Management of Road Infrastructure Safety

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IRTAD Working Sub-Group
Background

• Road infrastructure safety may be critical for road safety enhancement, especially in emerging economies.
• Traditional «reactive» approach to road safety (e.g. high risk site management) is becoming ineffective in more advanced countries.
• Moving towards a Safe System approach where the Road Administration has responsibility for the safety of the infrastructure.
IRTAD WG - Management of Road Infrastructure Safety

**Aims:**

1. To describe the most consolidated RISM procedures.
2. To analyse the use of RISM procedures worldwide and to identify possible barriers to their implementation.
3. To provide example of good practices.
4. To provide recommendations for the implementation of RISM procedures.

**Working Group participants:**
Argentina, Austria, France, Germany, Greece, Italy, Korea, South Africa
The IRTAD Report on “Management of Road Infrastructure Safety”

1. Introduction
2. Road Infrastructure Safety Management: An Overview
3. Road Infrastructure Safety Management Worldwide
4. Good Practices of Road Infrastructure Safety Management
5. Conclusion and Recommendations for Better Road Infrastructure Safety Management
Road Infrastructure Safety Management procedures

- Road Safety Impact Assessment (RIA)
- Road safety measures Efficiency Assessment Tools (EAT)
- Road Safety Audit (RSA)
- Network Operation (NO)
- Road Safety Performance Indicators (SPIs)
- Network Safety Ranking (NSR)
- Road Assessment Program (RAP)
- Road Safety Inspection (RSI)
- High Risk Sites (HRS)
- In-depth Investigation
Description of RSIM procedures

• Introduction
• Tools and data needed
• Common practices
• A synthesis:

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Compare different implementation scenarios from road safety point of view</th>
</tr>
</thead>
<tbody>
<tr>
<td>When</td>
<td>RIA is generally undertaken at planning stage (stage 1) and before a major upgrading of the infrastructure (stage 6).</td>
</tr>
<tr>
<td>Where</td>
<td>Part of the road network potentially influenced by a measure.</td>
</tr>
<tr>
<td>Data</td>
<td>Roadway related, Traffic related, Measures related</td>
</tr>
</tbody>
</table>
Putting it all together (1)

1. Planning & Design
   - Road safety Impact Assessment
   - Efficiency Assessment Tools
   - Road Safety Audit

2. Construction & Pre-opening
   - Road Safety Audit

3. Normal Operation
   - Road Network Operation
   - Safety Performance Indicators
   - Network Safety Ranking

4. Maintenance & Renewal
   - Road Network Operation
   - Road Safety Inspection
   - Road Assessment Program

5. Error correction, Hazard elimination
   - High Risk Sites
   - Road Safety Inspection
   - Road Assessment Program
   - In-depth investigation

6. Major upgrading & Renewal
   - Road safety Impact Assessment
   - Efficiency Assessment Tools
Putting it all together (2)

Data required:
- Traffic data
- Road data
- Crash data
- Measures related data

RISM Procedure:
1. Road Safety Impact Assessment - RIA
2. Efficiency Assessment Tools - EAT
3. Road Safety Audit - RSA
4. Network Operation - NO
5. Road Infrastructure SPI
6. Network Safety Ranking - NSR
7. Road Assessment Programs - RAP
8. Road Safety Inspection - RSI
9. High Risk Sites - HRS
10. In-depth Investigation

Purpose:
- Compare different scenarios from road safety point of view
- Identify the most efficient measure from a list of potentially effective
- Maintain the current level of safety of roads
- Assess the current level of safety of a road network
- Identify infrastructure or traffic related factors increasing injury/accident risk
- Rank elements of a road network based on their safety level
- Other, e.g. Identify vehicle related factors that increase injury or accident risk.
What are the main barriers that may prevent the use of RISM procedures?

