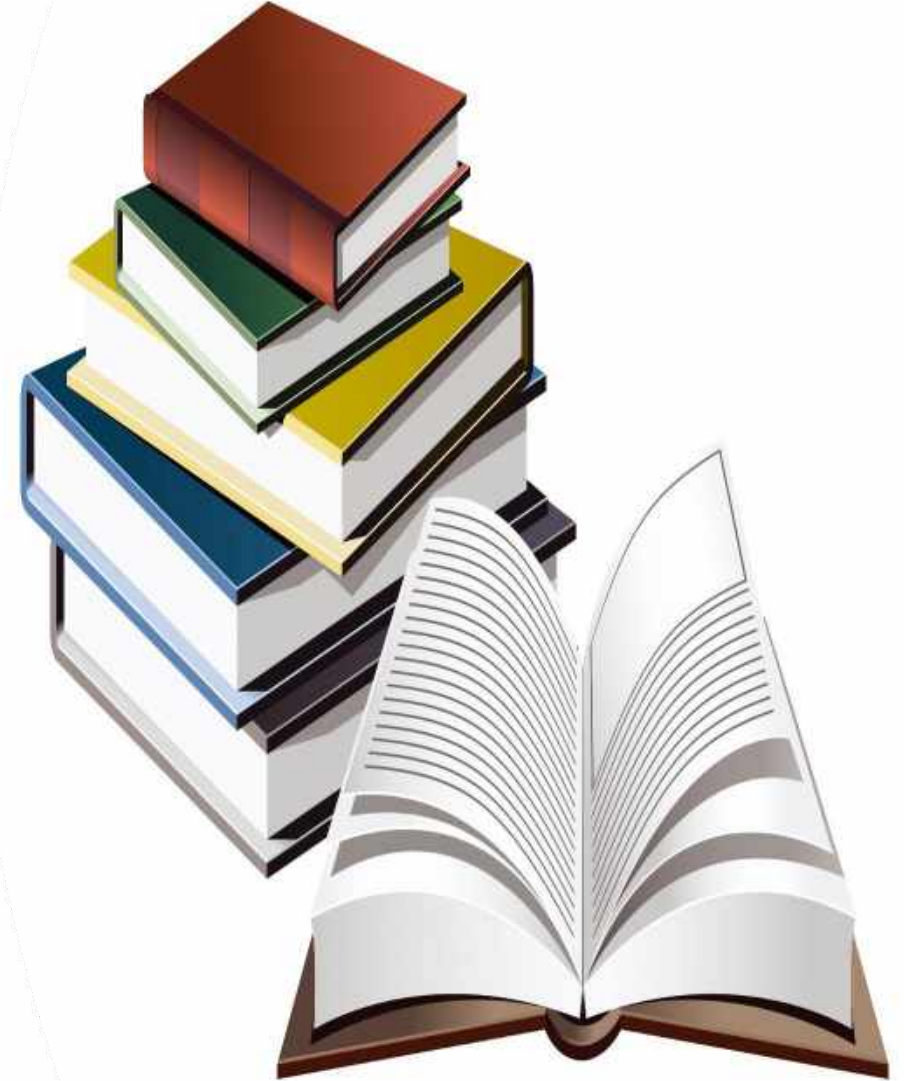
## 1.3 RSA situation in Greece





# RSA in Greece (1/3)

- **EU DIR2008/96** was adopted as national legislation in November 2011.
- **National guidelines for RSA procedures** were set on November 2012.
- **RSA training material** and curriculum was approved on June 2016.
- A **first group** of 30 Road Safety Auditors was trained on December 2018 and certified on April 2019.
- Currently there are **38 certified Road Safety Auditors** in Greece (30 trained and 8 trainers / professors).



# RSA in Greece (2/3)

- Responsibility for **training, certifying and managing the registry** of certified Road Safety Auditors is held by the Greek Ministry of Infrastructure - agency Δ14.
- Besides the Greek Ministry of Infrastructure, Road Safety Audits can also be assigned by **regional road authorities** and/ or road **concessionaires**, with the obligation to inform and cooperate with agency Δ14 for the selection of auditors.





# RSA in Greece (3/3)

## Weak points in the RSA procedures in Greece

- No specific procedure for **forming an RSA team** and/ or **assigning an audit** has been defined yet.
- **Unit prices** for Road Safety Audits (to determine Auditors fee) have not been defined yet.
- Although some RSAs/ RSIs have been performed since 2019 (from regional authorities and or concessionaires, or even private developers), **the pertinent authority (Δ14) has not been involved or even informed.**
- As a result, the registry does not include updated information on the experience of certified auditors.
- Very few RSAs/ RSIs are performed.



