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TECHNICAL ASSISTANCE FOR THE CAPACITY BUILDING OF KGM FOR THE ROAD INFRASTRUCTURE SAFETY MANAGEMENT IN TURKEY

EUROPEAID/140089/IH/SER/TR

WORKSHOP FOR STAKEHOLDERS

Activity 1.8

17,18 January 2023

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Agenda

- Welcome
- Objective of the Project
- Strategy and Policy Framework of Türkiye
- Road Safety and Safe System Approach
- RISM Directives and Components

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Agenda

- Harmonisation of RISM Acquis
- Questionnaire
- Questionnaire Results
- Discussion on Contribution of Stakeholders
- Questions and Answers
- Concluding and Closing Remarks

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Project Synopsis

Project Name*:	**Technical Assistance for the Capacity Building of KGM for the Road Infrastructure Safety Management in Turkey**
Contract Number:	TR14SR102
EuropeAid Number:	EuropeAid/140089/IH/SER/TR
Implementation Period:	24 months
Contract Budget:	2.078.880 EUR
Provision for Expenditure Verification:	12.000 EUR

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SECTORAL OPERATIONAL PROGRAMME FOR TRANSPORT

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Objective of the project

- To improve safety in transport, provide safer service in road network and develop institutional capacity to operate this system effectively and efficiently
  - To harmonize Turkish legislation with Directive 2008/96/EC as amended by 2019/1936/EC
  - To enhance and strengthen capacity at KGM to implement road infrastructure safety management (RISM)

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Objective of the Workshop

- To inform about the RISM directives that will contribute to the improvement of road traffic safety
- To inform about the findings and recommendations prepared for the harmonization studies carried out in Türkiye within the scope of this project,
- To inform about the legislations and guidelines, prepared for the harmonization studies
- To receive the opinions, suggestions and support of the road safety stakeholders

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The Directives

Directive 2008/96/EC of the European Parliament and of the Council of 19 November 2008 on road infrastructure safety management

as amended by:

Directive 2019/1936/EU of the European Parliament and of the Council of 23 October 2019 amending Directive 2008/96/EC on road infrastructure safety management

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Rationale for the project

- Road Infrastructure Safety Management is one of the elements to achieve the target of a 50% reduction in road casualties in this decade,
- It is a systematic approach, to make road and its environment safer for all road user, consists of tools focusing on different stages of project life cycle,
- Represented by Directive 2008/96/EC as amended, which is now being transposed in Türkiye by KGM.

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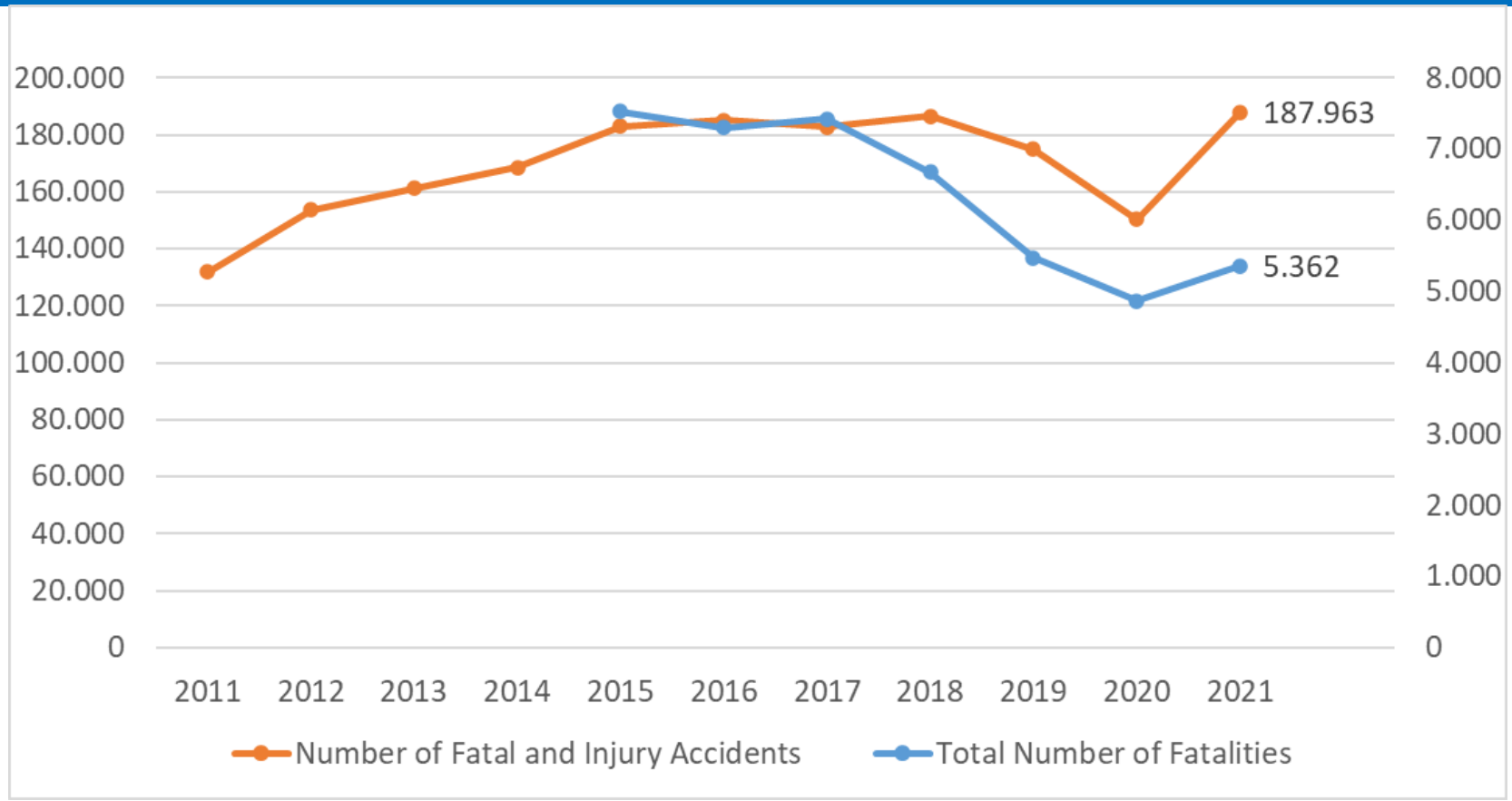
Long term road safety trend in Türkiye



Source: Traffic Accidents Summary, KGM, 2022

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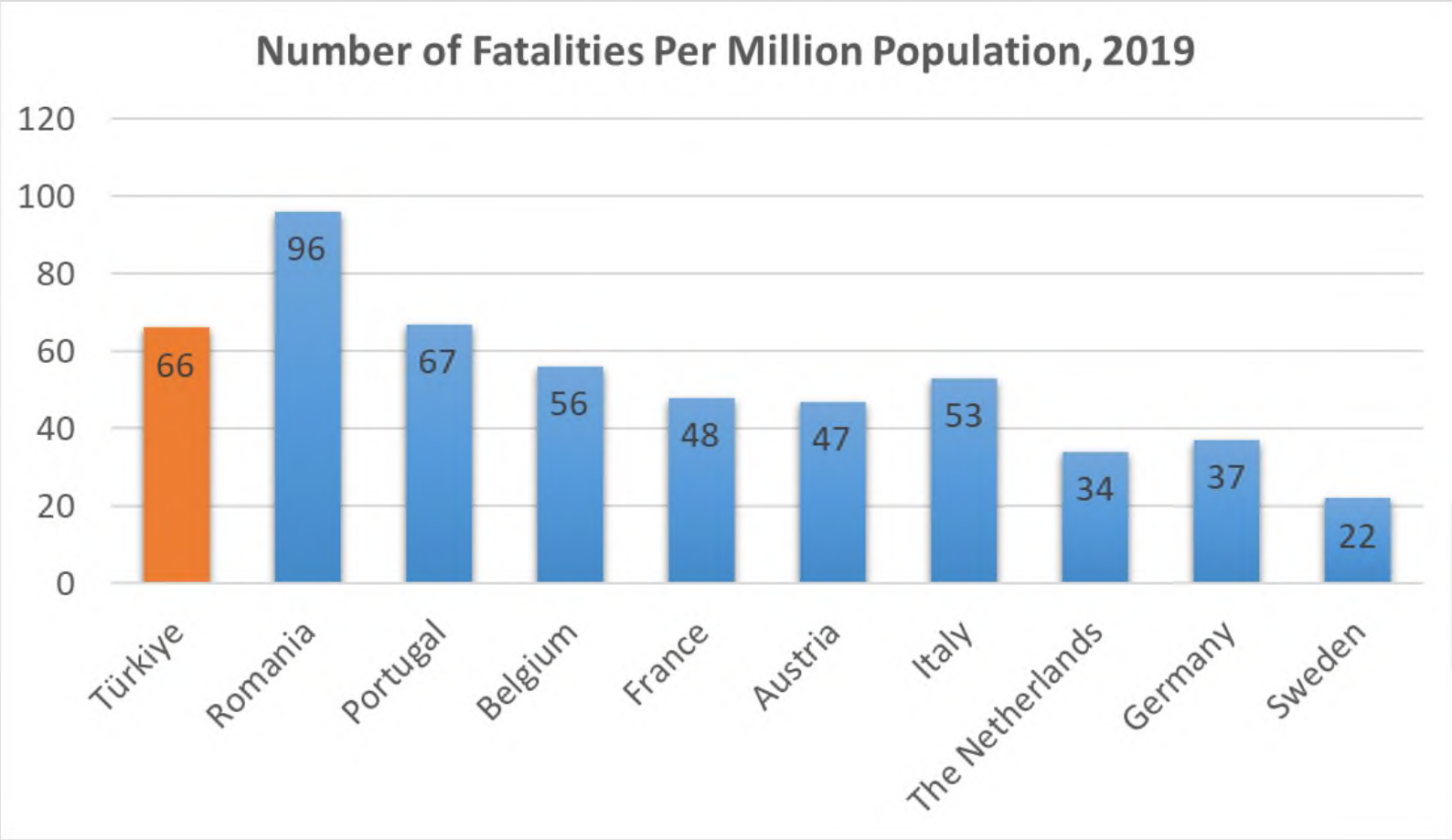
Comparison with other countries



Source: Traffic Accidents Summary, KGM, 2019& 2022

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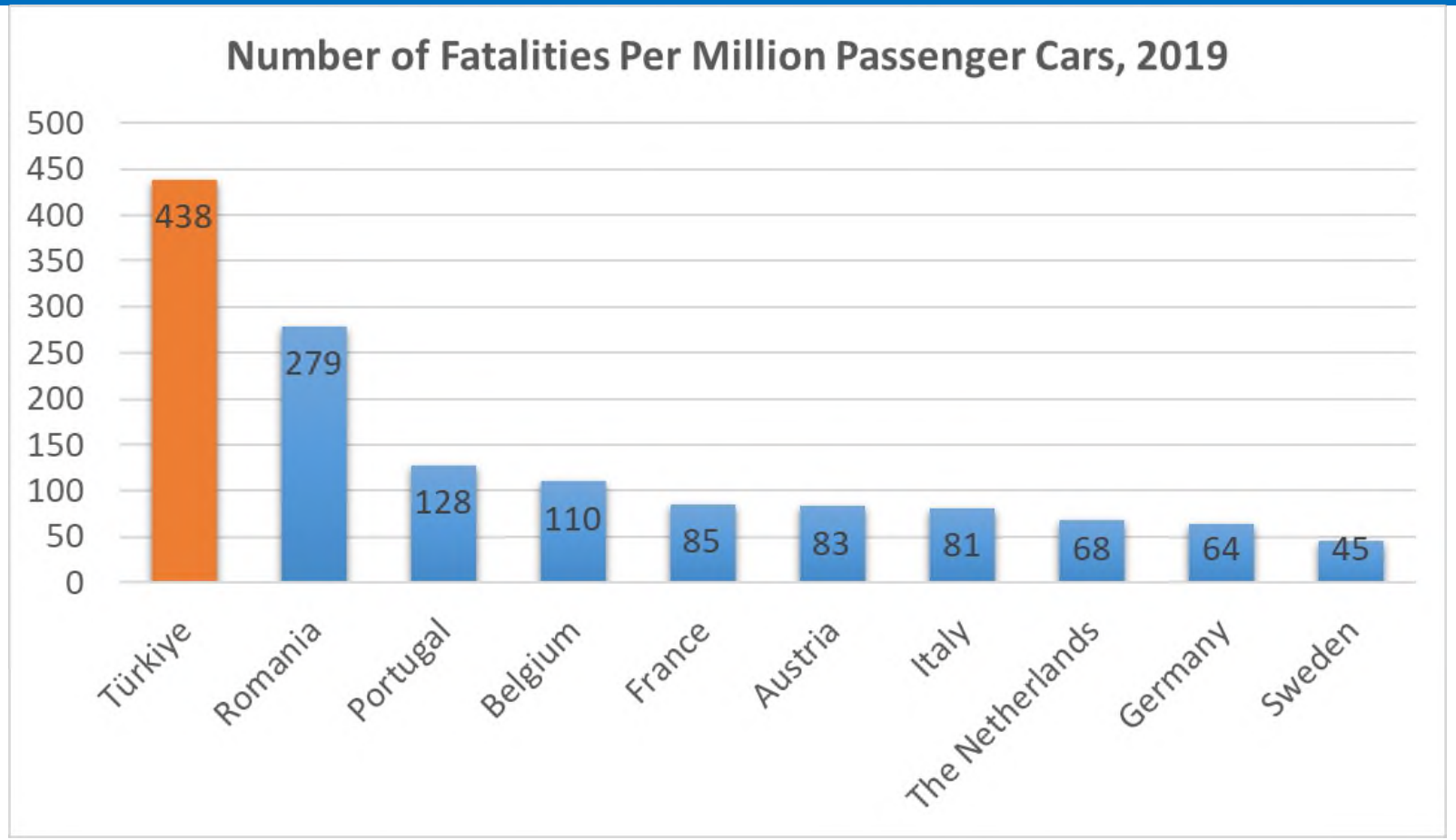
Comparison with other countries



