

## Star Rating from Designs in the RADAR project



Steve Lawson and Olivera Djordjevic, 15 December 2016, Belgrade



## Some things to think about



- Benefits – how it sits **alongside other work** that you are doing now
- Benefits – how this work will help **what you do now**
- Benefits – **technical value**
- Benefits – **communication value**

◆ A Europe free of high risk roads – designing for 3-star or better



## iRAP Traditional Star Rating the safety of roads

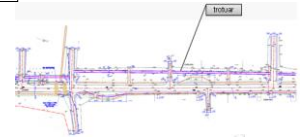
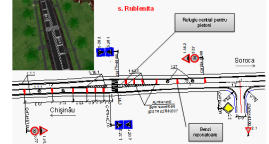
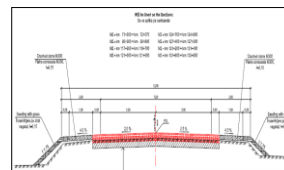


- Based upon video records
- Road features – **52 features known** to affect likelihood and severity of injury collected every **100 metres**
- Car occupants, motorcyclists, pedestrians, bicyclists
- Major crash types including head-on, run-off, intersection crashes

◆ A Europe free of high risk roads – designing for 3-star or better



## Can also do Star Rating from design plans



◆ A Europe free of high risk roads – designing for 3-star or better



## iRAP – a tool in a spectrum of crash analysis



- **Not** “hot spot”, “crash cluster” or “black spots”
- iRAP models safety from drive-through assessment of 52 factors every 100m

single site – safety audit – area wide – mass action – route action – route quality

1979



eg: Trunk road upgrades 1990s



◆ A Europe free of high risk roads – designing for 3-star or better



## Some of the 52 attributes...

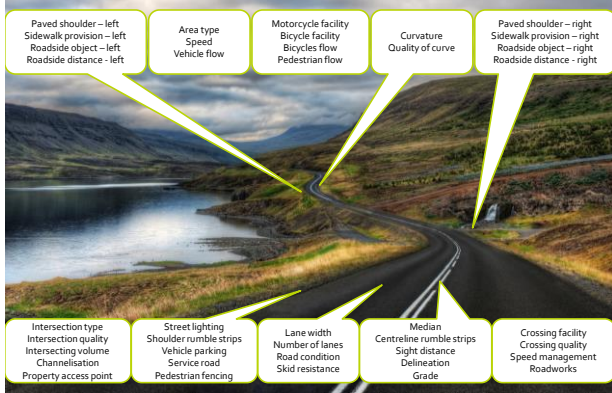


Posted Speed Limit, Operating speed, Traffic volumes  
Lane width, Paved shoulder  
Curvature, Curvature quality  
Delineation, Shoulder rumble strip, Shoulder sealing  
Road condition, skid resistance  
Roadside object to be struck  
Roadside severity (distance from carriageway)  
Intersection type and quality  
Intersecting road volume, minor access point density  
Pedestrian facilities and activity  
Land-use, area type, etc etc etc...

◆ A Europe free of high risk roads – designing for 3-star or better



## Some of the 52 attributes...



## Road Safety Audit alongside iRAP

Topic	Road Safety Audit → Qualitative	iRAP → Quantitative
Method of data collection	?	?
Assessment	?	?
Reporting of risk	?	?
Recommendations	?	?

◆ A Europe free of high risk roads – designing for 3-star or better



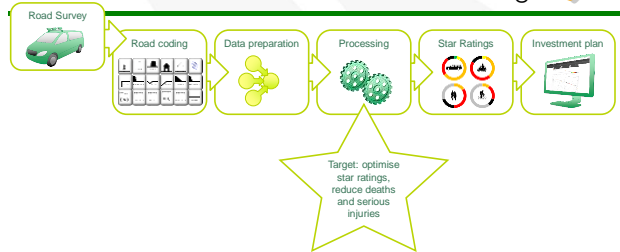
## Road Safety Audit alongside iRAP

Topic	Road Safety Audit → Qualitative	iRAP → Quantitative
Method of data collection	On-site visits / design plans	Survey to collect images at 10m to 20m intervals / design plans
Assessment	Checklist that covers broad number of issues	Coding of fixed list of attributes at 100m intervals Application of risk factors
Reporting of risk	Checklist	Star Rating Scores, Star Ratings, estimates of deaths and serious injuries, estimate of economic cost
Recommendations	List of countermeasures and further work	List of countermeasures at 100m intervals, deaths and serious injuries that could be prevented, economic savings