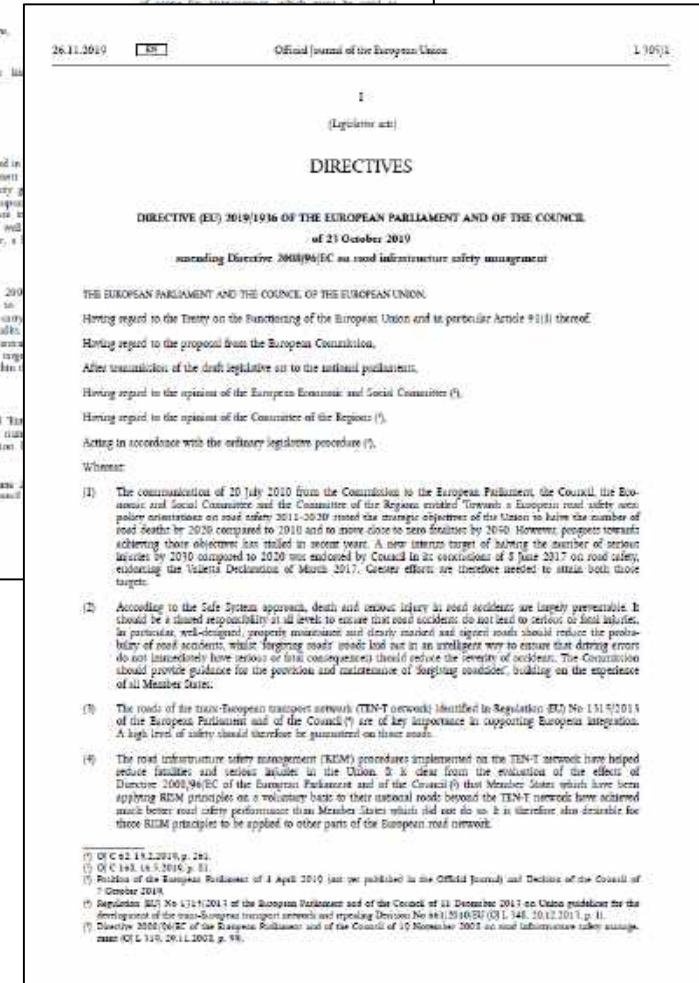
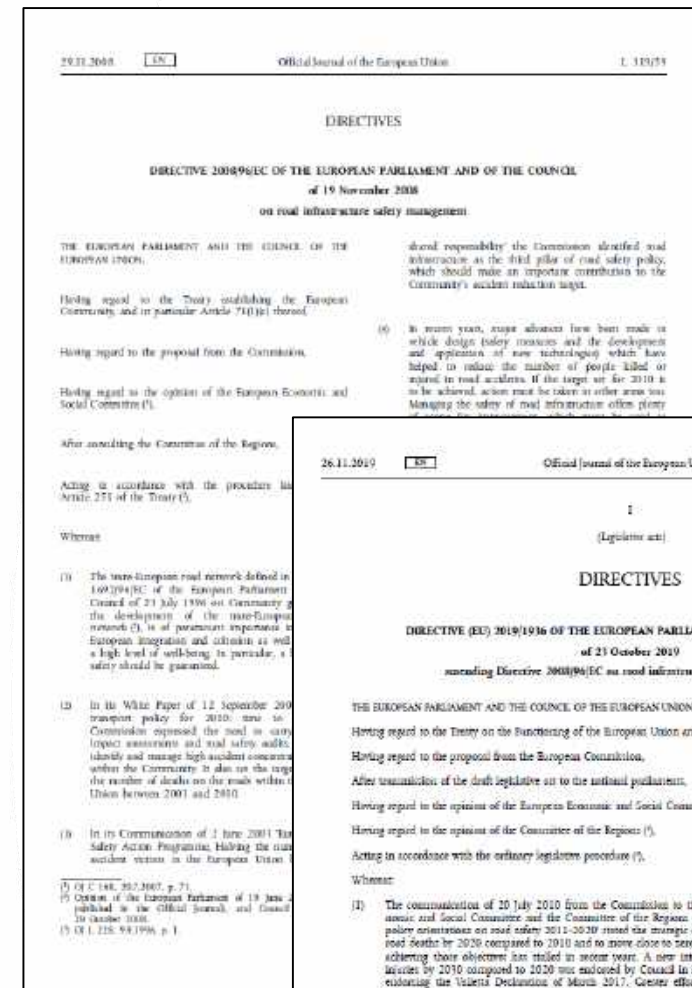
## 2. The new EU DIR 2019/1936





# The new EU DIR 2019/1936

- **EU DIR2008/96** on **Road Infrastructure Safety Management** (RISM) defined procedures relating to:
  - road safety impact assessments,
  - road safety audits,
  - the management of road network safety, and
  - safety inspections.
- **EU DIR2019/1936** comes to amend and improve Directive 2008/96/EC on road infrastructure safety management, by:
  - extending the scope,
  - introducing new procedures,
  - focusing on VRUs,
  - considering new technologies,
  - encouraging follow-up activities.
- Adoption in Member States legislation by **17 December 2021**



## 2.1 Road Infrastructure Safety Management (RISM) concepts





# Road Infrastructure Safety Management

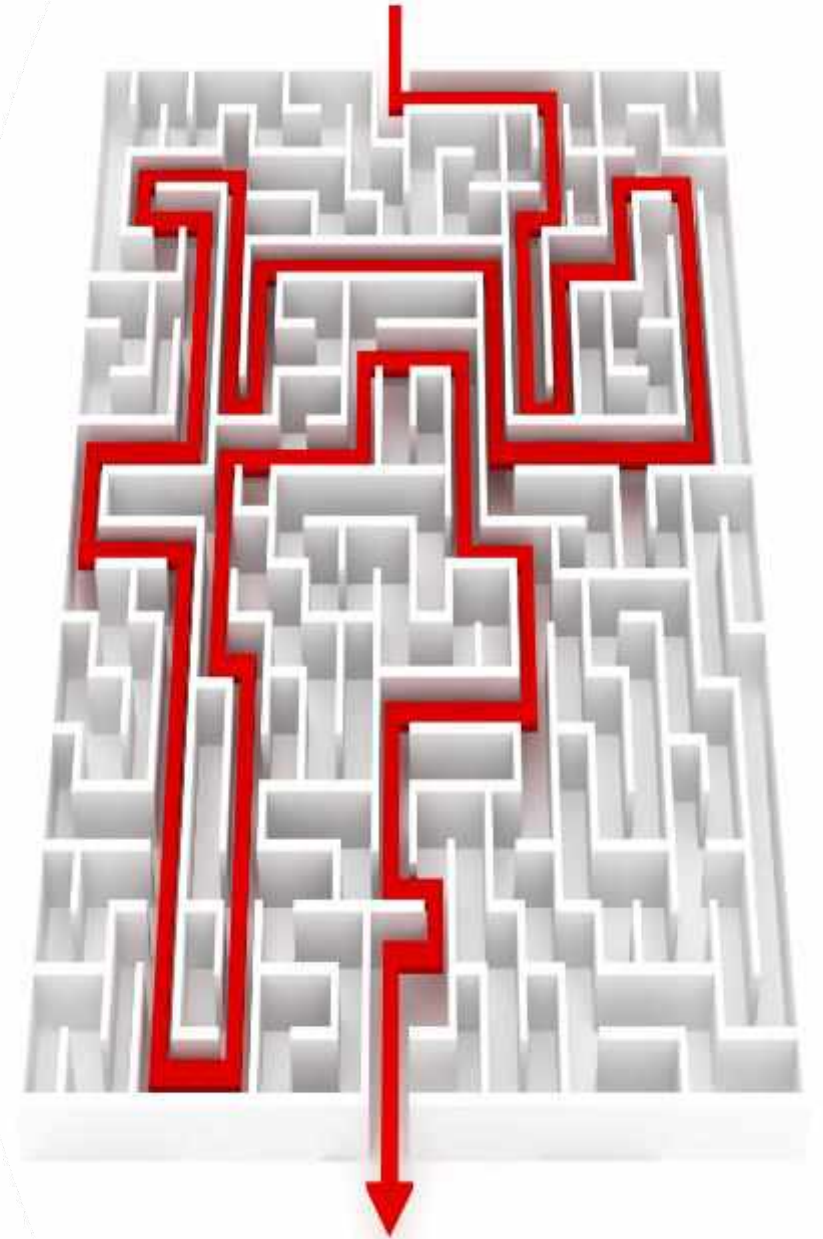
- The **Road Infrastructure Safety Management (RISM)** is defined as:

the total procedures supporting the road infrastructure management authorities to prevent future road accidents and/or to limit their consequences.