Source: Traffic Accidents Summary, KGM, 2019 & 2022

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Scale of the road safety issue

- Approximately 15 persons lose their lives and 752 persons are injured daily due to traffic crashes
- 7.4 traffic crashes involving death or injury per thousand vehicles
- 68.9% of traffic crashes involving death or injury occurs at day-time
- Traffic crashes involving death or injury occur in July most and in February least
- 50.5% of traffic crashes involving death or injury are two vehicle crashes and 43.6% are single vehicle crashes
- Among the total number of persons killed, 54.8% is at single vehicle crashes

Source: TUIK, 2022

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Strategy & policy framework - Türkiye

- Key documents:
  - National Development Plans,
  - Annual Presidency Programs,
  - 12th Transport and Communication Forum,
  - **2021-2030 Highway Traffic Safety Strategy Document**
  - 2021-2023 Road Safety Action Plan
  - Accessible Transport Strategy and Action Plan for 2021-2025
  - **2019-2023 Strategic Plan of the General Directorate of Highways.**

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11th Development Plan 2019-2023

- Although the geometric and physical standards of highways have been improved, the need to improve road traffic safety remains important (paragraph 146)
- The Safe System Approach, which assumes that road users would make errors and considers road safety as a common responsibility of all actors in the traffic system, will be adopted and institutional structure will be established accordingly (paragraph 512.1)

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2021-2030 Highway Traffic Safety Strategy

Traffic Safety Vision;
TÜRKİYE, where no loss of life and serious injuries happen due to traffic accidents

Objective: increasing traffic safety

«The main target of the Strategy Document for 2030 is reducing the loss of lives and serious injuries by 50% compared with the 2020 level »

«The 2050 target: a country where no road user is subjected to loss of life and serious injury»

Intervention 2: "Infrastructure; Road and Road Environment" by enhancing the safety standards of the infrastructure, road and road environment

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2021-2023 Road Safety Action Plan

- The Road Safety Action Plan 2021-2023 is an integral part of the Road Safety Strategy Document 2021-2030.
- The Action Plan has been prepared to elaborate on the strategic objectives and targets specified in the Road Safety Strategy 2021-2030,
- The Action Plan sets forth steps to be taken and activities to be carried out between 2021 and 2023. The Action Plan follows:
  - Safe System Approach,
  - Vision Zero

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Strategic Plan of KGM 2019-2023

- **Aims**
  - Improving road safety on the highway network
  - Building and developing safe and comfortable highways to meet the increasing demand for freight and passenger transportation
  - Ensuring the preservation, improvement and management of the highway network
  - Increasing the institutional capacity
  - Reducing environmental impacts, increasing energy efficiency and protecting historical and cultural assets

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What is road safety ?

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Perceptions

A starting question for discussion

What are three words you associate with road (un)safety?

- x
- y
- z

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Defining Road Safety

Some definitions

(Road accident) - **collision, crash**

An unplanned event in road traffic which a loss or injury occur

Objective traffic unsafety: collisions, crashes

+ social consequences (damage + associated costs)

Subjective traffic unsafety: perception, threat posed by danger in traffic

+ social consequences (negative perception fear...,

avoidance of moving around)

(based on SWOV)

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Defining Road Safety

Some definitions

Safety (two approaches, definitions)

- ✓ = absence of danger
- ✓ acceptable degree of risk

Risk = existing or potential set of conditions that could result in a crash

Lack of road safety (unsafety)

- ✓ presence of danger in traffic
- ✓ unacceptable degree of risk in traffic

(based on SWOV)

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Defining Road Safety

Some definitions

Risk = existing or potential set of conditions that could result in a crash

How to measure risk (of e.g. motorways?)

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Defining Road Safety & Risk

Some definitions

Risk = existing or potential set of conditions that could result in a crash

How to measure risk (of e.g. motorways?)

- **crash frequency:** number of crashes per vehicle kilometer travelled
- **injury frequency:** number of crashes with personal injury per vehicle kilometer travelled
- **crash density:** number of crashes with personal injury per kilometer of road

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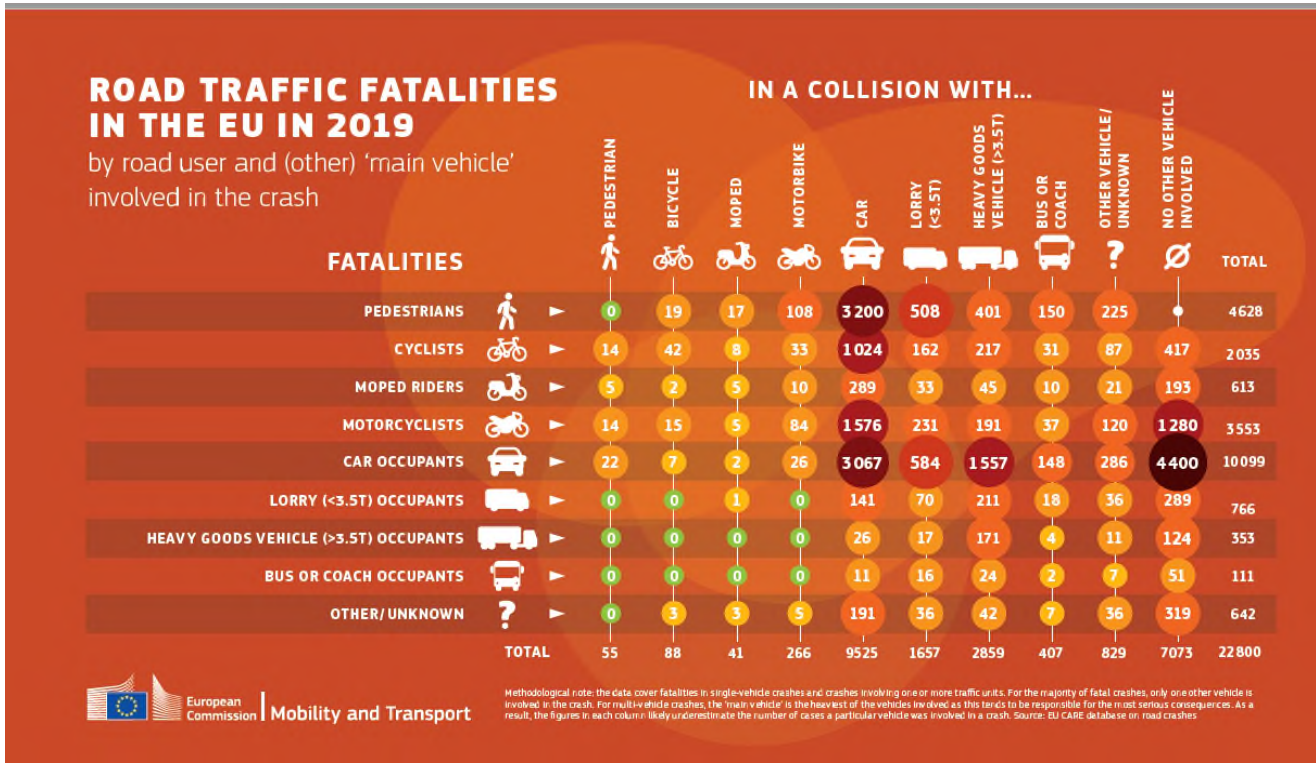
Road safety data

Need but also danger of focus (only) on victims

- need of collision matrix

The EC published a breakdown of fatalities in the EU by road user and (other) “main vehicle” involved in the crash. The matrix shows clearly that fatalities overwhelmingly occur in collisions involving cars and trucks, and the need to increase the protection of vulnerable road users such as pedestrians and cyclists.



ROAD TRAFFIC FATALITIES IN THE EU IN 2019

by road user and (other) ‘main vehicle’ involved in the crash

FATALITIES	IN A COLLISION WITH… PEDESTRIAN	BICYCLE	MOPED	MOTORBIKE	CAR	LORRY (<3.5T)	HEAVY GOODS VEHICLE (>3.5T)	BUS OR COACH	OTHER VEHICLE/ UNKNOWN	NO OTHER VEHICLE INVOLVED	TOTAL
PEDESTRIANS	0	19	17	108	3 200	508	401	150	225	•	4628
CYCLISTS	14	42	8	33	1 024	162	217	31	87	417	2035
MOPED RIDERS	5	2	5	10	289	33	45	10	21	193	613
MOTORCYCLISTS	14	15	5	84	1 576	231	191	37	120	1 280	3553
CAR OCCUPANTS	22	7	2	26	3 067	584	1 557	148	286	4 400	10099
LORRY (<3.5T) OCCUPANTS	0	0	1	0	141	70	211	18	36	289	766
HEAVY GOODS VEHICLE (>3.5T) OCCUPANTS	0	0	0	0	26	17	171	4	11	124	353
BUS OR COACH OCCUPANTS	0	0	0	0	11	16	24	2	7	51	111
OTHER/ UNKNOWN	0	3	3	5	191	36	42	7	36	319	642
TOTAL	55	88	41	266	9525	1657	2859	407	829	7073	22800

European Commission | Mobility and Transport

Methodological note: the data cover fatalities in single-vehicle crashes and crashes involving one or more traffic units. For the majority of fatal crashes, only one other vehicle is involved in the crash. For multi-vehicle crashes, the ‘main vehicle’ is the heaviest of the vehicles involved as this tends to be responsible for the most serious consequences. As a result, the figures in each column likely underestimate the number of cases a particular vehicle was involved in a crash. Source: EU CARE database on road crashes

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Are crashes accidents?

A starting question for discussion

Do you agree?

✓Yes, because…

✓No, because…

✓Other?

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Crashes are no accident

Crashes Are No Accident

UNITED NATIONS MONTENEGRO

United Nations Montenegro

Road traffic injuries are not accidents. They are preventable.

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The Safe System Approach

Safe System Approach principles

Humans Make Errors

Humans are Vulnerable to Injury

Responsibility is Shared

No Death or Serious Injury is Acceptable

Proactive vs. Reactive

https://www.nsc.org/road-safety

https://visionzeronetwork.org

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The Safe System approach

The Safe System approach is a core feature of the UN Decade of Action for Road Safety 2021– 2030

It recognizes that **road transport** is a **complex system** and places **safety at its core**. It also recognizes that humans, vehicles and the road infrastructure must interact in a way that ensures a high level of safety.

This **Global Plan** has been developed by the World Health Organization and the United Nations Regional Commissions, in cooperation with partners in the United Nations Road Safety Collaboration and other stakeholders, as a guiding document to support the implementation of the Decade of Action 2021–2030 and its objectives.

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The Safe System approach

- anticipates and accommodates **human errors**
- incorporates road and vehicle designs that **limit crash forces** to levels that are within human tolerance to prevent death or serious injury
- motivates those who design and maintain the roads, manufacture vehicles, and administer safety programmes to **share responsibility for safety with road users**, so that when a crash occurs, remedies are sought throughout the system, **rather than solely blaming the driver** or other road users

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The Safe System approach

- pursues a commitment to **proactive and continuous improvement of roads and vehicles** so that the entire system is made safe rather than just locations or situations where crashes last occurred
- adheres to the underlying premise that the transport system should produce **zero deaths or serious injuries** and that safety should not be compromised for the sake of other factors such as cost or the desire for **faster transport times**.

GLOBAL PLAN
DECADE OF ACTION FOR ROAD SAFETY
2021-2030

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Self-Explaining Roads (SER)

- aim at delivering a road environment which matches users' expectation and in turn triggers safer behaviour, speed, manoeuvres, and interaction with other users.
- Limiting road types and consistent design elements of layout, road furniture and signing are important concepts of SER.

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Self-Explaining Roads (SER)

Categorization of Roads → Learned Expectations → Driving Behaviour → Fewer Accidents

- Learned Expectations → Road Elements
  - Behaviour of Others
  - Own Behaviour
- Driving Behaviour → Predictable Behaviour
  - Homogenous Behaviour

STATISTICAL LEARNING
DRIVING EXPERIENCE

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Self-Explaining Roads (SER)

- **General Principles of Self Explaining Roads**
  - **Easy Recognisable** (Roads that have the same function, the same speed profile, the same type of road users should look similar)
  - **Easy Distinguishable** (Roads of different categories should look differently. In other words, there should be clear differences in appearance and layout between roads that belong to different road categories)
  - **Easy Interpretable** (It should be clear from the design what the desired behaviour should be on that route. The road characteristics should induce this type of behaviour.)

