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Abbreviations and Acronyms

Acronym	Abbreviation
RAP	Road Assessment Programme
iRAP	International Road Assessment Programme
EuroRAP	European Road Assessment Programme
CS	Case Study

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Executive Summary

Activity 6 refers to Case studies using the application of network-wide road assessment. This will support the ammended Directive 2008/96/EC, in particular Article 5 (new methods of safety ranking), and Article 6 (proactive safety inspections).

Case studies are so often the most effective way of communicating often complex theoretical and complex arguments or processes. Network-wide road assessment is no exception. This work will build on the style and form of the case studies and will be ellaborated in five groups, more specifically:

- A: Risk Mapping to guide selective Star Rating
- B: Before and after studies of network upgrading
- C: Identifying road sections to install 2+1 barrier
- D: Maintenance-only remedies
- E: Network-wide road assessment and Star Rating from design plans

The identification of the Case Studies to be explored within the framework of Activity 6 was the first step and was submitted in January 2020. However, as the activity proceeded, an alternative list of Case Studies was developed and this updated version of MS6.1 contains these details.

The wide range of Case Studies, across Europe and elsewhere, demonstrates the effectiveness of the tools applied for the assessment of road safety.

1. INTRODUCTION

Case studies are the most effective way of communicating often complex theoretical and complex arguments or processes. Network-wide road assessment is no exception. There is already good collection of network safety assessment case studies carried out by IRAP: and this Action will provide European equivalents of these and develop new ones including those listed below:

Group A: Risk Mapping to guide selective Star Rating

Group B: Before and after studies of network upgrading

Group C: Identifying road sections to install 2+1 barrier

Group D: Maintenance-only remedies

Group E: Network-wide road assessment and Star Rating from design plans

2. CASE STUDY IDENTIFICATION PROCEDURE

Group A: Risk Mapping to guide selective Star Rating

Risk Mapping a country's entire top-tier network is relatively inexpensive. Using this information and selecting road sections on the basis of either high individual or collective risk, it is possible to identify outliers, where a combination of factors may contribute. These road sections can then be studied in further detail by assessing the part that road infrastructure plays in this risk. This is a relatively quick exercise and reduces the need for a full-scale survey of the entire road network. It is a technique that has been used successfully in the English regions and elsewhere.

Group B: Before and after studies of network upgrading

These case studies will build on examples where implementation of countermeasures has been implemented or planned. This involves several steps:

- (i) Identify sections of network that have been both assessed in previous Star Rating and have been upgraded;
- (ii) Carry out "after" Star Rating for sections that have been upgraded;
- (iii) Compare "before" and "after" Star Ratings;
- (iv) Check against crash data where satisfactory data exist;
- (v) Learn from measures being used, which are effective and which raise the Star Rating.

Group C: Identifying road sections to install 2+1 barrier

This case study has the potential to make "Vision Zero" principles a reality at a site-specific level within individual countries, with road infrastructure design using the specific application of 2+1 barrier and using RAP methodology to identify suitable locations. Star Rating data may be used to identify single carriageway routes that may be upgraded using 2+1 barriers. Assessment of pros and cons and institutional resistance will be examined. The work will look for suitable road sections based upon such factors as length, carriageway width, current Risk and Star Rating.

Case study D: Maintenance-only remedies

Not all road safety remedial actions need to involve huge infrastructure spend. It is possible to upgrade the safety of a road by simple measures such as shoulder sealing, re-surfacing, improving or providing better lining.

Group E: Network-wide road assessment and Star Rating from design plans

New software allows road sections to be Star Rated from design plans (for example, of standard cross-sections) and for an iterative approach to bring designs to a higher standard before construction.

3. CASE STUDIES

The following Case Studies have been identified by the Consortium Partners and will be further investigated at the following Tasks of Activity 6.

Group A: Risk Mapping to guide selective Star Rating

Table 1. Case Studies Group A

Country	Title
CROATIA	A1 Croatia_A3_Novska - Okucani
CROATIA	A2 Croatia_A3_Okucani-N Gradiska
CROATIA	A3 Croatia_A6_Cavle-Orehovica
CROATIA	A4 Croatia_D8_Cvoriste_Vidici_Razine
CROATIA	A5 Croatia_D8_Karasovici_D516
CROATIA	A6 Croatia_D8_Rotor_Bilice_Split
CROATIA	A7 Croatia_D8_Slano_Sustjepan
CROATIA	A8 Croatia_D33_Sibenik_Vidici
CROATIA	A9 Croatia_D140
CROATIA	A10 Croatia_D424_Zadar_istokGazenica
CROATIA	A11 Croatia TEN-T Highest risk
OTHER	A12 Germany_Testares-Baden-Wuertternberg
GREECE	A13 Greece A2-Kozani - Florina
GREECE	A14 Greece_E75 - Chalastra-Evzonoï
GREECE	A15 Greece NR9 - Patras-Pyrgos
GREECE	A16 Greece NR15-A29 Siatista - Krystallopigi
GREECE	A17 Greece NR20 - NR22 Ioannina - Kakavia
GREECE	A18 Greece_NR-27-Termopylae-Itea
GREECE	A19 Greece NR38 Lamia-Karpenisi
GREECE	A20 Greece NR39 Tripoli - Sparti
GREECE	A21 Greece_NR48-Itea- Nafpaktos
GREECE	A22 Greece_NR97-Heraklion-Agia Varvara
GREECE	A23 Greece_TEN-T
ITALY	A24 Italy_SS51 di Alemagna
ITALY	A25 Italy_SS55 dell'Isonzo
ITALY	A26 Italy_SS309-Romeo
SPAIN	A27 Spain C14-Catalonia
SPAIN	A28 Spain N332-Sueca-Favara
SPAIN	A29 Spain N432 - Cordoba
SPAIN	A30 Spain N433 - CH57 - Huelva
SPAIN	A31 Spain N433 - CH74 Huelva
SPAIN	A32 Spain N435 - Badajoz