# Not all procedures are easy to be implemented

- Terminology
  - e.g. Black Spot? Hazardous Location? High Risk Site?
- Implementation Area
  - Where and when?
- Requirements
  - What tools and data are needed?
- Other barriers...
  - Why they are not used?

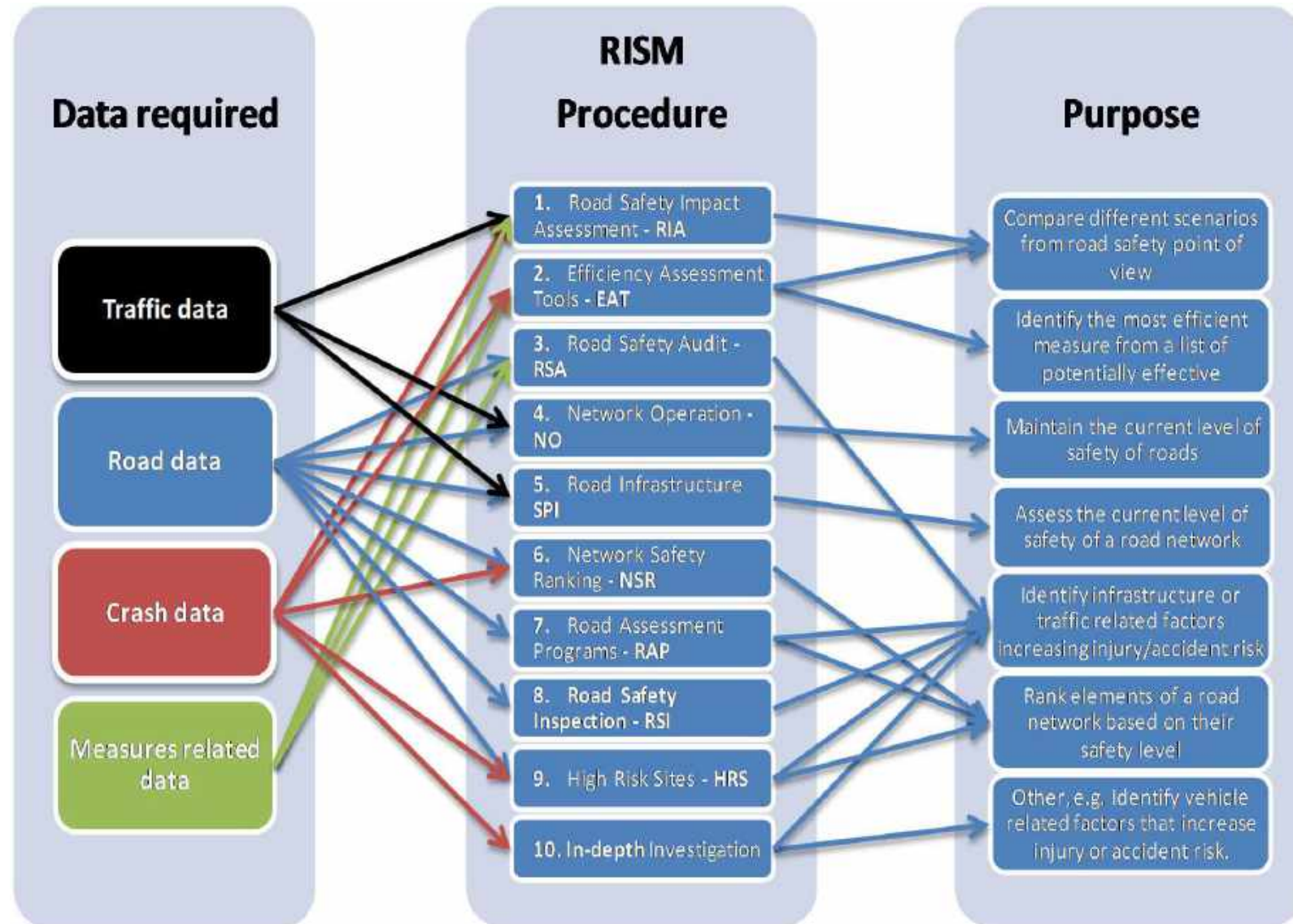


# Targets of RISM Procedures

- **Assessment of the results** of specific road safety measures or programs.
- Early identification of **new road safety problems**.
- Identification of the **most hazardous parts** of the road network.
- Identification of the **most significant contributors** to road accidents and injuries.