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Forgiving Roads

Aim to minimize the consequences of driver errors

Either:

- By allowing errant vehicles the opportunity to get back onto to the road to prevent any fatal or serious injury crash by leaving sufficient free space to do so,

Or

- By reducing the severity of outcome in case a vehicle leaves the road

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Forgiving Roads

Provide a Clear/Safe Zone

- Giving enough space to drivers for a recovery manoeuvre to be back to road safely,
- Which is a risk free zone decreasing severity of run-off event in case it occurs

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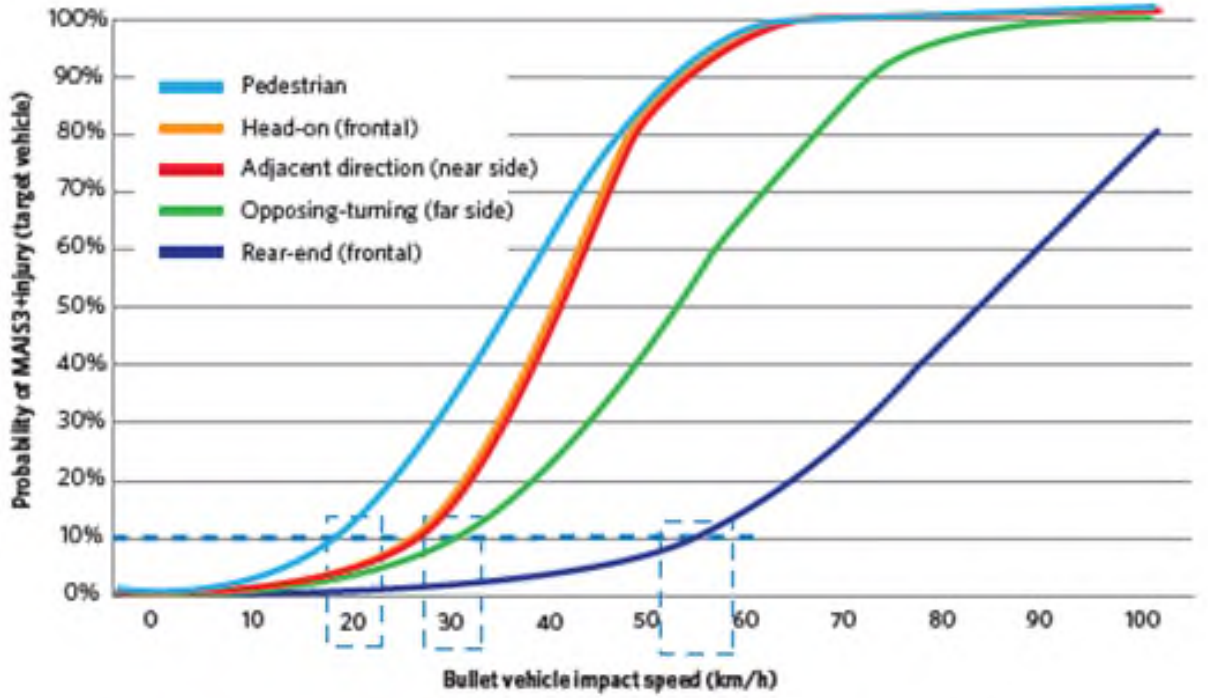
Speed is factor in 1/3 of fatal crashes (Europe average)



Probability of Severe Injury When Struck by a Motor Vehicle. Jurewicz et al, 2016

Severity of a crash is related to (impact) speed

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Stockholm Decleration

New milestone in policy approach of road safety

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Stockholm Declaration

New milestone in policy approach of road safety

Towards a new road safety paradigm

3. the new paradigm: integrated climate policy (incl. quality of life, mobility policy)

2. system safety: vision zero

1. five pillars road safety policy

- Pillar 1: Road Safety Management
- Pillar 2: Safer Fleets
- Pillar 3: Safer Road Users
- Pillar 4: Post-crash Response
- Pillar 5: Safer Driving Environment

Source : C. Tingvall et al., Saving lives beyond 2020, Recommendations Academic Group 3rd Global Ministerial Conference On Road Safety, 2019

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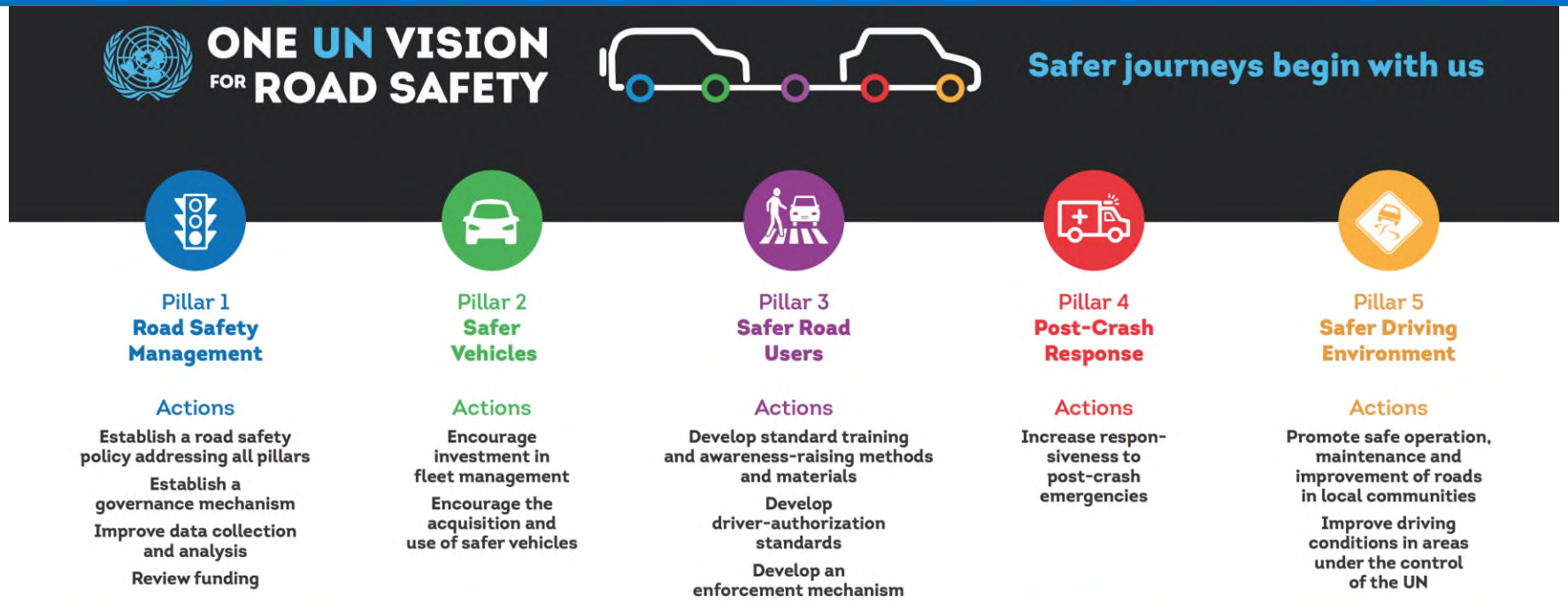
The 5 Pillars and 5 E's



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5 Pillars of Road Safety

Pillar 1 Road safety Management	Pillar 2 Infrastructure	Pillar 3 Safer Vehicles	Pillar 4 Road User Behaviour	Pillar 5 Post Crash Care

1. Lead Agency
2. Accountability by Road Authorities
3. Motor Vehicle Safety Regulations
4. Road Safety Risk Factors
5. Trauma Care - Crash Scene to Rehabilitation

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5 Pillars of Road Safety

Pillar 1 Road safety Management	Pillar 2 Infrastructure	Pillar 3 Safer Vehicles	Pillar 4 Road User Behaviour	Pillar 5 Post Crash Care

- The 5 Pillars are the cornerstone of the ’Safe System Approach’,
- The Safe System Approach assigns responsibility to all participants in the road transport system,
- Its aim is to ensure that crashes, if they occur, have the best possible outcome for those that are involved.

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Pillar 1 – The Lead Agency

Pillar 1
Road safety
Management

- Road Safety focus is not always automatic,
- The role of the lead agency is to:
  - Monitor,
  - Strategize, Plan,
  - Coordinate,
  - Promote and encourage,
  - Create Public Awareness,
- The Lead Agency is there to ensure Road Safety is always on the agenda.

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Pillar 2 – Infrastructure

Pillar 2
Infrastructure

- Infrastructure safety concerns all road owners/managers and applies to both Urban and Non-Urban Roads,
- It assigns the responsibility for safe roads to those road owners and managers,
- Strongly influences road user behaviour.

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Infrastructure

Pillar 2
Infrastructure

- Under infrastructure safety we should understand Road Infrastructure Safety Management that incorporates:
  - Road Safety Impact Assessment,
  - Road Safety Audits,
  - Network-wide Road Safety Assessment,
  - Road Safety Inspection.

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Infrastructure outcomes

Pillar 2
Infrastructure

- Infrastructure safety management
  - Road Categorisation (road profile appropriate for its purpose)
  - Self explaining roads,
  - Safe roadsides,
  - Traffic Calming measures,
  - Signing and Signalling

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Pillar 3 – Vehicle Safety

Pillar 3
Safer Vehicles

- Safer Vehicles is the requirement for car manufacturers to add passive and active safety measures to vehicles,
- These serve to avoid crashes on the one hand and, if they occur, to reduce the impact of crash on the participants of the crash,
- It also concerns ‘in service’ safety, which is the requirement that vehicles are kept in safe condition.

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Standards applied in Vehicles

Pillar 3
Safer Vehicles

- Examples of safer vehicle elements are:
  - Seat belts, seat belt tensioners,
  - Anti-Lock brakes,
  - Safety cage and deformation zones,
  - Headrests,
  - Airbags,
  - Safety glass,
  - Collapsible steering columns.

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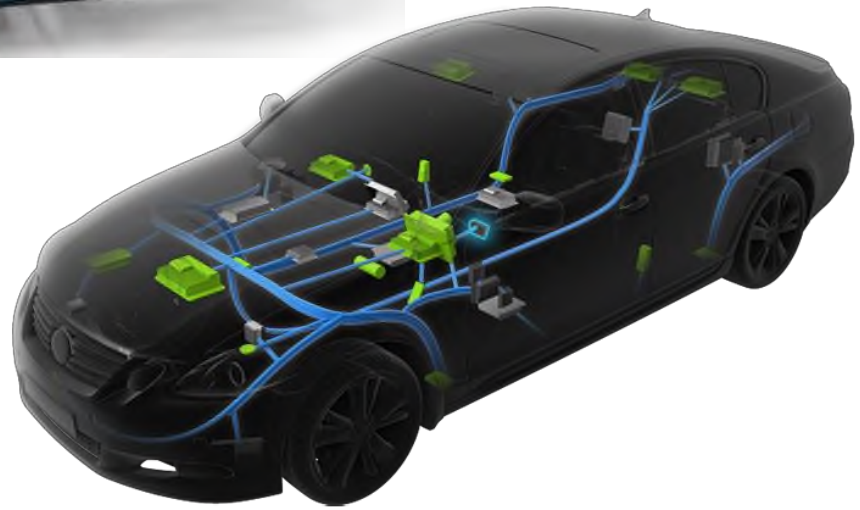
Passive and Active Safety systems



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Pillar 4 – Road User Behaviour

Pillar 4
Road User
Behaviour

- Road user behaviour is a major factor in road safety,
- It depends on the willingness of traffic participants to observe traffic rules and behave safely, even if there is no police standing next to them,
- It is achieved by relentless awareness campaigns and the perception that there will be consequences if not complying with road traffic regulations.

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Examples of road user behaviour

- Some examples of erroneous road user behaviour:
  - Speeding,
  - Distracted driving,
  - Not wearing seatbelts or using child restraints,
  - Running red lights,
  - Not wearing type approved crash helmets,
  - Driving fatigued,
  - Vehicle not in appropriate technical condition,

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Post Crash Care

Pillar 5
Post Crash Care

- Post crash care also covers medical interventions such as:
  - Maximum Abbreviated Injury Scale classifications (MAIS)
  - Specialised trauma care,
  - Post care rehabilitation,
  - 30 day follow-up.

AIS Value	Injury Description
0	No Injury
1	Minor
2	Moderate
3	Serious
4	Severe
5	Critical
6	Maximum/Fatal

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Pillar 5 – Post Crash Care

Pillar 5
Post Crash Care

- Post crash concerns every aspect life saving or injury reduction when crashes have occurred,
- It covers aspects such as:
  - Single emergency phone number,
  - E-call system,
  - Pre-positioned emergency response teams,

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The interaction between the pillars

- Though presented separately, the safe system approach expects all pillars to function as one single unit,
- Without this, the efforts in individual pillars will not deliver the intended and necessary results,
- This is often visible in crash statistics.

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Example 1

Pillar 1 Road safety Management	Pillar 2 Infrastructure	Pillar 3 Safer Vehicles	Pillar 4 Road User Behaviour	Pillar 5 Post Crash Care

- Pillar 2 requires road infrastructure to be safe. Hence, forgiving roadsides and appropriate design speeds and speed limits are implemented,
- The lead agency role is to promote compliance through awareness of risks,
- But road users will not observe speed limits if they do not have the perception that the speed limit will be enforced.

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Example 2

Pillar 1 Road safety Management	Pillar 2 Infrastructure	Pillar 3 Safer Vehicles	Pillar 4 Road User Behaviour	Pillar 5 Post Crash Care

- Pillar 3 requires vehicle manufacturers to put seat belts in cars,
- These however only work if people actually wear them consistently in the correct manner,
- To encourage wearing of seat belts, manufacturers put seat belt warnings in cars,
- People are buying seat belt defeaters.