◆ A Europe free of high risk roads – designing for 3-star or better



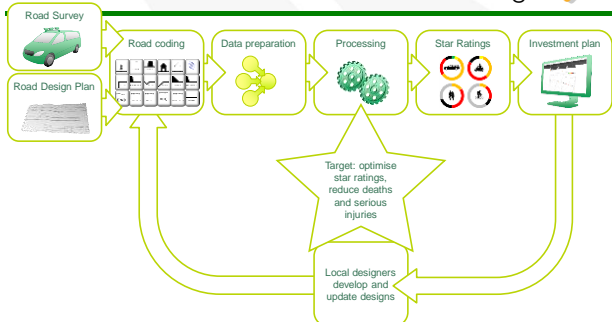
## Process from data collection to Star Rating



◆ A Europe free of high risk roads – designing for 3-star or better



## Process from data collection to Star Rating



◆ A Europe free of high risk roads – designing for 3-star or better



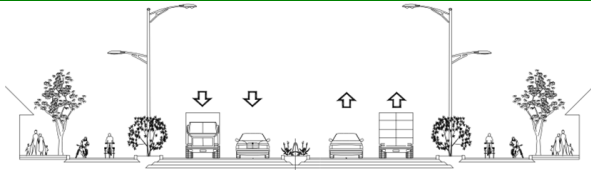
## Advantages of Star Rating a design

- Used as a **key performance indicator (KPI)** to objectively quantify the level of infrastructure risk
- Demonstrate a **reduction in risk** (safety improvement) from baseline or preliminary design stage
- **Proactive method** ensures safe design from the start
- Ability to **set minimum safety levels** for each road user type (3-star minimum)

◆ A Europe free of high risk roads – designing for 3-star or better



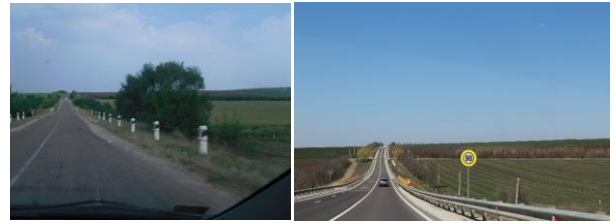
## iRAP assessments: quantitative



	VEH. OCCUPANTS	MOTORCYCLISTS	PEDESTRIANS	BICYCLISTS
80 KMH	★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★ ★
60 KMH	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★

Assumes no intersections

◆ A Europe free of high risk roads – designing for 3-star or better



◆ A Europe free of high risk roads – designing for 3-star or better



◆ A Europe free of high risk roads – designing for 3-star or better



◆ A Europe free of high risk roads – designing for 3-star or better



## RADAR PROJECT CALL FOR PARTICIPATION



- Source of funding: Danube Transnational Programme
- Associated Strategic Partners: travel and accommodation costs covered by ERDF partner 100%
- Submission of full application form expected late February
- Envisaged budget 2.5mil EUR for Danube region countries
- How we can seek for funding for inclusion of SEETO's non Danube countries?

◆ A Europe free of high risk roads – designing for 3-star or better



## DTP and SEETO regions



◆ A Europe free of high risk roads – designing for 3-star or better



## Danube region road safety priorities



- **Extend surveyed** road networks in Danube countries: only sample surveys of 100 to 500 km of road networks have been performed in many Danube countries
- Provide **training, technology and support** that will build and sustain national, regional and local capacity; and
- **Track road safety performance** so that funding agencies can assess the benefits of their investments
- Results shall focus on remedies that provide **safer roads for all users including pedestrians and cyclists**.
- **Practical implementation** of relevant pilots – hand-on knowledge transfer

◆ A Europe free of high risk roads – designing for 3-star or better



## Compliance with the Danube Strategy Target(!)



- List of EUSDR targets  
(As validated in the meeting of National Coordinators and Priority Area Coordinators held in Bratislava on 23 May 2016)
- **Priority Area 1B "To improve mobility and intermodality - rail, road and air"**
- Support efficient freight railway services and improved travel times for competitive railway passenger connections between major cities in the Danube Region (DR) by 2030.
- Support fully functional multi-modal TEN-T Core Network Corridors by 2030.
- Support the development of efficient multimodal terminals at sea, river and dry ports in the Danube Region and ensure their connectivity and access through the integration of all modes of transport and efficient logistics services by 2030.
- Support improvement of the regional air connectivity and the implementation of the Single European Sky initiative.
- **Facilitate the improvement of secondary and tertiary roads in the DR.**
- **Support safe and sustainable transport and mobility in the Danube Region**