# Road Infrastructure Safety Management Procedures





# Stage 1: Planning & Design

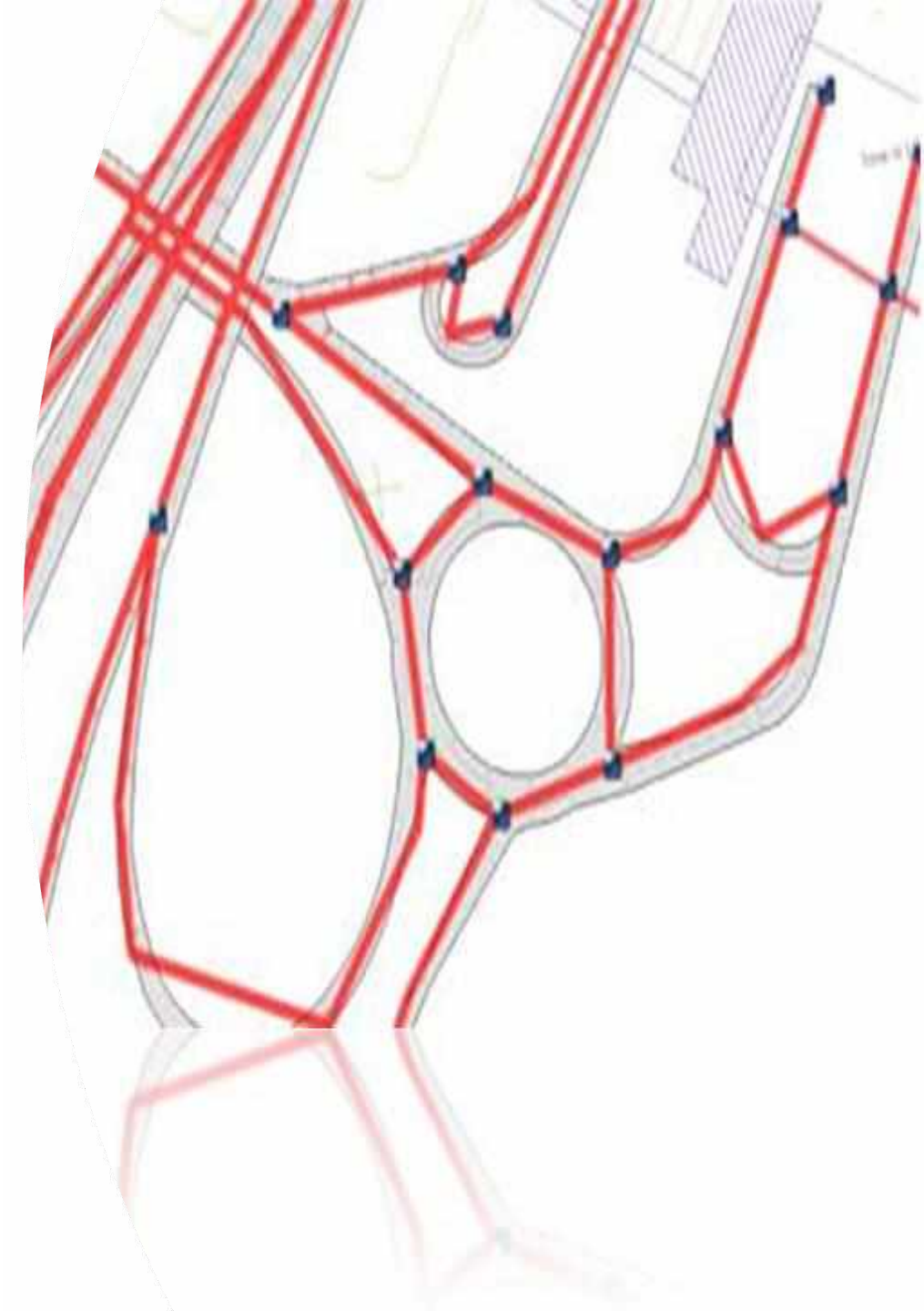


- Road Safety Impact Assessment (RIA)
- Road Safety Measures Efficiency Assessment Tools (EAT)
- Road Safety Audit



# Road Safety Impact Assessment

- A RIA is a methodology used at the planning stage to assess changes in the network safety level resulting from the introduction of a **modification in the road network configuration or operation**.
- It requires the **estimation of the safety level** of a part of the road network.
- Its aim is to **compare different implementation scenarios** from road safety point of view.



# Road Safety Measures Efficiency Assessment Tools

- **Economic resources** for transport in general and for road safety in particular should be distributed in the most efficient way.
- The tools for measuring the efficiency of measures (e.g. cost-benefit analysis) determine the **social benefit of an investment** in order to set the appropriate priorities.
- The aim is to compare different scenarios from road safety point of view and **identify the most efficient measure** from a list of potentially effective measures.
- Applied at the **planning stage** and before a major upgrading of the infrastructure.