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Road Infrastructure Safety Management

Directive 2008/96/EC of the European Parliament and of the Council of 19 November 2008 on road infrastructure safety management

as amended by:

Directive 2019/1936/EU of the European Parliament and of the Council of 23 October 2019 amending Directive 2008/96/EC on road infrastructure safety management

WEglobal

SECTORAL OPERATIONAL PROGRAMME FOR TRANSPORT

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Roads subject to the Directive

- Roads which are part of the trans- European road network, to motorways and to other primary roads, whether they are at the design stage, under construction or in operation,
- Roads situated outside urban areas, which do not serve properties bordering on them and which are completed using Union funding, with the exception of roads that are not open to general motor vehicle traffic, such as bicycle paths, or roads that are not designed for general traffic, such as access roads to industrial, agricultural or forestry sites.

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KGM Road Map

Total Road network: 68.700 km
Motorways: 3.633 km
State Roads: 30.954 km
Provincial Roads: 34.113 km
(As of 01.01.2023)

Motorways: Highways having high travel speed and standards where minimum speed limit and access control are applied.

State Roads: Main highways that are not under the responsibility of municipalities or other institutions (other than KGM), connecting transit traffic to provinces, ports, shipyards, airports, railway stations and border gates without interruption.

Provincial Roads: Highways other than the roads under the responsibility of municipalities or other institutions, connecting provinces to each other, state roads, ports, shipyards, railway stations, airports and other places required by public needs and starting and ending within a province.

WEglobal

KGM

SECTORAL OPERATIONAL PROGRAMME FOR TRANSPORT

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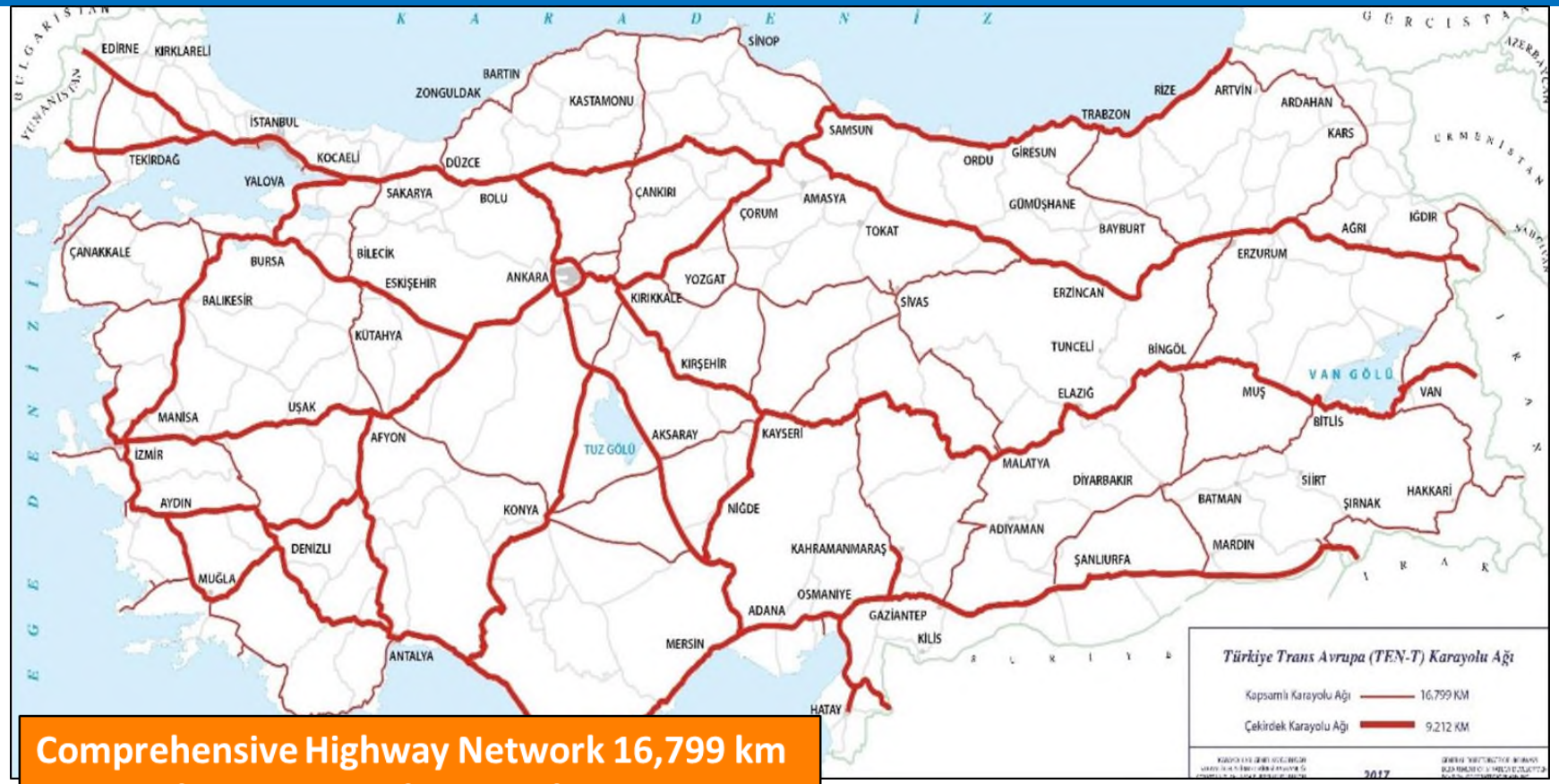
Türkiye TEN-T Road Map



Comprehensive Highway Network 16,799 km
Core Highway Network: 9,212 km

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KGM

SECTORAL OPERATIONAL PROGRAMME FOR TRANSPORT

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Possible Exemptions from implementation

- Primary roads which have a low risk for safety, based on duly justified grounds connected to traffic volumes and accident statistics may be exempt from **implementation**,
- This means that, if the conditions change on that particular road, the road must be subjected to the actions required by the Directive,
- Exemptions and exclusions from the scope are at KGM's discretion.

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Harmonisation - Actions

- Preparation of Gap Analysis and New Institutional Reports
- Amending the existing legislation in line with EU Directive 2019/1936
- Defining potential organisation structures available to KGM complementing the proposed legislative changes
- Guidelines to define the processes for carrying out RSIA, RSA, RSI and NRSA

Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

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Harmonisation - Actions

- Revision of design manuals
- Handbook to define the technical procedures for carrying out RSIA, RSA, RSI and NRSA
- Preparation of the training programme and training material

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GAP ANALYSIS FRAMEWORK

- **Legislation**
  - This required a detailed understanding of EU Directive 2019/1936/EC aims and delivery expectation, and how to realise this for KGM's road safety service and function, by way of KGM's legislation documentation
- **Institutional (organizational structure)**
  - KGM's department, teams and specific expertise situation with EUD requirements were reviewed. KGM capacity was also assessed for achieving each EUD article's aim, duty and output expectation
- **Technical (procedure and duty) components of KGM's legislative framework**
  - The technical component included review of KGM's procedures, manuals, and guidelines' suitability

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RECOMMENDATIONS FROM GAP ANALYSIS (1)

- Revision of legislation to define responsibilities, duties, outputs & performance and to ensure specific skills requirements for road safety functions in KGM
- Road safety services must flow from project planning to maintenance works
- Balancing of skills and resources in central and regional divisions
- Training to both technical specialist personnel, as well as department managers (and decision-makers) for achieving responsibilities aligned with each EUD article function
- Developing a road safety training curriculum
- Improving data collection and analysis mechanisms

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RECOMMENDATIONS FROM GAP ANALYSIS (2)

- Preparing and updating the technical procedures, guidelines, handbooks, manuals and standards
- Defining tasks and responsibilities aligned with each EU Directive article, when and how to achieve them, and to what output quality level
- Developing long-term risk-based prioritized action plan and road safety priority works programmes
- Establishing a monitoring and evaluation system
- Establishing a Department/Unit composed of Certified Road Safety Auditors

to orchestrate the whole RISM process within KGM

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Legislation Reviewed

- Part 17 of Presidential Decree No. 4 on the Organization of Affiliated, Related, Associated Institutions and Organizations to Ministries and Other Institutions and Organizations
- Law on the Services of the General Directorate of Highways No.6001
- Regulation on Duty, Power and responsibility of General Directorate of Highway
- Regulation on Road Infrastructure Safety Management

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Road Safety Infrastructure Management By-Law

- The by-law regarding Road Infrastructure Safety Management system stipulated by the EU Directive 2008/96/EC on the Turkish TEN-T Highway Network was published in the Official Gazette numbered 30572 dated on 21.10.2018.
- For the by-law to be implemented, the documents such as guides, handbooks, specifications, directives, etc. are stipulated to be prepared within 5 years as of the date of publication of this By-law.
- For preparation of aforementioned documents and to comply with the Directive 2019/1936/EC (consolidated directive) fully, this EU funded Project has been initiated.

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Processes

- The RISM processes are defined by the By-Law and précised by implementation guidelines,
- The guidelines provide detailed explanations and instructions for implementers that are discussed in the next section.

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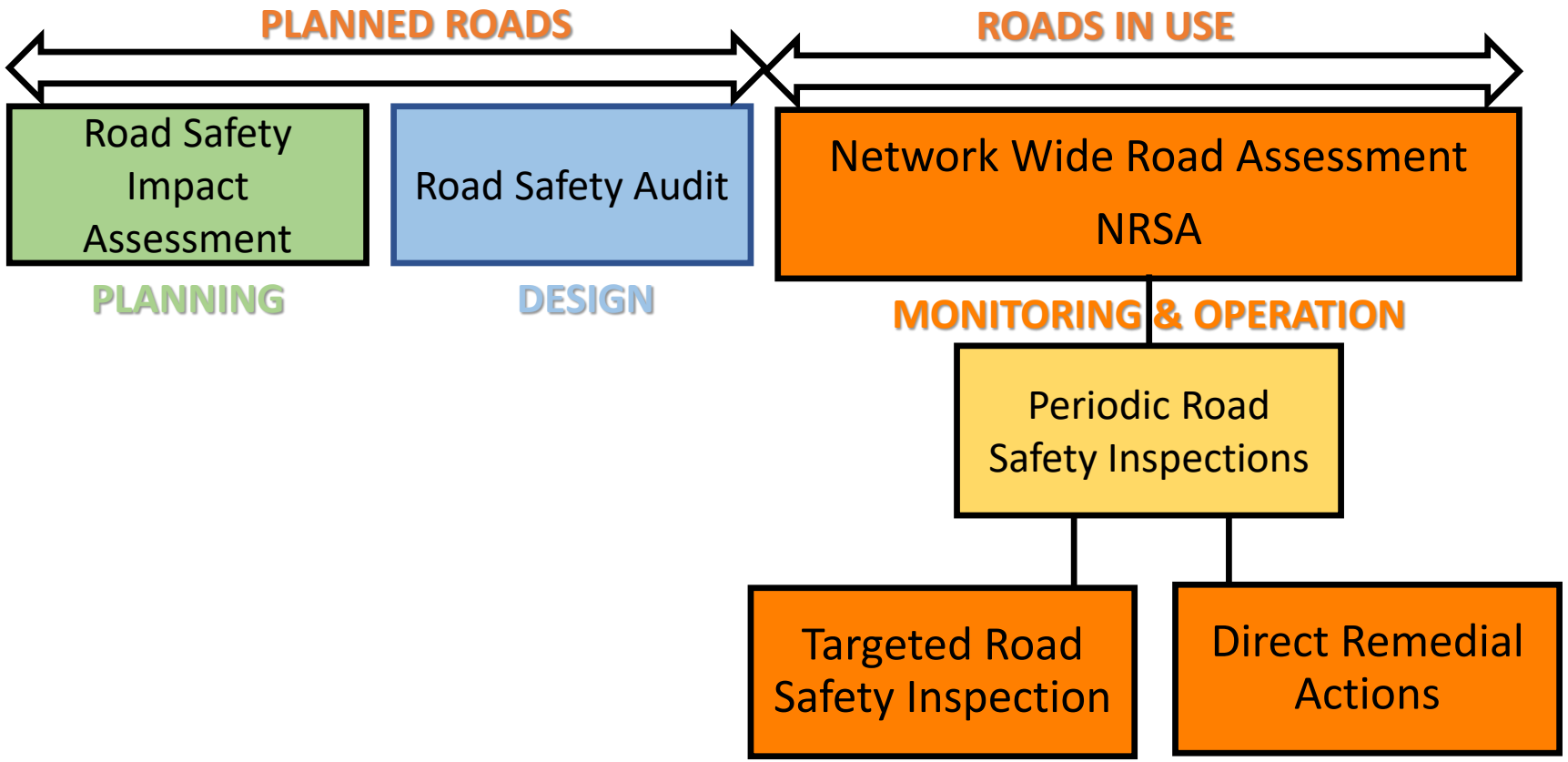
RISM components and their relationship



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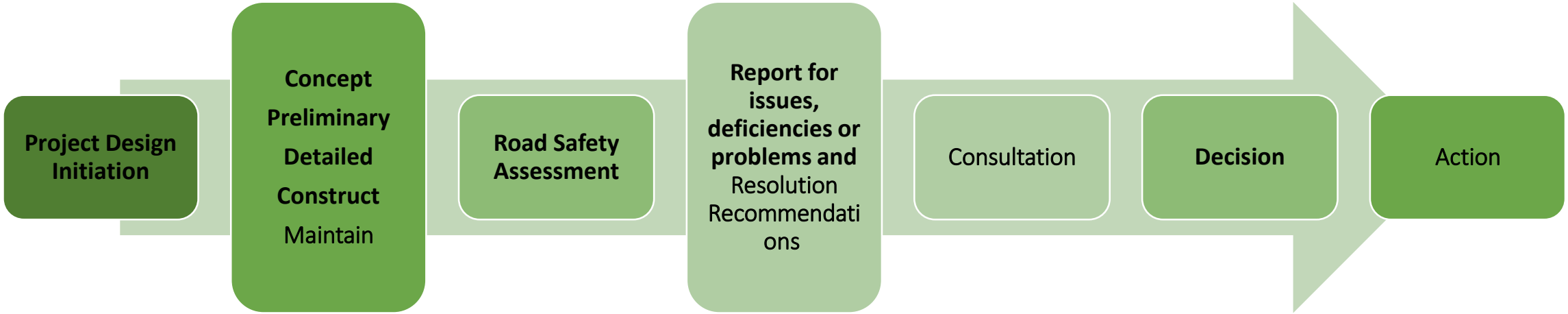
RISM Work Flow

RISM project workflow



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Road Safety Impact Assessment (RSIA)

Road Safety Impact Assessment
RSIA

Planned Roads

- "'Road Safety Impact Assessment' means a strategic comparative analysis of the impact of a new road or a substantial modification to the existing network on the safety performance of the road network".
- Any new infrastructure project realignment or rehabilitation/change to existing infrastructure that substantially affects the performance of the national road network shall be assessed.