![Bar chart showing selected number of times for different RISM procedures]

- Lack of resources/tools
- Not recommended/imposed
- Unfamiliar/Unknown
- Data not available
- Not applied anyway/Reason unknown
- Other
Who is implementing a pro-active approach?

Number of road life cycle stages covered by fully implemented RISM procedures

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ireland</td>
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</tr>
<tr>
<td>Switzerland</td>
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</tr>
<tr>
<td>Netherlands</td>
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</tr>
<tr>
<td>Sweden</td>
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<tr>
<td>Hungary</td>
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<td>Germany</td>
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</tr>
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<td>France</td>
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<td>Austria</td>
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<td>Japan</td>
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<td>Argentina</td>
<td>0</td>
</tr>
<tr>
<td>South Africa</td>
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</tr>
</tbody>
</table>
Good practices

- To better understand possible issues related to barriers highlighted within the survey.
- To identify (affordable) solutions to these issues.
- To report good practices showing how these issues have been overcome in some countries.
Key Messages of the Report
Key Message 1

• **Road Authorities are key players for improving road safety**
  – In the USA, road conditions contribute in 53% of all road deaths and 38% of all injuries.
  – There are substantial opportunities, programs, and tools to improve safety of road infrastructure.
  – Road safety measures should be defined and implemented according to preference and circumstances of each country.
Key Message 2

- **Road Infrastructure Safety Management procedures are effective and efficient**
  - RIAs and EATs provide better information to policy makers in order to make better decisions.
  - RSAs and RSIs have shown positive cost-benefit-ratios, up to 99:1.
  - Regular use of RAP has shown improvements in Spain, UK and Sweden.
  - HRS (and potentially NSR) approach results in an 18% reduction in casualties.
Key Message 3

• **Success factors for the implementation of a RISM procedure are:**
  - adequate level of investment
  - a supporting regulation
  - road safety data
Key Message 4

- A critical requisite is an adequate institutional management capacity to support the development and implementation of effective interventions.
  - The risk exists that a formal procedure becomes a purely ritual act.
  - Critical factors include: political commitment to improving safety, the adoption of ambitious safety targets, vertical and horizontal co-ordination, stable funds.
Key Message 5

• **Several tools supporting road infrastructure safety management are already available.**
  
  – International guidelines and manuals are nowadays available.
  
  – National guidelines and software are available in many countries (e.g. Australia, Austria, Canada, Finland, Germany, Greece, Ireland, Japan, the Netherlands, Norway, Spain, Sweden, UK, USA, etc.)
Key Message 6

• Each country has specific needs and has to cope with specific barriers to the implementation of RISM as different conditions exist.
  – There is no procedure better than other, and it is not the case that a more extensive use of these tools automatically ensures a superior road safety performance.
  – Procedures should be adapted to the specific conditions of each country.
  – Low and medium income countries can focus on low budget procedures.
Key Message 7

- **Road design standards cannot guarantee road safety in all conditions.**
  - Designers may be encouraged to reduce construction cost and are not aware of future traffic conditions.
  - The relationship between design standards and road safety is unclear and the level of safety designed into roads is unpremeditated (Hauer, 1999).
  - Design standards are important to keep up with nominal safety. Substantive safety must be considered in design process to care for safety in principle.
Key Message 8

- **Road infrastructure should be improved with the development of self-explaining roads to guide drivers to adopt appropriate behaviours.**
  - Evidence of increased safety after the implementation of the self-explaining roads.
  - In general a more pro-active approach to road infrastructure design and management is desired (e.g. Vision Zero, Sustainable Safety, Safe System, Safety Conscious Planning).
Key Message 9

• *Road safety performance monitoring helps to achieve safety target of road authorities.*
  
  – A target should be defined and progress toward the safety target should be monitored.
  
  – Fundamental road safety performance indicators can be the number of road accidents or fatalities per unit distance or unit number of vehicles or vehicle travelled.
  
  – Monitoring can be effective if the exact location of accidents or x, y coordinates are available.
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