



SENSoR project, EuroRAP applications and example in Albania

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Thank you

- To SEETO for its work
- For the invitation and opportunity
- To the road authorities in the SEETO region who provided data on traffic volumes, crashes, speed and countermeasure costs



This presentation

- The SENSor project in South East Europe
- EuroRAP methodology – brief introduction
- EuroRAP results in Albania as an example
- Aspirations



- Albania
- Bosnia & Herzegovina
- Bulgaria
- Croatia
- FYR Macedonia
- Greece
- Hungary
- Moldova
- Montenegro
- Romania
- Serbia
- Slovakia
- Slovenia
- Ukraine



| Country | Coverage |
|----------------------|-----------------|
| Greece | 3.500km |
| Slovakia | 2.500km |
| Slovenia | 3.150km |
| Hungary | 3.000km |
| Bulgaria | 620km |
| Romania | 540km |
| Serbia | 138km |
| FYROM | 548km |
| Bosnia & Herzegovina | 352km |
| Montenegro | 555km |
| Albania | 533km |
| Croatia | 481km |
| Total | 15.917km |





Headline results – scale of need

- Typically 50-70% of roads in individual countries score 1 or 2 stars (least safe) for vehicle occupants
- More than 4,800 pedestrian crossings surveyed -- 2,150 (44%) were of poor quality
- Commonly, pedestrian activity expected on >40% of networks; footways generally available on <10% of the network



RAP on a global scale – active in 80+ countries



EuroRAP's core activity

Spatial description of risk, and development of infrastructure-related investment packages.

- Where and how are people killed?
- How do we match countermeasures to needs?
- What are the costs and benefits?



How do we Star Rate roads for safety?



Star Rating the safety of roads

- Based upon
 - Road features – 52 features known to affect likelihood and severity of injury
 - Head-on, run-off, intersection crashes
 - The speed at which the road is operated at
 - Car occupants, motorcyclists, pedestrians, bicyclists



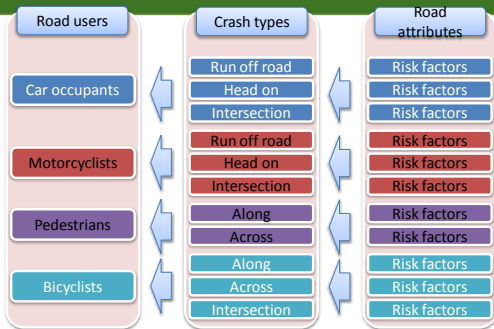
A few of the 52 attributes...

- 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...



RAP Star Ratings

- Video recording of the road
- Survey of road elements that lead to death or serious injury
- Data collected every 100 metres
- 52 road features recorded
- Vehicle occupants, motorcyclists, pedestrians and bicyclists



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



Albania – results





Star rating map – vehicle occupants



Network level safety

- Not simply high risk sites (“blackspots”)
- Raising the standard of the whole network
 - within ongoing maintenance
 - specific accident reduction programmes
 - road rehabilitation



ViDA software gives indicators for what to spend and where and what costs and benefits will be



Safer Roads Investment Plan -Albania

505km of network – 603km carriageway length

Full programme – 30+ countermeasures

- EUR 31m, Eur 50k per carriageway kilometre
- Reduction of 6,610 fatal and serious injuries over 20 years
- Benefit cost ratio (BCR) of 6



Best casualty reductions



- Fatal and serious injuries saved per km per year



Identifying potential location of countermeasures by software zoom

Location for barriers

| Countermeasure | Length (km) | Yrs saved | PV of safety (€k€) | Estimated Cost | Cost per PV saved | Programme BCR |
|--|-------------|-----------|--------------------|----------------|-------------------|---------------|
| Roadside barriers - stone walls | 140.7 km | 3,300 | 12,469,233,622 | 1,815,811,600 | 550,076 | 8 |
| Roadside barriers - stone pillars | 101.8 km | 2,200 | 8,726,742,280 | 1,767,896,800 | 580,374 | 8 |
| Median barriers (Q + 1 type with barriers) | 38.4 km | 1,800 | 8,007,000,801 | 1,054,830,600 | 1,181,086 | 4 |
| Programme countermeasures | 306.1 km | 7,200 | 3,221,125,803 | 256,793,000 | 446,117 | 9 |
| Other countermeasures (general road) | 22.2 km | 600 | 6,760,919,816 | 1,099,086,300 | 1,581,873 | 8 |
| Shoulder loading - stone side of road | 171.4 km | 800 | 3,815,166,346 | 472,214,000 | 524,401 | 8 |
| Shoulder loading - stone pillars (Q + 1) | 181.8 km | 700 | 3,178,882,732 | 403,803,000 | 344,489 | 8 |