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Road Safety Impact Assessment (RSIA)

Road Safety Impact Assessment
RSIA

Planned Roads

- Not only design changes in road network affect its performance but also any change in characteristics and/or amount of generated traffic may have considerable effects on performance.
- RSIA is necessary where the envisaged effect on the national network is substantial. Smaller projects will not require assessment.

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Road Safety Impact Assessment (RSIA)

Road Safety Impact Assessment
RSIA

Planned Roads

- The RSIA shall be carried out at the initial planning stage before the infrastructure project is approved.
- The RSIA shall indicate the road safety considerations which contribute to the choice of the proposed solution.
- It shall further provide all relevant information necessary for a cost-benefit analysis of the different options assessed.

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Road Safety Impact Assessment (RSIA)

Road Safety Impact Assessment
RSIA

Indicative Elements

1. Elements of a road safety impact assessment report:
   - problem definition,
   - current situation and ‘do nothing’ scenario,
   - road safety objectives,
   - analysis of impacts on road safety of the proposed alternatives,
   - comparison of the alternatives, including cost-benefit analysis,
   - presentation of the range of possible solutions.

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Road Safety Impact Assessment (RSIA)

Road Safety Impact Assessment
RSIA

Indicative Elements

2. Elements to be taken into account:

- fatalities and accidents, reduction targets against ‘do nothing’ scenario,
- route choice and traffic patterns,
- possible effects on the existing networks (e.g. exits, intersections, level crossings),
- road users, including vulnerable users (e.g. pedestrians, cyclists, motor cyclists),

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Road Safety Impact Assessment (RSIA)

Road Safety Impact Assessment RSIA

Indicative Elements

2. Elements to be taken into account:

- traffic (e.g. traffic volume, traffic categorisation by type), including estimated pedestrian and bicycle flows determined from adjacent land-use attributes,
- seasonal and climatic conditions,
- presence of a sufficient number of safe parking areas,
- seismic activity.

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RSIA process

Road Safety Impact Assessment
RSIA

Process

- The RSIA team is made up of one certified auditor and an experienced civil (road) engineer,
- The RSIA team is embedded in the feasibility study team and participated in the discussions about options under consideration,
- There is no conflict of interest clause for these experts.

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RSIA output

Road Safety Impact Assessment
RSIA

Output

- The RSIA report may in some cases advise against proceeding with the project on the basis that, from road safety perspective the options that are under consideration do not provide the desired level of safety.
- This may be based on a comparison between the ‘do nothing’ scenario and all the options under consideration.

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Road Safety Audit

Road Safety Audit
RSA

Planned Roads/Roads Under Construction

- "'Road Safety Audit' means an independent detailed systematic and technical safety check relating to the design characteristics of a road infrastructure project and covering all stages from planning to early operation".

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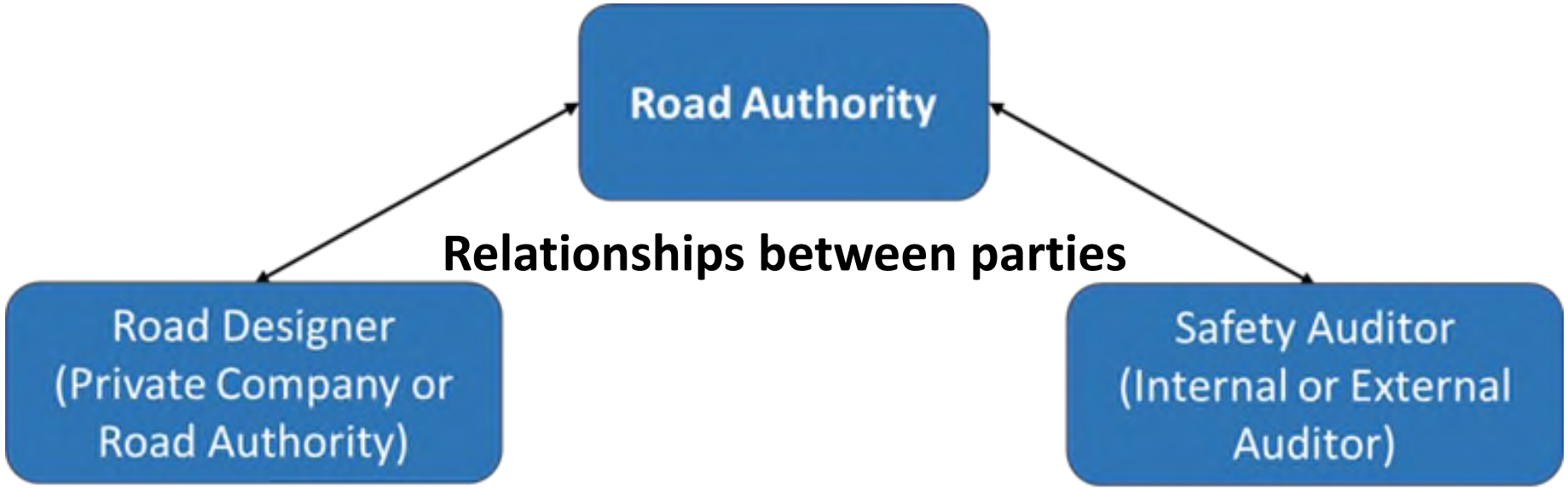
Road Safety Audit

Road Safety Audit
RSA

Planned Roads/Roads Under Construction



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Road Safety Audit

Road Safety Audit
RSA

Planned Roads/Roads Under Construction

- Stages of RSA:
  1. Draft design stage
  2. Detailed design stage
  3. Pre-opening stage
  4. Early operation stage

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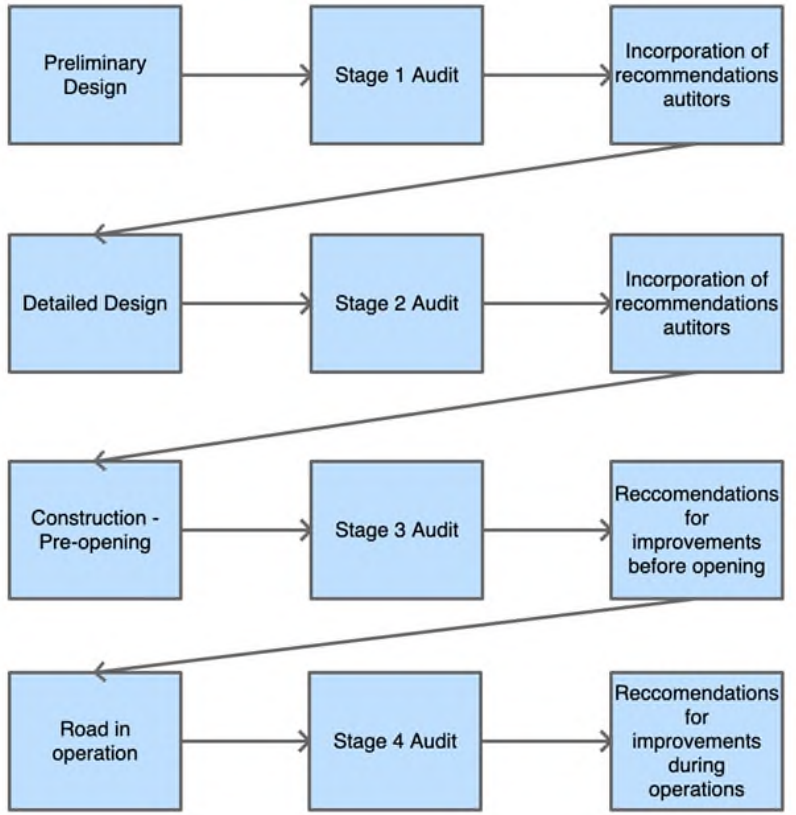
Road Safety Audit

Road Safety Audit
RSA

Stages of RSA



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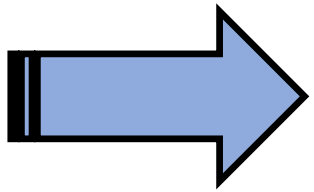
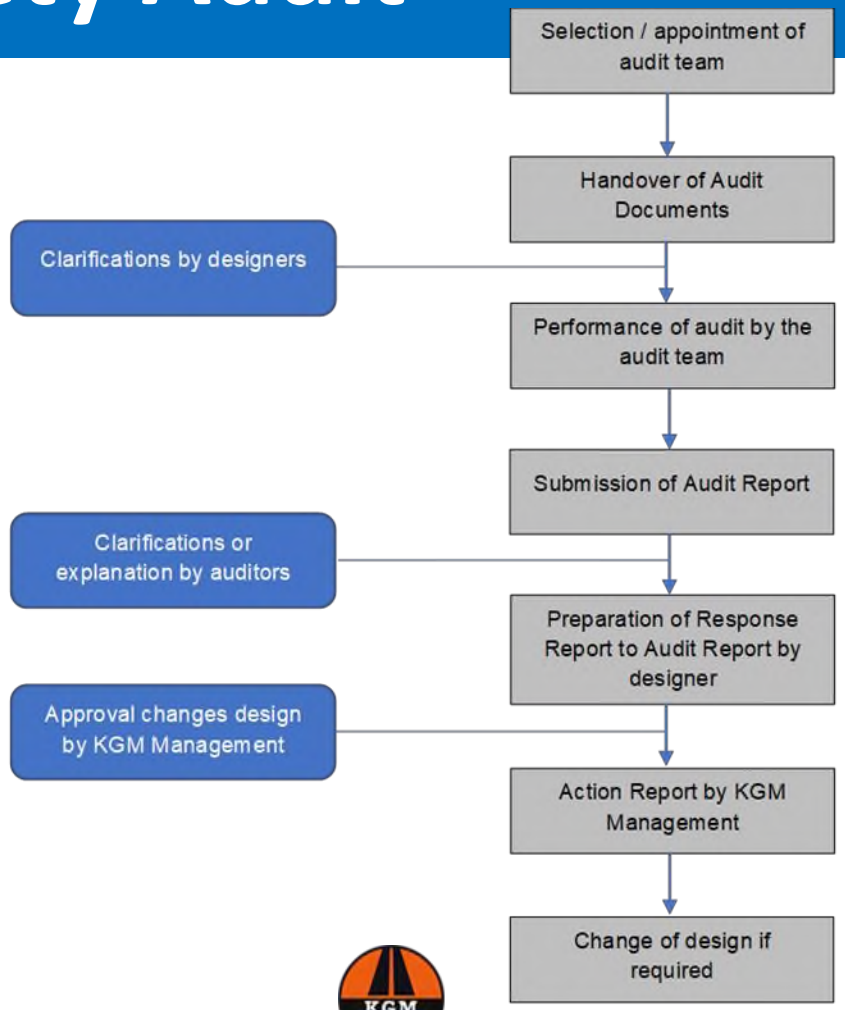
Road Safety Audit

Road Safety Audit
RSA

RSA Process





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Road Safety Audit – Report and Responses

- Unless there is a re-audit due to the large number of road safety defects, the role of the audit team ends when it has delivered the report and provided any clarifications,
- The Designer or Contractor response is between them and KGM,
- KGM can accept or reject both the audit findings or the Designer/Contractor response.

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Road Safety Audit

Road Safety Audit
RSA

Decision after RSA report

Design Amendment	Drawing change	Increased returns (less collisions or injury severity
Alternative to Infrastructure or TM Device	Higher BCR and quicker implementation	Adopting technology
Ignore RSA recommendation	Risk acceptance	Other influences on the project indirectly reduce the identified risk

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Road Safety Audit - Team

- Road Safety Auditors must be certified,
  - follow the training and become certified through an exam
- This allows to become an Intern Road Safety Auditor.

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Road Safety Audit - Team

- A typical RSA team consists of:
  - Audit Team Leader,
  - Road Safety Auditor
  - **Optional:** A trainee Road Safety Auditor.
- Large and complex projects may have more auditors to ensure that the audit does not become a cause for delay,

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Network-wide Road Safety Assessment

Network Wide Road Assesment NRSA

Roads In Operation

- A step by step by step assessment of the inherent safety of the road network consisting of:
  - **Prioritisation** of roads or road sections by assessing relative risk, represented by fatalities and serious injuries per km
  - Followed by a **Periodic Road Safety Inspection** on roads representing the highest risk to identify locations where most likely infrastructure has played a role in the crash.
  - These may be **joint inspections** to assess also tunnels.