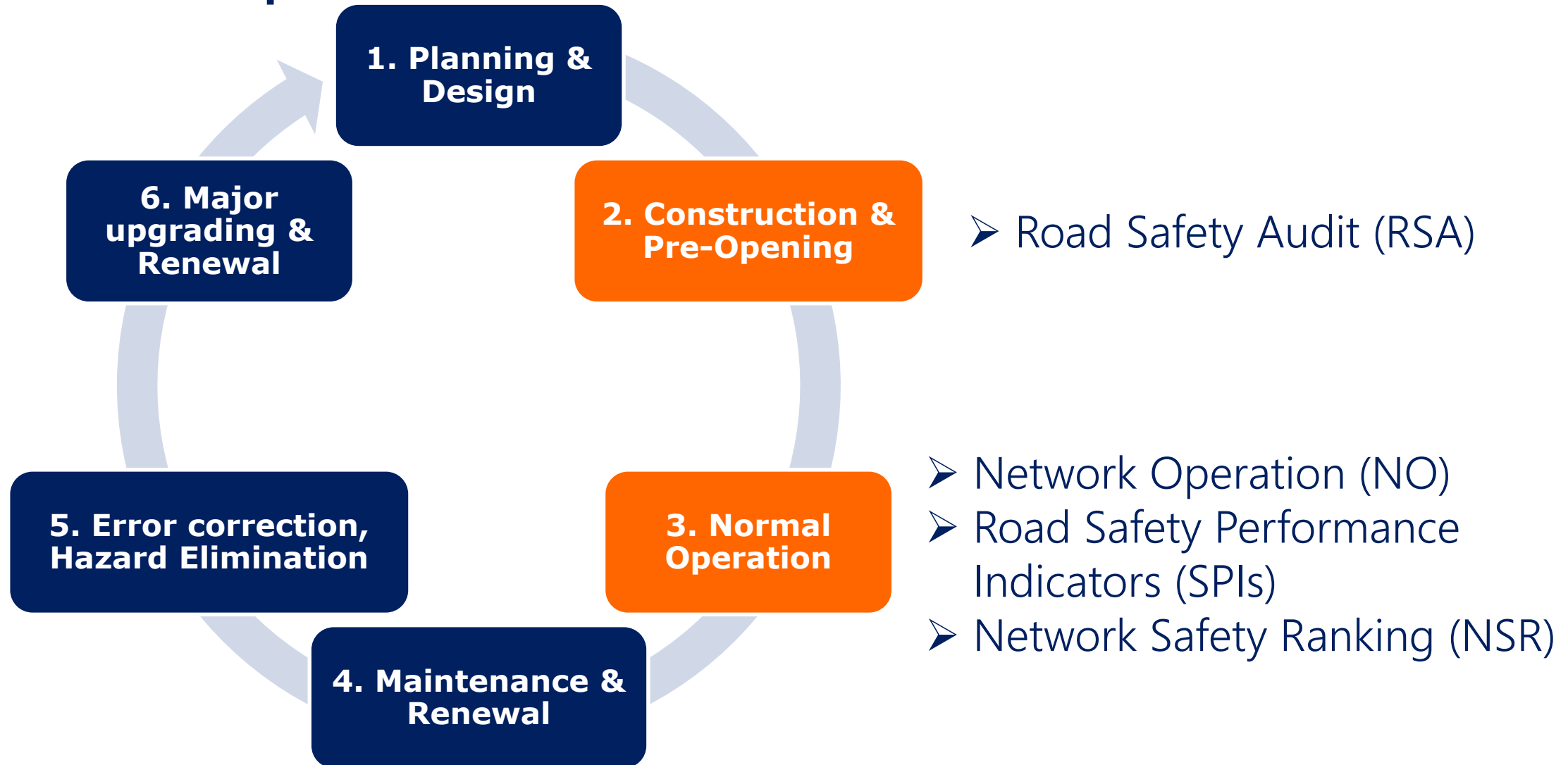
# Road Safety Audit

- A Road Safety Audit (RSA) is commonly defined as a **safety check of an infrastructure project**, be it a new (section of) road or an intersection, or a substantial modification to the existing network, covering all stages from planning until the initial operation.
- A RSA is a **formal, detailed and systematic process** that should be carried out by an independent and well-trained auditor (or team of auditors).
- Its aim is to identify **infrastructure or traffic related factors** increasing injury or accident risk.
- **Undertaken** during planning, design, construction, pre-opening and early operation stages.





# Stage 2: Construction & Pre-Opening & Stage 3: Normal Operation



# Network Operation

- Gradual change in **infrastructure and / or traffic characteristics**, with consequences on road safety.
- Information on **scheduled or unscheduled events** that may increase the risk level on the road network.
- The aim of NO is to **maintain the current level of safety** of roads.
- Undertaken during **normal operation** of a road and during maintenance.



# Road Safety Performance Indicators

- The purpose of **SPIs** is to assess risk factors related to road infrastructure at two levels:
  - the road network level and
  - the road design level (e.g. percentage of road network not meeting design requirements).
- The **safety performance** of the existing road network during normal operation of the infrastructure is monitored.



# Network Safety Ranking

- NSR is a systematic **road safety ranking and management** approach at the level of road networks.
- Generally undertaken during **normal operation** of the road network.





# Stage 4: Maintenance & Renewal



- Network Operation (NO)
- Road Safety Inspection (RSI)
- Road Assessment Programme (RAP)



# Road Safety Inspection

- Regular, systematic, **on-site inspection of existing roads** covering the whole road network.
- RSI aims to identify **potentially hazardous conditions** and deficiencies that can result in severe accidents.
- Generally undertaken during **normal operation** of a road and may also contribute to error correction and hazard elimination



# Road Assessment Programme

- A process for the **assignment of a score to a road section** based on the existence or the absence of essential design features related to road safety.
- **Applies** to the whole or part of the road network.
- Generally undertaken for **identification and correction of errors** on the road infrastructure.



# Stage 5: Error correction, Hazard Elimination



- High-Risk Site Treatment (HRS)
- Road Safety Inspection (RSI)
- Road Assessment Programme (RAP)
- In-Depth Investigation





# High-Risk Site Treatment

- Specific road sections where the number of accidents is **remarkably high**.
- The approach of high risk sites is based on the perception that, in specific sections of the road network, there is a **combination of factors** leading to an increased number of accidents.



# In-Depth Investigation

- The In-depth Investigation concerns the collection of all necessary data and the **identification** of one or more of the following:
  - the cause(s) of an accident,
  - the injuries, the way they were caused and their results,
  - how accidents and injuries could have been prevented.
- Undertaken to identify and remove safety issues emerging from the **interaction** between human factors and infrastructure.

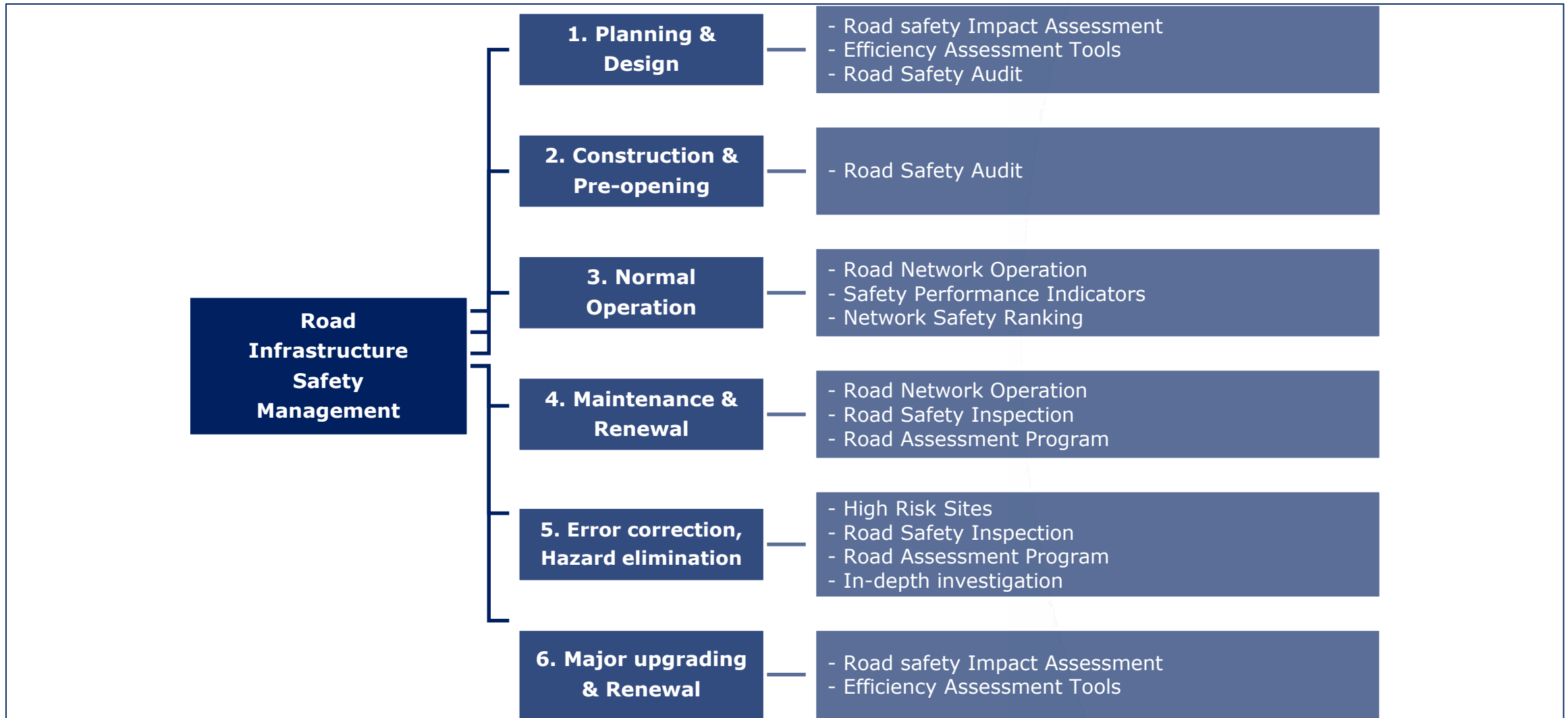


# Stage 6: Major upgrading & Renewal

- Road Safety Impact Assessment (RIA)
- Road Safety Measures Efficiency Assessment Tools (EAT)