◆ A Europe free of high risk roads – designing for 3-star or better



## ROLE OF THE Associated Strategic Partners



- Relevant Ministries and Road Authority
- Advisory, participation in contribution in project meetings and working groups
- Key role in selection of pilots that will match their need and current working plans

◆ A Europe free of high risk roads – designing for 3-star or better



## ROLE OF THE Associated Strategic Partners



- To take active role in selection and implementation of one (or more) pilots:
- Star rating of designs
- Extended Road Start Rating on non-Sensor networks
- VRU facilities Star Ratings for selected routes
- Star rating for schools
- Engineering countermeasures as practical implementation of SRIP

◆ A Europe free of high risk roads – designing for 3-star or better



## RADAR PROJECT WORK PACKAGES



- Management and Coordination
- Communications
- Transnational Road Safety Strategy Mapping
- Best practice exchange and know how transfer
- Pilots implementation and transfer of know how-Matching the needs of Strategic Partners
- Horizontal activity – working with Strategic Partners together on saving lives through infrastructure improvements

◆ A Europe free of high risk roads – designing for 3-star or better



THANK YOU



[www.eurorap.org](http://www.eurorap.org)



[www.irap.org](http://www.irap.org)

◆ A Europe free of high risk roads – designing for 3-star or better





◆ A Europe free of high risk roads – designing for 3-star or better  

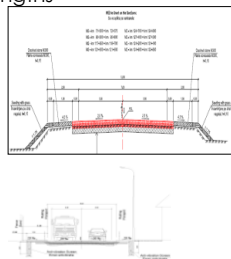
◆ A Europe free of high risk roads – designing for 3-star or better  

### What do design plans show?



#### 1. Road profiles – locations and lengths

- What they **do** show  
road width, lanes, shoulder, carriageway type, slope
- What **do** they **not** show?



◆ A Europe free of high risk roads – designing for 3-star or better  

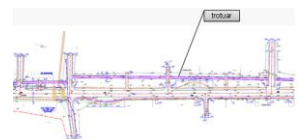
### What do design plans show?





#### 1. Road profiles – locations and lengths

#### 2. Road plan – location of footways, frequency and layout of junctions

What **do** they **not** show?



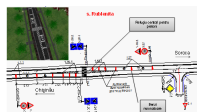
◆ A Europe free of high risk roads – designing for 3-star or better  

◆ A Europe free of high risk roads – designing for 3-star or better  

### What do design plans show?

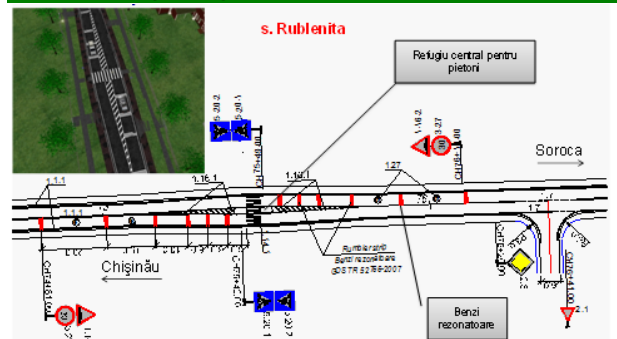




- Road profiles – locations and lengths
- Road plan – location of footways, frequency and layout of junctions
- **Road markings plan** – detail of signing, road markings, supplementary measures such as rumble strips  
What **do** they **not** show?



◆ A Europe free of high risk roads – designing for 3-star or better  

### Road markings – signs and lines



◆ A Europe free of high risk roads – designing for 3-star or better  

## Moldova and Ukraine case studies

- Moldova 2011 and 2015 -- "Before and after"
- <http://www.irap.org/en/about-irap-3/assessment-reports?download=282:m2-r7-moldova>
- Ukraine 2012 and 2016 – roads rated and sections selected for upgrade

<http://www.irap.org/en/about-irap-3/assessment-reports?download=285:m12-corridor-ukraine-assessment-report>