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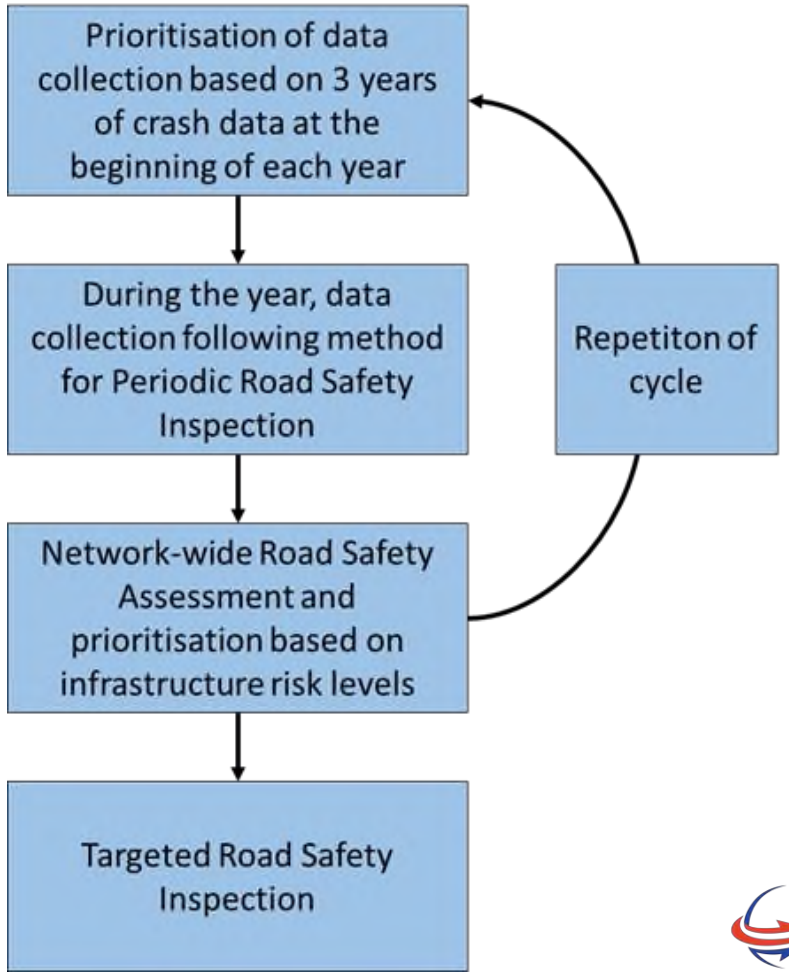
Network-wide Road Safety Assessment

Network Wide Road Assesment
NRSA

Steps of NRSA



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Network-wide Road Safety Assessment – Periodic Road Safety Inspection

Network Wide Road Assesment NRSA

Indicative Elements of the periodic road safety inspection under the NRSA (1)

1. General
2. Traffic Volumes
3. Accident Data
4. Operational Characteristics
5. Geometric Characteristics
6. Objects, Clear Zones and Road Restraint Systems

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Network-wide Road Safety Assessment – Periodic Road Safety Inspection

Network Wide Road Assesment NRSA

Indicative Elements of the periodic road safety inspection under the NRSA (2)

7. Bridges and Tunnels
8. Intersections
9. Maintenance
10. Vulnerable Road Users' Facilities
11. Pre/post-crash systems for traffic injury and gravity mitigation elements

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Output Network-wide Road Safety Assessment

Network Wide Road Assesment NRSA

Roads In Operation

- Output of the Periodic Road Safety Inspection:
  - Input scores to be used to calculate the network risk ranking:
    - **Low Risk**
    - **Medium Risk**
    - **High Risk**
- The entire network must be assessed every 5 years.

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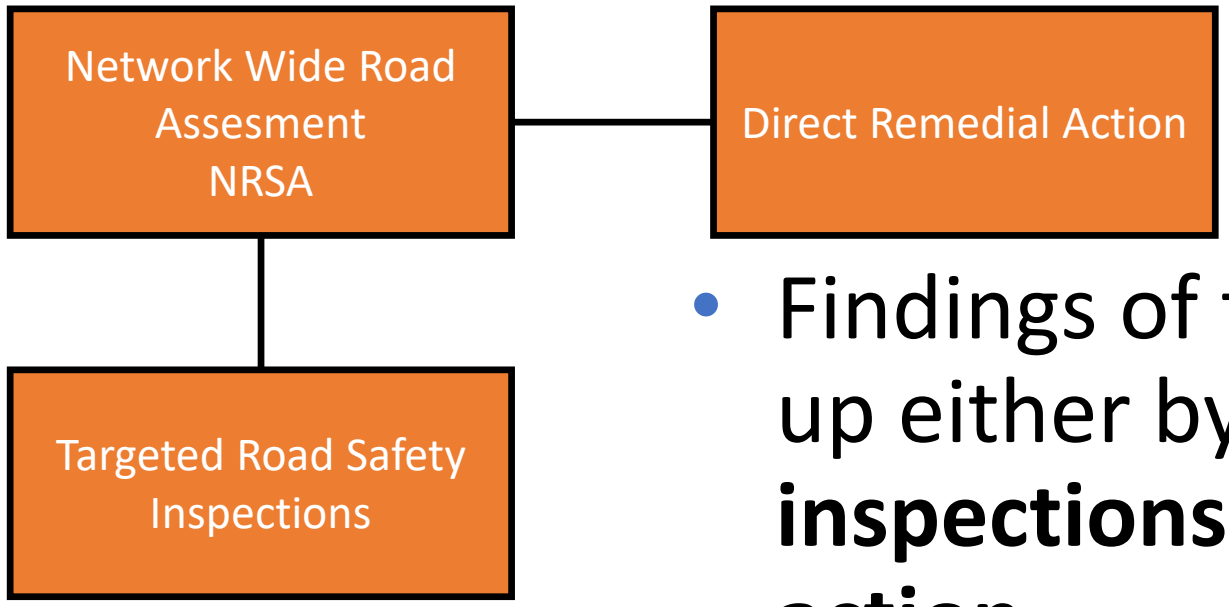
NRSA Follow-up



- Findings of the NRSA are followed up either by **targeted road safety inspections** or by **direct remedial action**.

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Targeted Road Safety Inspection

- Targeted Road Safety Inspection is a targeted investigation carried out by expert teams 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.

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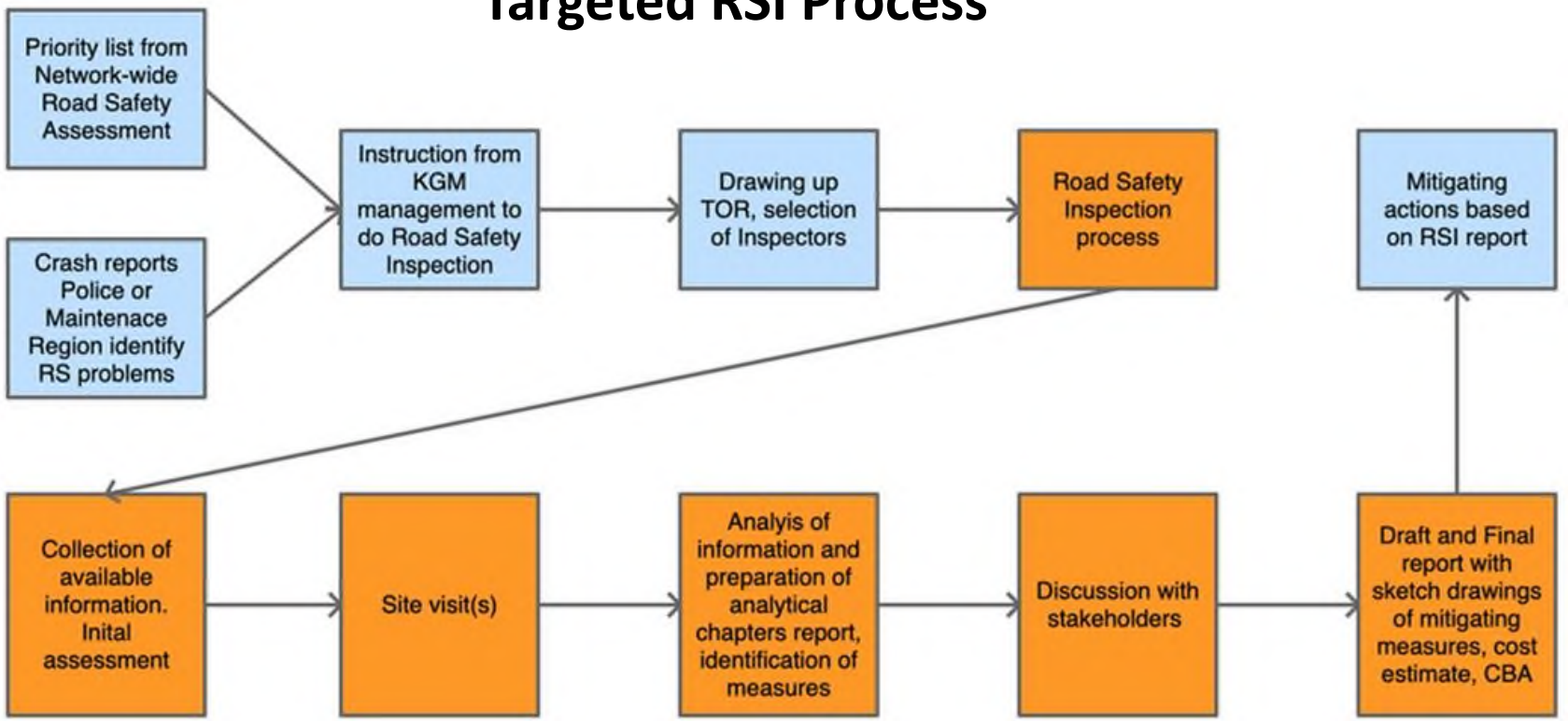
Targeted Road Safety Inspection

Network Wide Road Assesment NRSA

Targeted Road Safety Inspections

Targeted RSI Process



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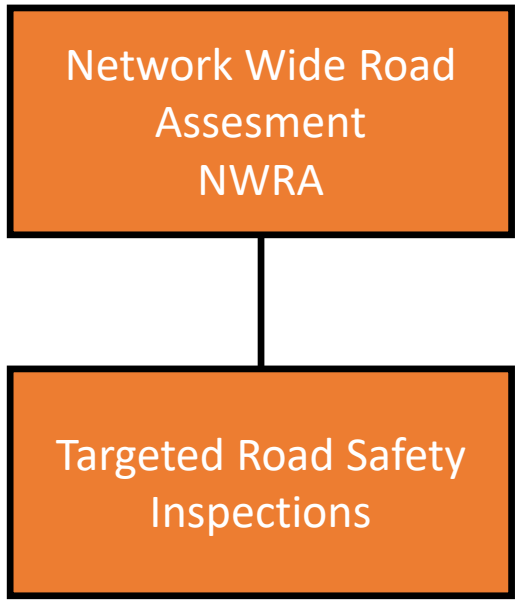
Targeted Road Safety Inspection



- Findings of targeted road safety inspections are followed up by reasoned decisions determining if remedial action is necessary,
- If improvements are needed, develop a preliminary measure with cost estimate and CBA,
- Prioritised programme such that the limited budget provides maximum return.

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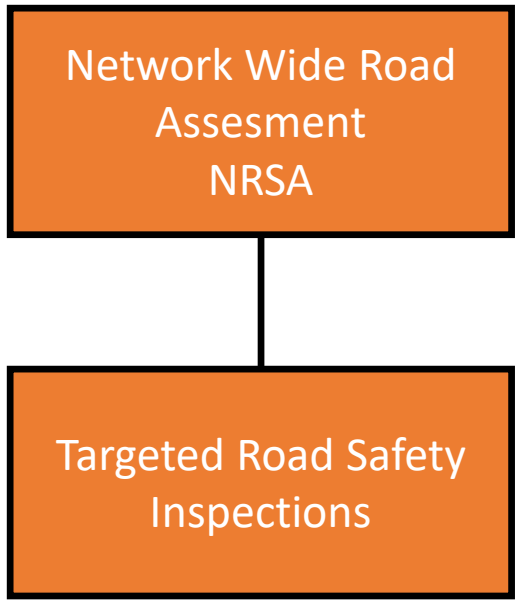
Targeted Road Safety Inspection



Indicative Elements of RS Inspection (1)

1. Road alignment and cross-section
2. Intersections and interchanges
3. Provision for vulnerable road users
4. Lighting, signs and markings
5. Traffic Signals

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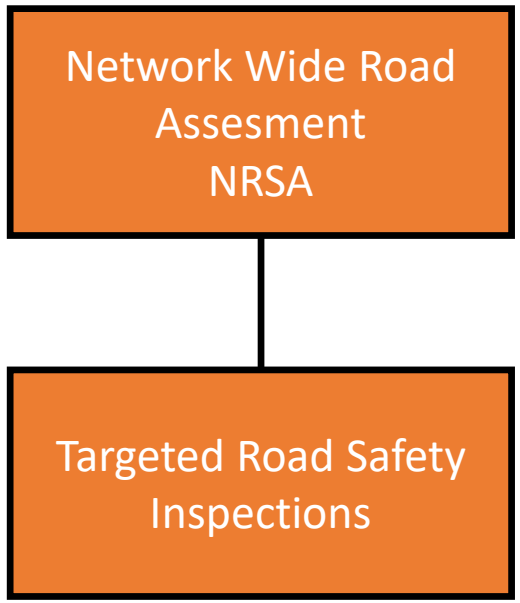
Targeted Road Safety Inspection



Indicative Elements of RS Inspection (2)

6. Objects, clear zones and road restraint systems
7. Pavement
8. Bridges and Tunnels
9. Other issues

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Need for Detailed Crash data

- Crash data is an important tool for Road Infrastructure Safety Management,
- It is used in all aspects of the Directive such as:
  - Road Safety Impact Assessment,
  - Road Safety Audit,
  - Network-wide Road Safety Assessment,
  - Targeted Road Safety Inspection,
- It is also used for black spot identification.