# Putting it all together





## 2.2 Changes in RISM procedures



# Extension of scope

- **EU DIR2008/96**: Roads which are part of the trans-European road network.
- **EU DIR2019/1936**: Roads which are part of the trans-European road network, plus:
  - motorways,
  - other primary roads (to be further analyzed),
  - roads outside urban areas, not serving bordering properties and are completed using EU funding.

Also clarified that in the scope of DIR2019/1936 are:

- road sections (fulfilling the above criteria) on bridges and in tunnels, except those covered by DIR 2004/54/EC,
- entries and exits to parking areas along the network within scope.





# Scope with regards to primary roads

- **Primary roads** are roads outside urban areas that connect major cities or regions or both, belonging to the highest category of road below the category "motorway" in the national road classification.
- Each Member State will prepare a list of **motorways and primary roads** and notify EC by 17 December 2021.
- A primary road can be **exempted** from scope if it has a low risk, based on traffic volumes and accident statistics.



# Road Safety Inspections

- RSIs in **DIR2008/96** refer to periodic inspections, mostly maintenance related.
- **DIR2019/1936** introduces the **targeted RSI**, as a "targeted investigation to identify hazardous conditions, defects and problems that increase the risk of accidents and injuries, based on a site visit of an existing road or section of road.

An indicative high-level checklist for RSIs has been included in the Annex

- It is now clarified that periodic RSIs are maintenance related.





# Network-wide road safety assessment

- The concept of **network-wide road safety assessment** has replaced the procedure of "ranking of high accident concentration sections and network safety ranking", described in EU DIR2008/96.
- EGRIS (Expert Group on Road Infrastructure Safety) - Sub Group SG2 is supporting the EC in this procedure.

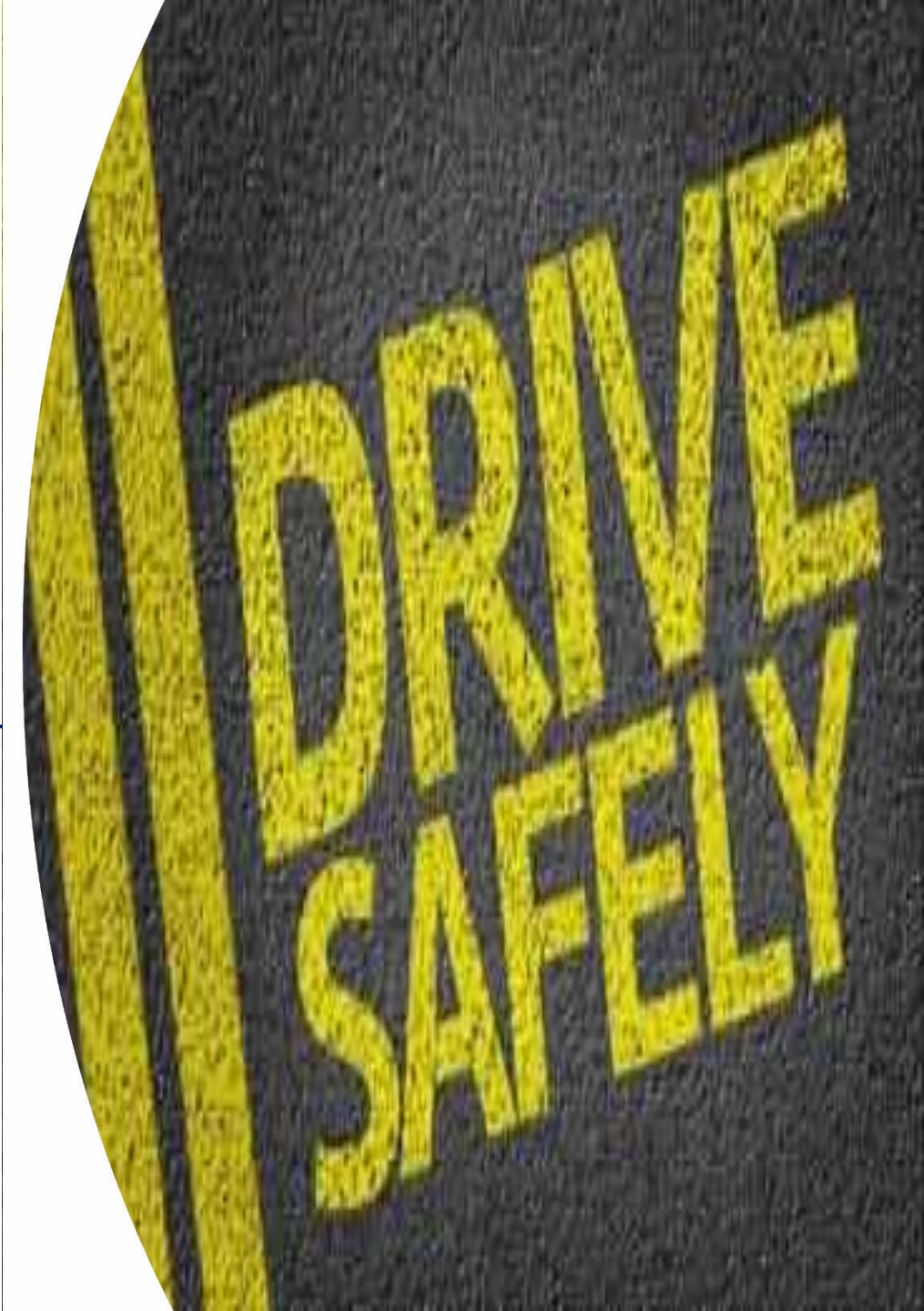
[https://circabc.europa.eu/ui/group/e888bb1c-5246-4c08-add8-ff6f946e9080/library/3f7ba987-33c7-4664-a0d8-4514eaec78fe?p=1&n=10&sort=modified\\_DESC](https://circabc.europa.eu/ui/group/e888bb1c-5246-4c08-add8-ff6f946e9080/library/3f7ba987-33c7-4664-a0d8-4514eaec78fe?p=1&n=10&sort=modified_DESC)



# Road markings and signs - new technologies

- Common specifications for **road markings and signs** are to be developed, to ensure effective readability and detectability of road markings and road signs for human drivers and **automated driver assistance systems**.
- EGRIS (Expert Group on Road Infrastructure Safety) - Sub Group SG1 is supporting the EC in this procedure.