A Europe free of high risk roads – designing for 3-star or better



## A 3-star minimum – not just England

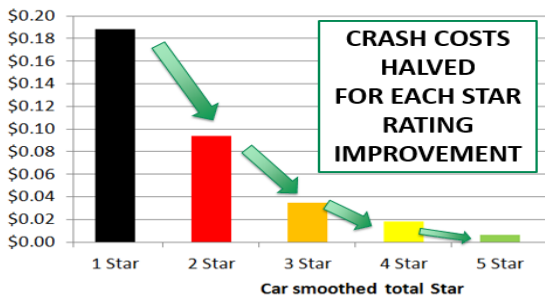
- (Netherlands) No 1- or 2-star national roads by 2020
- (Sweden) 75% of travel on 3-star or better by 2020 and approaching 100% by 2025
- (England) 90% of travel on 3-star or better roads by 2020
- (New Zealand) Roads of National Significance (RONS) to be 4-star
- } Minimum 3-star related targets national highways: Tasmania; and Queensland
- } (Australia) All new roads 4-star and no road user group less than 3-star
- (Malaysia) 3-star or better by 2020 for 75% of travel on high volume networks

A Europe free of high risk roads – designing for 3-star or better



## Star Rating vs crash costs or crash rates

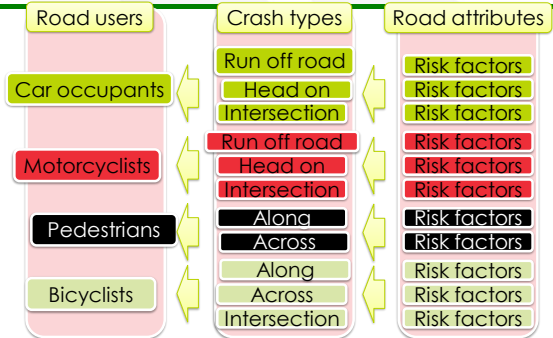
Car smoothed Star Rating vs KSI cost per vKt



A Europe free of high risk roads – designing for 3-star or better



## Feed it all into the multiplicative model...



A Europe free of high risk roads – designing for 3-star or better

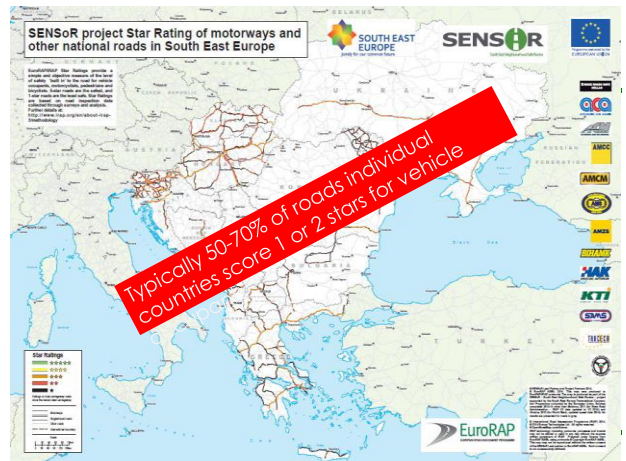


## "How we score what we score"



<http://www.irap.org/en/about-irap-3/methodology>

A Europe free of high risk roads – designing for 3-star or better



## Road Safety Audit alongside iRAP



Topic	Road Safety Audit → Qualitative	iRAP → Quantitative
<b>Method of data collection</b>	On-site visits / design plans	Survey to collect images at 10m to 20m intervals / design plans
<b>Assessment</b>		
<b>Reporting of risk</b>		
<b>Recommendations</b>		

◆ A Europe free of high risk roads – designing for 3-star or better



## Road Safety Audit alongside iRAP



Topic	Road Safety Audit → Qualitative	iRAP → Quantitative
<b>Method of data collection</b>	On-site visits / design plans	Survey to collect images at 10m to 20m intervals / design plans
<b>Assessment</b>	Checklist that covers broad number of issues	Coding of fixed list of attributes at 100m intervals Application of risk factors
<b>Reporting of risk</b>		
<b>Recommendations</b>		

◆ A Europe free of high risk roads – designing for 3-star or better



## Road Safety Audit alongside iRAP



Topic	Road Safety Audit → Qualitative	iRAP → Quantitative
<b>Method of data collection</b>	On-site visits / design plans	Survey to collect images at 10m to 20m intervals / design plans
<b>Assessment</b>	Checklist that covers broad number of issues	Coding of fixed list of attributes at 100m intervals Application of risk factors
<b>Reporting of risk</b>	Checklist	Star Rating Scores, Star Ratings, estimates of deaths and serious injuries, estimate of economic cost
<b>Recommendations</b>		

◆ A Europe free of high risk roads – designing for 3-star or better