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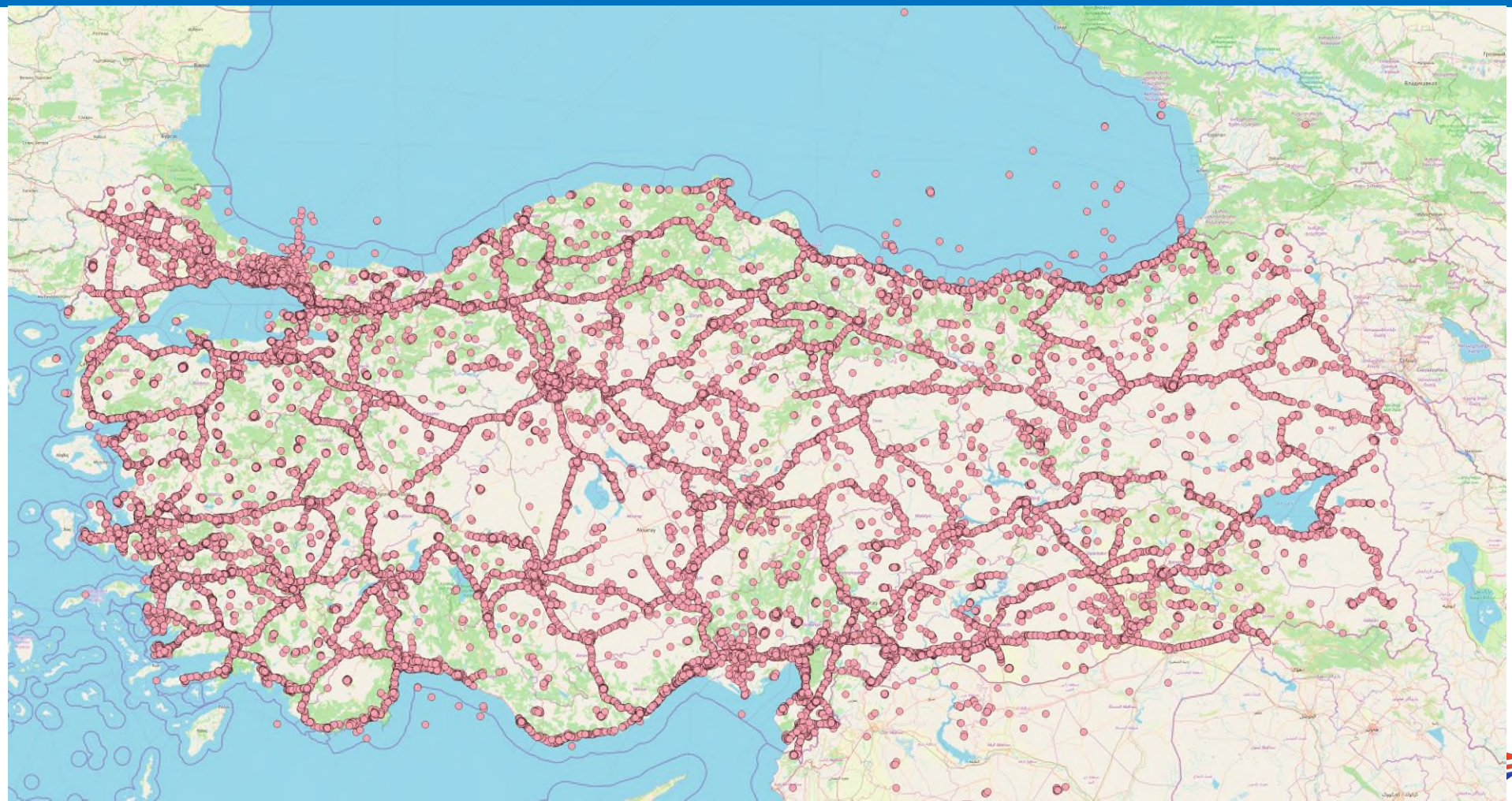
Using Crash Data for visualisation:



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Zooming In

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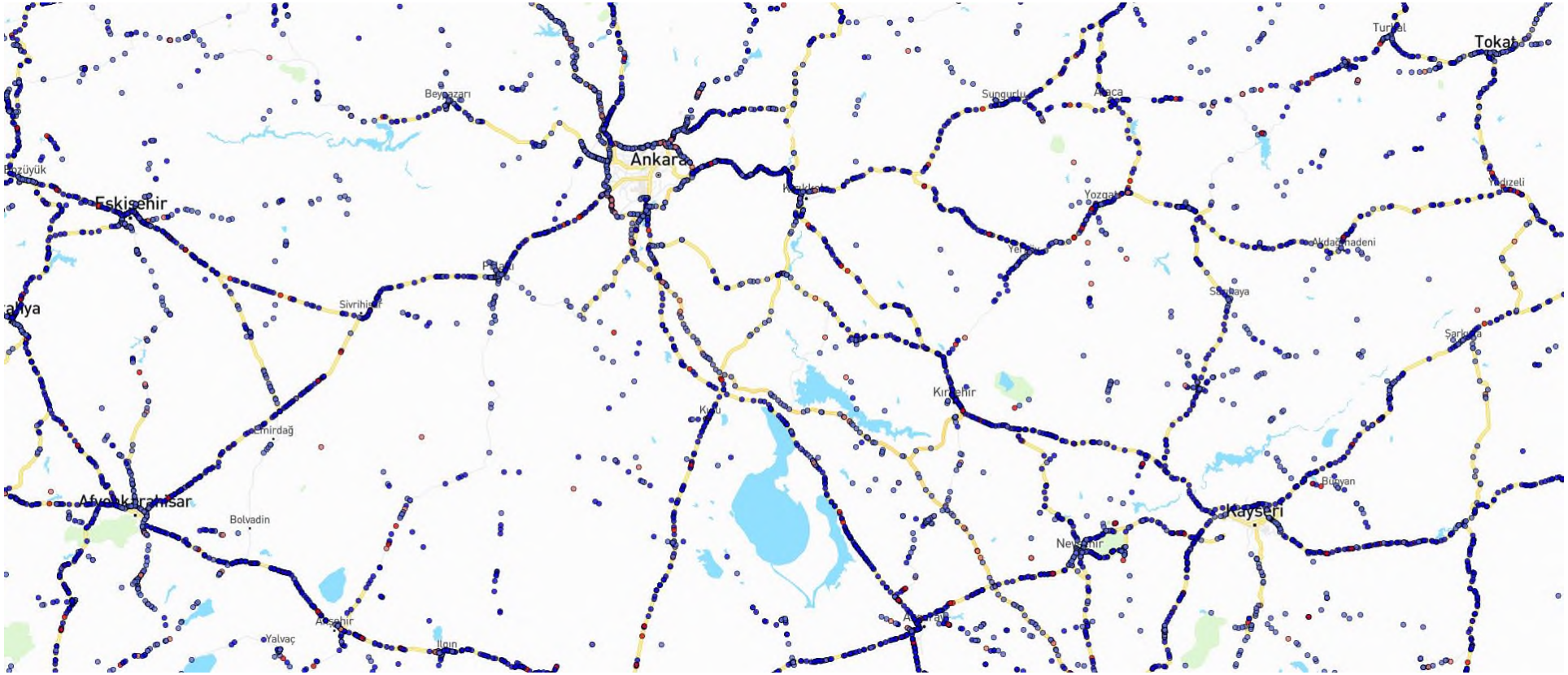
Zooming In



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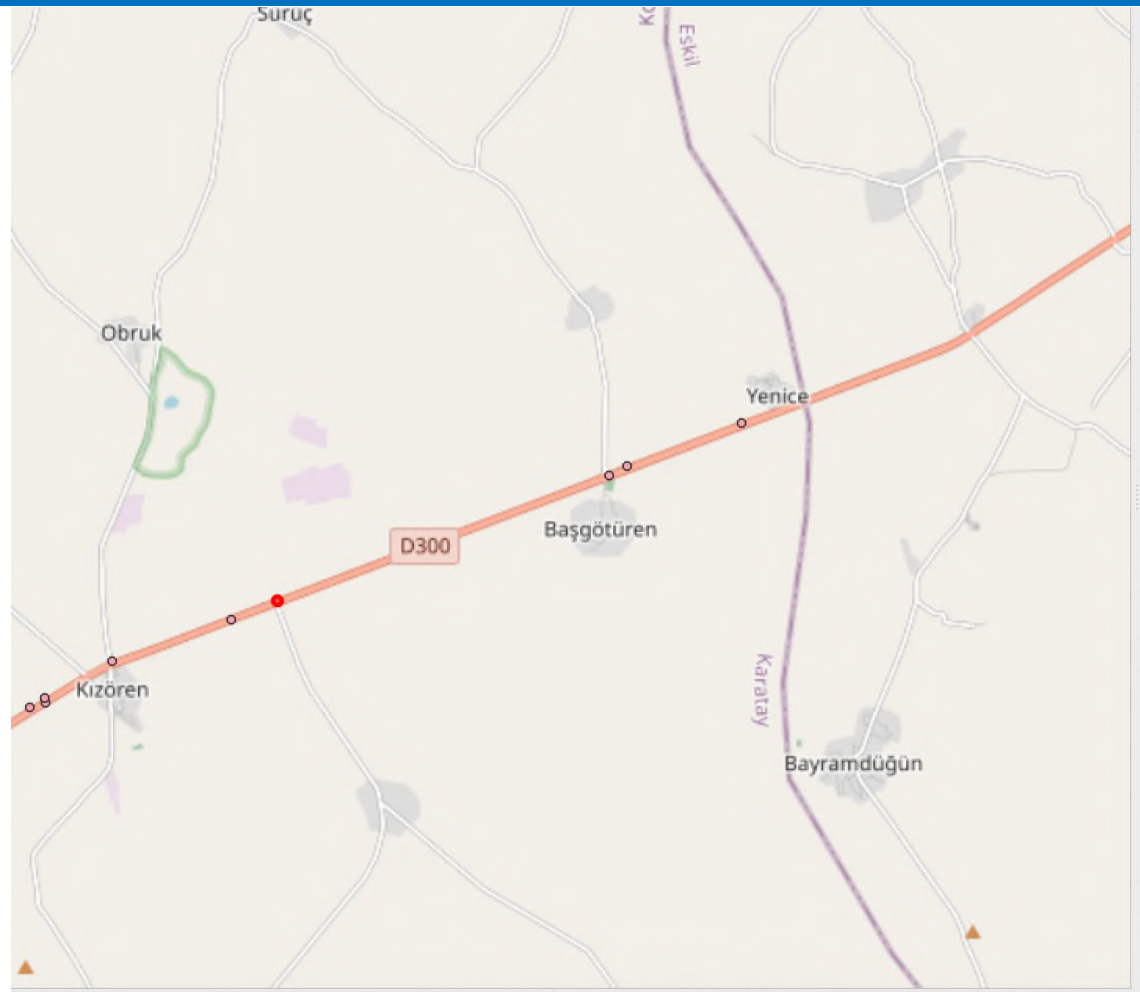
Showing the underlying information



Identify Results

Feature	Value
2016_crashes	
unit name	Bölge
(Derived)	
(Actions)	
Year	2016
Month	3
field_3	11
Day	8
day of week	SALI
hours	6
mins	59
Hour/mins	06:59:00.000
field_9	06:00-07:59
City	42
Lat	33.20343
Long	38.14913
ref#	20160308
book #	31
District_of_Accident	KARATAY
police unit	KONYA - Bölge Trafik Denetl...
Unit type	BÖLGE-Şube Müdürlüğü
unit name	Bölge
Acc Region	Polis
Acc place	2-Yerl.Yeri Disi
Village/town	NULL
Type_of_the_Road	1-Bölünmüs Yol
Road_surfacing	1-Asfalt
Road_class	Devlet Yolu
Legal_speed_limit	110
Road_lane_number	2
Road_lane_width	4