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# Provision for VRUs

- Guidance on **quality requirements regarding vulnerable road users** to be developed by the EC in cooperation with Member States.
- Specific items regarding VRUs have been added in the high-level **checklists** included in the Annexes of the Directive.



# Other additions in the Directive

- Guidance for the design of “**forgiving roadsides**” and **self-explaining and self-enforcing roads** to be developed by the EC in cooperation with MS
- EGRIS (Expert Group on Road Infrastructure Safety) - Sub Group SG3 is supporting the EC in this procedure.

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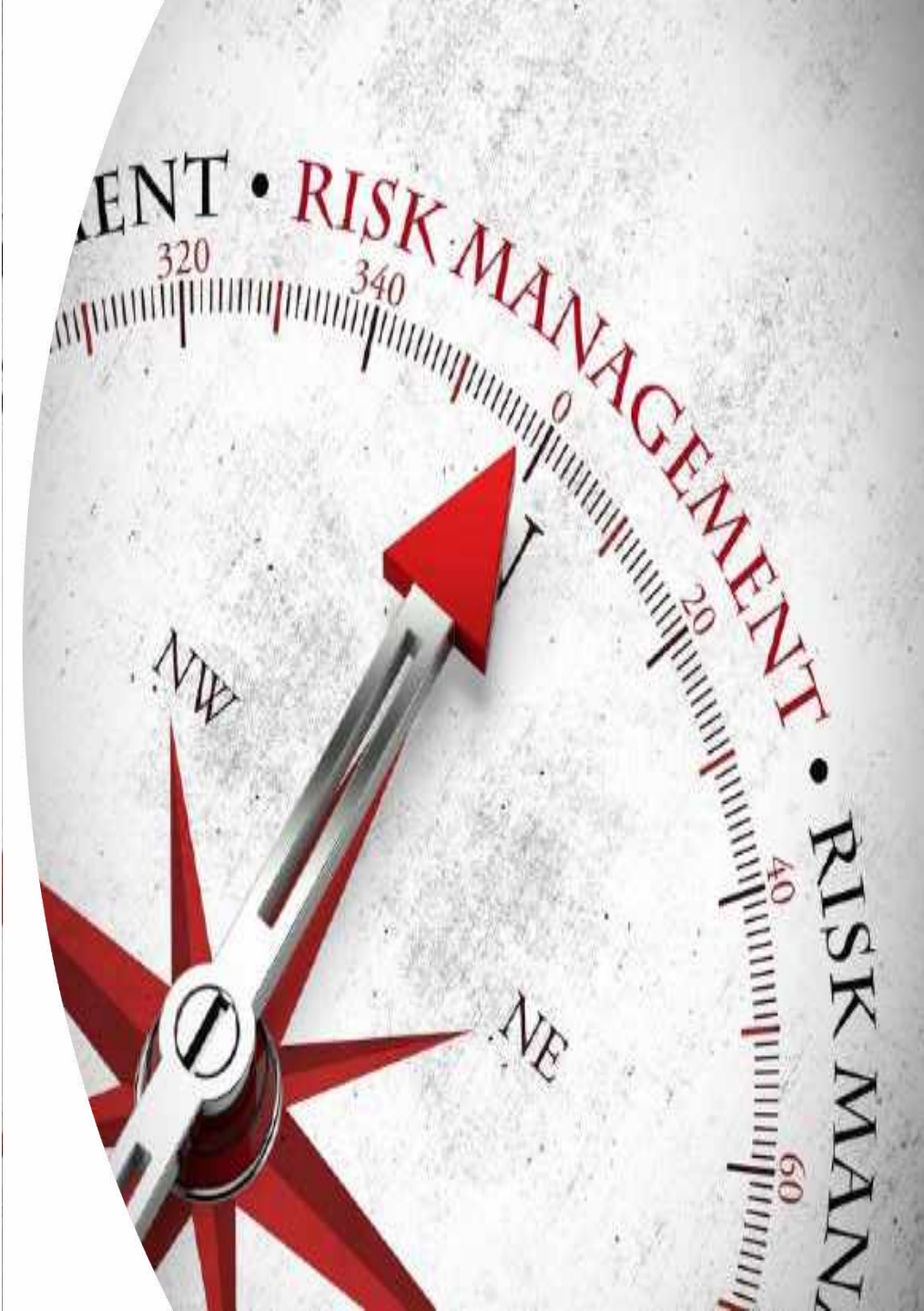
# Other additions in the Directive

- For sections of the road network within scope of DIR2019/1936 adjoining road tunnels covered by Directive 2004/54/EC, **joint road safety inspections by road safety auditors and tunnel experts** will be performed, at least every six years.
- **Follow-up procedures** are described, to encourage remedial actions on identified problems.
- A system for **exchange of information and best practices** between the Member States is to be established by the EC.



# Amendment of Annexes

- Annexes of DIR2019/1936 include **high-level checklists** for:
  - Road Safety Impact Assessments
  - Road Safety Audits
  - Targeted Road Safety Inspections (*new*)
  - Network-wide Road Safety Assessments (*new*)
  - Accident information contained in accident reports
- All Annexes have been revised, and new items have been added.