Country	Title
SPAIN	A33 Spain N435 - CH104-Huelva
SPAIN	A34 Spain N435- CH129 - Huelva
SPAIN	A35 Spain N630 - Badajoz
SPAIN	A36 Spain N630-Huelva
SPAIN	A37 Spain N630-Sevilla
SPAIN	A38 Spain N432 - Badajoz
OTHER	A39 Hungary_Road4_Nyiregyhaza-Ukraine border
OTHER	A40 UKEngland_A40_RACF2018RSF
OTHER	A41 UKEngland_A67_RACF2018RSF
OTHER	A42 UKEngland_A361_RACF2018RSF
OTHER	A43 UKEngland_A537_RACF2018RSF
OTHER	A44 UKEngland_A3071_RACF2018RSF
OTHER	A45 UKEngland_A18_RACF2018RSF

Group B: Before and after studies of network upgrading

Table 2. Case Studies Group B

Country	Title
CROATIA	B1 D8 Croatia
CROATIA	B2 Croatia - D34
ITALY	B3 Italy SS13 - Pontebbana
ITALY	B4 Italy SS114
ITALY	B5 Italy SS28
ITALY	B6 Italy SS309-Romea
OTHER	B7 Slovakia D1 Petrovany - Budimiir
OTHER	B8 Slovakia D1 Tmava - Luka
OTHER	B9 Slovakia D2 Brodske - Lamac
OTHER	B10 Slovakia R1 Tmava - Nitra
OTHER	B11 Slovakia R1 - Ziar- Budca
SPAIN	B12 Spain A4
SPAIN	B13 Spain A364
SPAIN	B14 Spain A375
SPAIN	B15 Spain A8077
SPAIN	B16 Spain N433
SPAIN	B17 Spain N435
OTHER	B18 UKEngland_A285_RS2015
OTHER	B19 UKEngland_A404_RS2015
OTHER	B20 Moldova_M3-Congaz

Group C: Identifying road sections to install 2+1 barrier

Table 3. Case Studies Group C

Country	Title
CROATIA	C1 Croatia D8 - selce-NoviVinodolski
CROATIA	C2 Croatia D102 - Kirkbridge - Baska
GREECE	C3 Greece NR51
OTHER	C4 Hungary Generic case selecting 2+1
OTHER	C5 Ireland 4 pilots
OTHER	C6 Netherlands Generic case selecting 2+1
SPAIN	C7 Spain C12
SPAIN	C8 Spain C55 - C58
SPAIN	C9 Spain C66
OTHER	C10 Sweden Road 21 Vanneberga
OTHER	C11 Sweden national programme
SPAIN	C12 Spain_Catalonia network assessment process

Group D: Maintenance-only remedies

Table 4. Case Studies Group D

Country	Title
CROATIA	D1 Croatia - Sections A6-A8-A9-D8
GREECE	D2 Greece_NR2_Kavala
GREECE	D3 Greece NR3 - Domokos
GREECE	D4 Greece NR6 - Metsovo
GREECE	D5 Greece NR9 - Kalikomo
GREECE	D6 Greece NR30 - Sofades
GREECE	D7 Greece - NR38 - Tymfristots
GREECE	D8 Greece NR39 Sparti
GREECE	D9 Greece - NR44 Amarynthos
ITALY	D10 Italy SS16 Adriatica
ITALY	D11 Italy_SS52_Carnica
ITALY	D12 Italy_SS1-Alemagna
ITALY	D13 Italy_SS309-Romea
SPAIN	D14 Spain A318
SPAIN	D15 Spain A376
SPAIN	D16 Spain A8005

Group E: Network-wide road assessment and Star Rating from design plans

Table 5. Case Studies Group E

Country	Title
CROATIA	E1 Croatia A3
GREECE	E2 GR HR IT ES Rural and motorway profiles
GREECE	E3 Greece NR7 Asprohoma
GREECE	E4 Greece NR39 Sparti
GREECE	E5 Greece NR75 signalised T
GREECE	E6 Greece NR90
ITALY	E7 Italy SP10 Cremona - Mantova
ITALY	E8 Italy SS45 Genova - Piacenza
ITALY	E9 Italy SS124 Siracusa - Floridia
ITALY	E10 Italy SS131 Cagliari - Sassari
SPAIN	E11 Spain N-IV CH558 - 566
SPAIN	E12 Spain N-IV Intersection CH579
SPAIN	E13 Spain SE30 Centennial Bridge
SPAIN	E14 Spain SE40
SPAIN	E15 Spain A392
OTHER	E16 Ukraine M12
OTHER	E17 Bosnia and Herzegovina_VC2
OTHER	E18 Moldova Cross sections mid block
OTHER	E19 Moldova Intersections
OTHER	E20 Moldova M2_R7 Route

4. CONCLUSIONS

More than 100 Case Studies have been identified across Europe and elsewhere. Following steps include site visits (where necessary and for analysis of before and after Star Rating and crash), data extraction (detailed recording and costing of measures), analysis of before and after data (Star Rating and Crash Data), and finally reporting and stakeholder consultation. All outcomes will be published at the project's Webpage.