Mode Current Layer

View Tree

SECTORAL OPERATIONAL PROGRAMME FOR TRANSPORT

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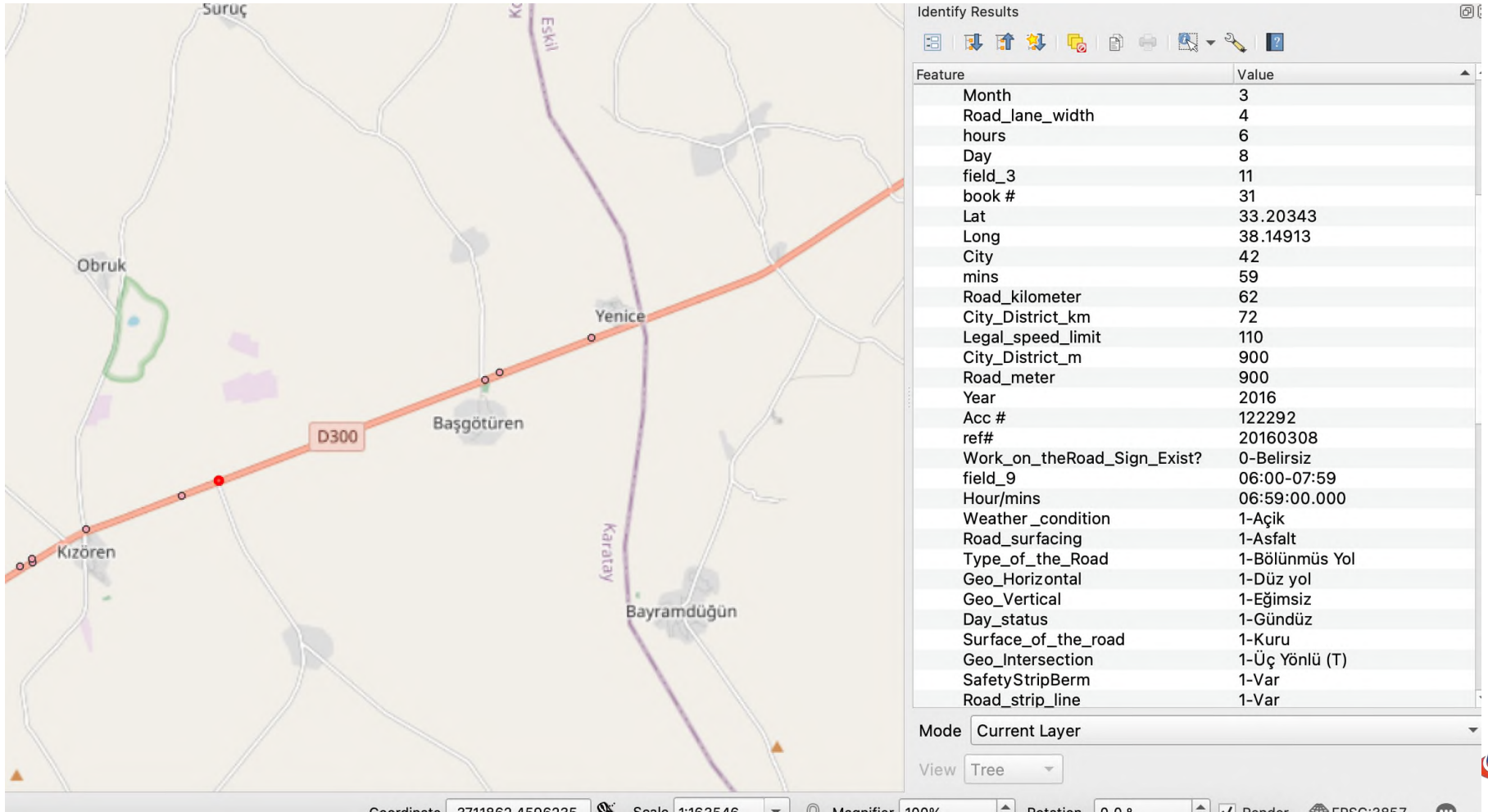
Showing the underlying information



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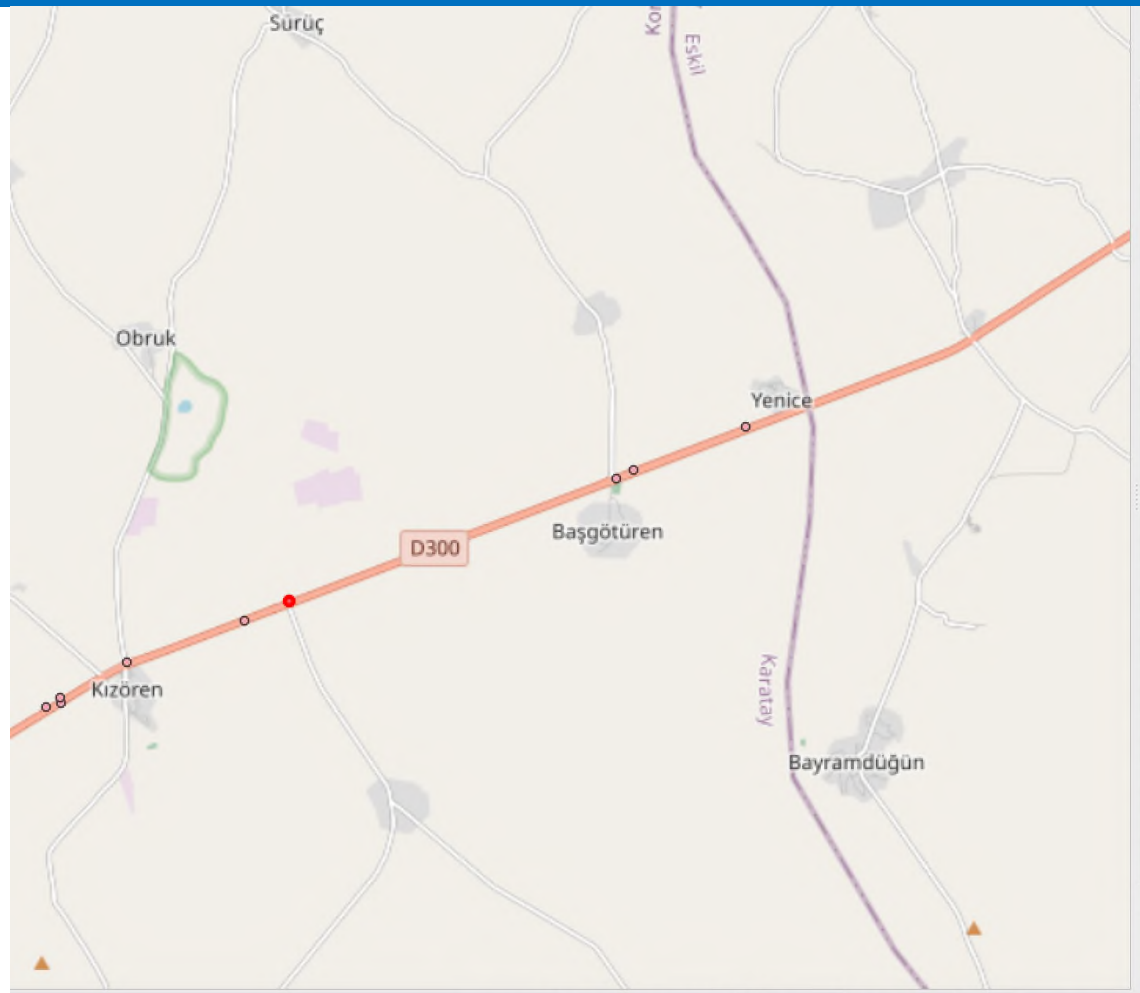
Showing the underlying information



Identify Results

Feature	Value
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Year	2016
City_District_m	900
Road_meter	900
Legal_speed_limit	110
City_District_km	72
Road_kilometer	62
mins	59
City	42
Long	38.14913
Lat	33.20343
book #	31
field_3	11
Day	8
hours	6
Road_lane_width	4
Month	3
Road_lane_number	2
RESULT_TOTALDEAD	2
RESULT_DEADDRIVER	1
RESULT_DEADPASSENGER	1
RESULT_withDEATH	1
RESULT_DEADPEDETRIAN	0
RESULT_INJUREDDRIVER	0
RESULT_INJUREDPASSENGER	0
RESULT_INJUREDPEDESTRIAN	0
RESULT_TOTALINJURED	0
RESULT_withINJURIES	0
(Actions)	
(Derived)	

Mode Current Layer

View Tree

SECTORAL OPERATIONAL PROGRAMME FOR TRANSPORT

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What we can learn

- We can learn a lot, but it requires very systematic analysis of the data that we have available,
- Once we know what the data tells us, it is possible to perform a targeted site investigation to arrive at a final conclusion,
- Analysis start with preparing a ‘Stick Diagramme’ for a road section, summarising all data available.

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Summary

- Even some basic data can provide a lot of information that we can use for further analysis,
- If there is no particular indicator/factor that jumps out, it is difficult to draw conclusions that can be turned into mitigating measures and more investigation is needed.
- This brings us into the **Reactive RSIM steps such as Road Safety Inspections.**

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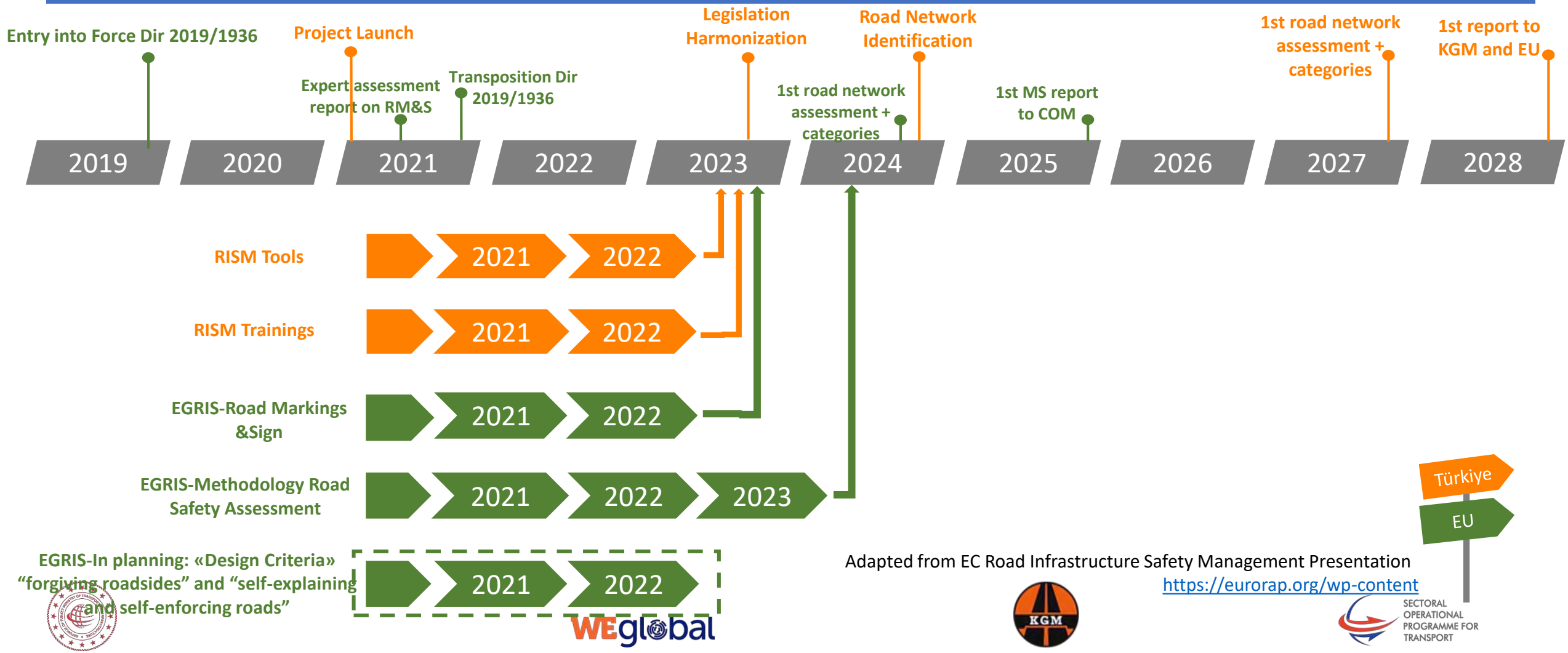
ROAD MAP- RISM DIRECTIVE &TÜRKİYE IMPLEMENTATION



Adapted from EC Road Infrastructure Safety Management Presentation
https://eurorap.org/wp-content

Türkiye
EU

WEglobal

KGM

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DUTY, AUTHORITY AND RESPONSIBILITY BY-LAW

- To implement the work and procedures required by RISM, the duties, authorities and responsibilities of KGM have been re-evaluated and a draft regulation has been developed.
- A new proposal has been developed for the KGM organizational structure in this context.

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NEW ORGANIZATIONAL STRUCTURE (1)

- A road safety entity, exclusively responsible for the whole process, is expected to have the following duties, authorities and responsibilities:
  - the coordination between departments for RISM process
  - setting and revising standards for guidelines, manuals, handbooks and report templates
  - administration of training process for RISM components (RSA, RSI, etc.)
  - administration of exam process
  - certification to successful candidates

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NEW ORGANIZATIONAL STRUCTURE (2)

- administration of auditor registry
- assignments of the auditors
- ensuring the quality of audits
- the resolution of disputes in RSA
- focusing on technical excellence development with research of innovations or technology and gathering the ‘lessons learnt’ from the field or international best practices
- exchanges best practices with European Commission

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Completed Activities

- Current Situation, Gap Analysis and New Institutional Reports
- Technical visits to Germany and the Netherlands
- Workshop for executives on gap analysis and new institutional report
- Strategy Paper
- Draft Legislative Documents
- Draft Guidelines for RSIA, RSA, RSI and NRSA
- Technical visit to Portugal

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Ongoing Activities

- Workshops for the personnel of road designers, contractors, consultants, municipalities, universities and other related institutions work on road infrastructure safety
- Workshop for executives on final draft legislations and guidelines
- Highway Design Manual (Ongoing)
- Motorway Design Manual (Ongoing)
- Handbooks for RSIA, RSA, RSI and NSRA (Ongoing)
- Training program and training materials (Ongoing)

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Questionnaire

WEglobal

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Summary of the Questionnaires

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Summary

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Discussion on roles and contributions

- Ministry of Transport and Infrastructure
- KGM

- Presidency, Strategy and Budget Office
- Other Ministries
- Police and Gendarmerie
- Other Public Institutions

- Municipalities
- Universities
- Private Sector
- NGO's
- Press – Social Media