Developing EuroRAP Risk Assessments in Greece

Stelios Efstathiadis, Transportation Engineer

Ioannina, 18 November 2010
Road crashes are one of the top three causes of death for 5 to 44 year olds.

World Health Organisation
The Human Impact

- 3,500 people die and 100,000 injured every day
- 90% of deaths in low and middle income countries
- Biggest killer of 10-17 year old children
- Significant personal and financial impacts on families
The Economic Impact

- 1-3% of GDP per annum per country
- US $2-4 billion a day globally
Europe
Regional Director: Jo Hill

**EuroRAP**
Active in 33 countries
More than 200,000km assessed

**Czech**
Risk Maps for 6,500km show 33% drop in the number of higher risk roads

**Poland**
Assessment of 17,000km of national roads show 60% high risk

**Serbia**
US$60 m plan to prevent 6,000 KSI

**Slovenia**
Risk Maps for 6,500km of motorways, main roads and regional

**Czech**
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**UK**
Annual performance tracking to 2020 on 50,000km rural network

**Italy**
‘Individual’ Risk Maps now for motorways

**Greece**
Risk Maps the whole European Network by March 2011

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North America
Regional Director: Peter Kissinger

Canada
Potential trial identified for 2 provinces

United States
Some 80,000km assessed, including validation of star ratings

KSI = killed and seriously injured
Latin America
Regional Director: Julio Urzua

- **Meso American Highway**
  - 4,200km assessment through 7 countries

- **Costa Rica**
  - $50m programme saving 14,700 KSI’s

- **Paraguay**
  - Capacity-building and inspection supported by IDB

- **Argentina**
  - 3,100km assessment across national and Cordoba State highways

- **Chile**
  - US$32m plan to prevent 19,000 KSI

- **Mexico**

KSI = killed and seriously injured

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Asia Pacific
Regional Director: Greg Smith

China
Inspections of 2,100km of highway underway

India
Pilot project linked to US$25 m investment

Bangladesh
Pilot project underway

Malaysia
US$100m plan to prevent 33,000 KSI. 1st 5-day training course in 2010

Korea
Pilot project underway

Philippines
Major project underway

Vietnam
US$195 m plan to prevent 78,000 KSI

Australia
30,000+ km assessed

New Zealand
10,000+ km assessed

KSI = killed and seriously injured
Kenya
$US100 million plan that could cut KSI by 25%

South Africa
US$60 m plan to prevent 8,300 KSI's

Nigeria
Demonstration project completed. Proposal to extend to entire country

Malawi
Project proposal under development

Uganda
$US32 million plan to prevent 29,000 KSI's

Kenya
$US100 million plan that could cut KSI by 25%

Tanzania
3100km assessment completed

KSI = killed and seriously injured

International Director: John Mumford
EuroRAP Philosophy

The safe road system is a shared responsibility

Rocks

User

Vehicle
Risk Mapping – Individual risk

- Based on real accident & traffic data
- Colour coded maps showing risk of death & serious injury on a network
- Effective way of benchmarking within and between countries
- Important first step for nations with access to data
- Gives important direction for later stages
Risk Mapping – Collective risk

- Aimed at road operators
- Highlights roads where high crash numbers occur
- Closely related to traffic flow (high volume roads often highlighted)
Performance Tracking

- Allows agencies to measure & celebrate success
- Supports continuous improvement
Protocol 3 - Star Rating

- As in EuroNCAP car crash tests
- 1 - 5 stars dependent upon crash protection

“...the extent to which the road infrastructure determines the likelihood of an accident and protects the car occupants from being severely injured or killed once an accident occurs”
Star Rating

• Video inspection of the road

• 30+ road features assessed

• Model based on crash studies from around the world

• Star Ratings calculated

• Economic countermeasures recommended
Demonstration in Crete
Car occupant Star Ratings
Demonstration in Crete
Motorcyclist Star Ratings
Demonstration in Crete Pedestrian Star Ratings
Example in Crete
Future Plans Risk Mapping - 1st Stage
Future Plans
Risk Mapping - 2\textsuperscript{nd} Stage
### Example risk factors – horizontal alignment

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight or gently curving</td>
<td>1.00</td>
</tr>
<tr>
<td>Moderate curvature</td>
<td>2.20</td>
</tr>
<tr>
<td>Sharp curve</td>
<td>3.50</td>
</tr>
<tr>
<td>Very sharp</td>
<td>6.00</td>
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</table>
Sources of data

- Examples:

Mean acceleration (m²/s)
iRAP Star Rating

Road users
- Vehicle occupants
- Motorcyclists
- Pedestrians
- Bicyclists

Crash types
- Run off road
- Head on
- Intersection
- Along
- Across
- Intersection

Road attributes
- Risk factors
iRAP Star Rating

Road users
- Motorcyclists

Crash types
- Run off road
- Head on
- Intersection

Road attributes
- Speed
- Roadside severity – left
- Roadside severity – right
- Lane width
- Paved shoulder
- Curvature
- Curvature quality
- Delineation
- Shoulder rumble
- Road condition
- Facilities for m/c

- Speed
- Median type
- Number of Lanes
- Lane width
- Curvature
- Curvature quality
- Road condition

- Speed
- Intersection type
- Intersecting road volume
- Intersection quality
- Minor access density
iRAP Star Rating

Road users
- Bicyclists

Crash types
- Along
- Across
- Intersection

Road attributes
- Speed
- Roadside severity – left
- Roadside severity – right
- Lane width
- Paved shoulder
- Curvature
- Curve quality
- Delineation
- Road condition
- Facilitates for bikes
- Side friction
- Speed
- Crossing facilities
- Number of lanes
- Median type
- Crossing facilities
- Crossing facilities quality
- Speed
- Intersection type
- Intersecting road volume
- Intersection quality
- Minor access density
iRAP Star Rating process

Road Inspection Data → Road Protection Scores → Star Rating → Road Safety Investment Plan

Car Occupant RPS

Run-off
- Protection
- Likelihood
- Crash Factor

Head-on
- Protection
- Likelihood
- Crash Factor

Intersection
- Protection
- Likelihood
- Crash Factor
iRAP Countermeasures

- 70 proven countermeasures
- 300+ engineering trigger sets
- Calculate potential lives saved
- Minimum BCR criteria set
70 ‘countermeasures’ considered

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RPS \times \text{traffic volume} \times \text{calibration factor}

Deaths and serious injuries (before)

Apply countermeasures $\rightarrow$ new RPS

Deaths and serious injuries (after)

Reduction in deaths and serious injuries and economic benefit
www.irap.org/toolkit

- Free resource to help road safety practitioners
- Easy to use and simple, concise research
- A ‘living’ document
- Can help promote knowledge and the Safe System
Thank you for your attention

Stelios Efstathiadis
Technical Director
TRANSPORTATION SOLUTIONS
Developing EuroRAP Risk Assessments in Greece
with co-operation of ELPA & Road Safety Institute ‘Panos Mylonas’