Safer roadsides

- Objects within 1-5 metres
- Trees
- Sign/post/poles
- Barriers
- Break-away
- Delineation





Safer overtaking

- Single- to dual-carriageways
- Central median barrier
- Central hatching
- Wide centrelines
- Overtaking-lane



Safer Intersections – control & protection

- Very little control at intersections – few sites with traffic signals
- Many unprotected turns
- Few roundabouts
- Intersection quality (visibility, layout and markings) often judged as poor
- Road markings judged as “poor”



Safer Villages

typical modern treatments



Fatal & serious injuries (FSIs) saved in 20 years by most common measures
(Source: Lawson et al PIRC Conference, Seoul, November 2015, in press)

| Country | Side barriers | Shoulder treatment /marking | Median barrier | Pedestrian provision | Road surface | Sign/lining including inter-sections |
|---|---------------|-----------------------------|----------------|----------------------|--------------|--------------------------------------|
| Albania | 2,960 | 1,250 | 130 | 620 | 910 | 840 |
| Bosnia & Herzegovina | 680 | 520 | -- | 427 | -- | 110 |
| Bulgaria | 3,600 | 2,500 | 3,120 | 3,960 | 2,190 | 1,810 |
| Croatia | 820 | 480 | 72 | 326 | -- | 180 |
| Former Yugoslav Republic of Macedonia | 1,380 | 470 | -- | -- | 219 | 226 |
| Greece | 6,220 | 5,230 | 8,100 | 1,240 | 3,110 | 570 |
| Hungary | 3,370 | 3,450 | 1,890 | 2,220 | 1,730 | 1,010 |
| Montenegro | 1,040 | 188 | -- | -- | 130 | 226 |
| Republic of Moldova | 1,150 | 4,450 | -- | 1,840 | 260 | 1,310 |
| Romania | 2,260 | 1,440 | 4,680 | 2,310 | 430 | 690 |
| Serbia | 279 | 252 | 49 | 173 | 0 | 62 |
| Slovenia | 2,310 | 1,590 | 1,740 | 1,288 | 1,070 | 406 |
| Slovenia | 2,620 | 490 | 100 | -- | 65 | 45 |
| Ukraine | 590 | 1,230 | 1,180 | 4,120 | -- | 1,520 |
| Total | 29,279 | 23,542 | 21,061 | 18,524 | 10,011 | 8,799 |
| % of FSIs saved by most common measures | 21% | 17% | 15% | 13% | 7% | 6% |



Programme costs and benefits

(Source: Lawson et al PIRC Conference, Seoul, November 2015, in press)

| Country | Program cost (EUR (m)) | FSIs saved | EUR(m)/carriageway km | BCR |
|---------------------------------------|------------------------|------------|-----------------------|-----|
| Albania | 31 | 6,610 | 0.05 | 6 |
| Bosnia & Herzegovina | 11 | 2,000 | 0.03 | 5 |
| Bulgaria | 112 | 14,190 | 0.16 | 6 |
| Croatia | 34 | 2,050 | 0.07 | 5 |
| Former Yugoslav Republic of Macedonia | 12 | 1,980 | 0.01 | 6 |
| Greece | 660 | 25,480 | 0.13 | 9 |
| Hungary | 207 | 12,580 | 0.05 | 5 |
| Montenegro | 14 | 1,820 | 0.02 | 6 |
| Republic of Moldova | 39 | 10,670 | 0.02 | 5 |
| Romania | 81 | 9,330 | 0.11 | 7 |
| Serbia | 22 | 850 | 0.18 | 2 |
| Slovakia (first Class roads) | 178 | 7,580 | 0.07 | 5 |
| Slovenia | 171 | 6,790 | 0.05 | 7 |
| Ukraine | 37 | 14,380 | 0.02 | 5 |
| Total | 1,599 | 114,310 | -- | -- |



SEETO road safety priorities for EuroRAP?

- **Extend surveyed** road networks in SEETO countries: only sample surveys of 100 to 500 km of road networks have been performed in many SEETO countries
- **Assess high-risk roads --** develop Safer Roads Investment Plans
- 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.**



The investments and the Benefit-Cost Ratios are
“the best show in town”

– typically 5-6 and higher.

Thank you