## 2.3 Network-wide road safety assessment



# Concept (1/2)

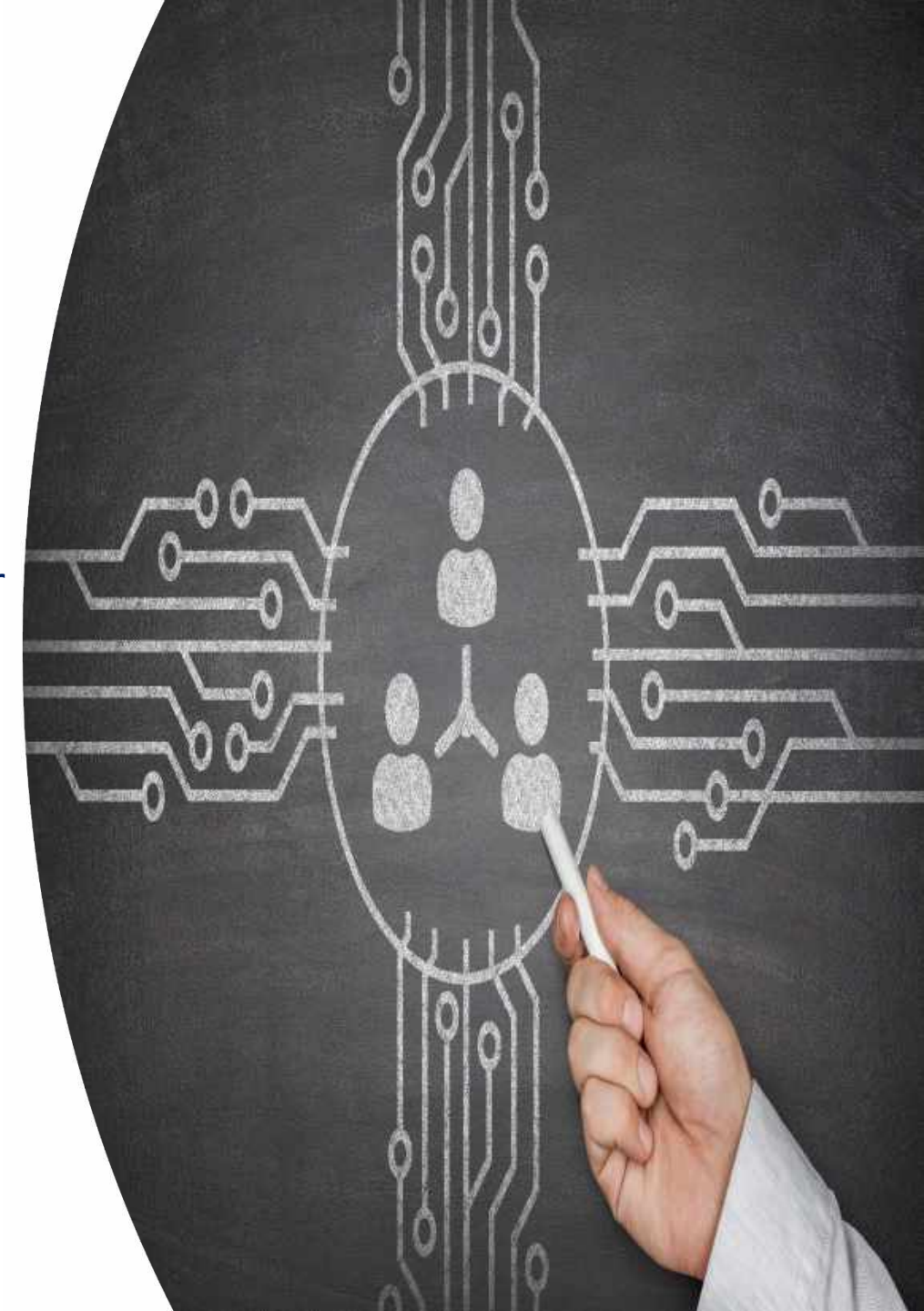
- Network-wide road safety assessments shall evaluate **accident and impact severity risk**, based on:
  - primarily, a visual examination, either on site or by electronic means, of the **design characteristics of the road** (in-built safety); and
  - an analysis of sections of the road network which 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.





# Concept (2/2)

- Combines **proactive** analysis (in-built safety) and **reactive** analysis (sections with large number of accidents).
- On the basis of the results of the assessment and for the purpose of prioritization of needs for further action, Member States shall **classify** all sections of the road network in no fewer than **three categories** according to their level of safety.



# Purpose of Network-wide Road Safety Assessment

- To **identify** sections of the network that should be targeted by detailed road safety inspections (RSI)
- To **prioritize investment** according to its potential to deliver network wide safety improvements
- To **classify** all sections of the road network in no fewer than 3 categories according to their level of safety (ranking NSR)
- To **inform**: Commission to publish a map of the European road network with ranking



# Indicative Elements (Annex III)

1. General (type of road, area, land use, etc.)
2. Traffic volumes
3. Accident data
4. Operational characteristics (speed limit, schools, IRS, etc.)
5. Geometric characteristics (curvature, cross sections, visibility, alignment, etc.)
6. Objects, clear zones and road restraint systems
7. Bridges and tunnels
8. Intersections
9. Maintenance
10. Vulnerable road users' facilities
11. Pre/post crash systems for traffic injury mitigation



# Methodology (1/3)

- According to EU DIR2019/1936, "The Commission shall provide **guidance on the methodology** for carrying out systematic network-wide road safety assessments and safety ratings".





# Methodology (2/3)

- The Commission has assigned a Consulting Consortium to carry out the "**Study on a Methodology for Network-wide Road Safety Assessment**"
  - National Technical University of Athens (NTUA)
  - Faculty of Transport and Traffic Sciences of University of Zagreb (FPZ)
  - FRED Engineering (FRED)
- The methodology development involves extensive **consultation** with:
  - the Commission,
  - Member States authorities,
  - key stakeholders (CEDR, ASECAP, EuroRAP, etc.),
  - EGRIS SG2.



# Methodology (3/3)

## ➤ Preparatory Phase

- Inventory of practices in EU MS & worldwide

## ➤ Phase I - Conceptual work

- Evaluate accident and impact severity risk based on
  1. Design characteristics of the road (in built safety) —“ex ante”
  2. Analysis of road sections with large number of serious accidents —“ex post”
- Integrated methodology results of “ex ante” + “ex post”; classification  $\geq 3$  categories

## ➤ Phase II - Deployment

- Supporting study: assessing 30 50km in each MS



# Timeline & Implications for Road Safety Auditors

- Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with EU DIR 2019/1936 by 17 December **2021**.
- Methodology development to be finished (including pilot deployment) by early **2023**.
- Member states to carry out network-wide road safety assessments by **2024** at the latest. Subsequent at least every five years.







SLOVENIAN  
TRAFFIC SAFETY  
AGENCY

Lecture at periodical RSA training courses

Ljubljana, September 16th 2020

# Update on Road Safety Audit practices in the European Union and internationally

**Anastasios Dragomanovits**

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Road Safety Auditor



Department of Transportation Planning and Engineering  
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