Two-wheeler safety in Athens:
An application of the eSUM Action Pack

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The eSUM Action Pack overall approach:

- Analysis of the PTW problem
- Identification of causes and definition of objectives
- Selection of interventions and development of a safety plan
- Implementation and monitoring of the interventions
- Evaluation of the interventions or the plan
Objective

- Implementation of the eSUM Action Pack for the analysis of powered two-wheelers safety in Athens, Greece
  - Analysis of current situation
  - Identification of problems and causes
  - Selection of necessary interventions
  - Implementation of interventions
  - Evaluation of interventions

- Synthesis of the results of the implementation of the Action Pack within a broader road safety analysis context
• Analysis of contextual data (background of PTW use in the city)
  • General: Demographic and social-economic data, town model, road network (design, hierarchy, furniture etc.)
  • Vehicles and mobility: vehicle fleet, mobility distribution by mode, driving habits, public transport, parking
  • Safety actions: legislation, campaigns, measures, enforcement.

• Analysis of accident data (description of the collision issues)
  • Road accident data: location, data, time, weather etc.
  • Vehicle data: type of vehicle, vehicle age, vehicle manoeuvre
  • Casualty data: age, gender, injury severity, injuries location and description
  • PTW user data: age, licence, experience.
eSUM approach for problem identification

- Problem identification
  - Examination of casualty trends, locations of clusters of PTW collisions, prevailing conditions (weather, road surface etc.), high risk groups (age, vehicle type etc.), common collision types
  - Association with an indicative yet detailed list of problems and causes

- Identification of high risk sites (black spots)
  - By means of dedicated techniques

- Target setting
  - Qualitative or quantitative, but clearly defined
eSUM approach for interventions selection

- Selection and prioritisation of interventions
  - well oriented to objectives
  - well balanced: a mix of measures (training, awareness, enforcement, road design)
  - evaluated by cost-benefit and time development.

The eSUM Good Practice Guide provided guidance on potentially successful casualty reduction interventions.
Towards an integrated approach

- Accident data
  - Social costs
  - Number of killed and injured
  - Safety performance indicators
  - Safety measures and programmes
  - Structure and culture

- Contextual data

Source: SUNflower
Application for the city of Athens

- The population of the Athens area is 40% of the total population of Greece.

- The number of motorcycles registered in the Athens area is 44% of the total number of registered motorcycles in Greece (32% for mopeds).

- The number of motorcycle casualties in Athens area is 57% of the total number of PTW casualties in Greece (30% for fatalities).
Structure and culture

- Population: 4,500,000 inhabitants
- Surface: 465,000 Km² (density: 10 inh/km²)
- Road network length: 16,000 km (4,200 junctions)

- Climate and congestion make PTW riding very attractive

- Limited respect of road rules
- PTW traffic education need further attention
- The structure and organisation of the Public Authorities as regards road safety can be significantly improved
- Implementation of the National Strategic Road Safety Plans is not systematic
Programmes and measures

- PTW users driving lessons: Compulsory
- Legal access age: 16 for mopeds, 18 for motorcycles
- Compulsory periodical technical inspections

- Helmet wearing law: Obligatory (more than 25,000 violations recorded in the Athens area on 2009)

- Enforcement/penalty levels are defined in the Greek traffic law
  - More than 52,000 speeding violations in the Athens area
  - More than 10,000 alcohol violations in the Athens area (out of 340,000 controls)

- Quality of road design standards with respect to powered two-wheeler specifications (visibility, obstacle-free zones, road surface) is not satisfactory
- Traffic management for PTW is not sufficient
- Few PTW information campaigns
Infrastructure programmes and measures

- A large programme for identification of high risk sites in the Athens area (2008 - 2009)

- Engineering study completed
  - identification of 90 high risk sites (70 junctions)
  - identification of interventions
  - design of low cost measures

- Implementation of measures (5 million euros)
Safety performance indicators

- 3,1 million registered PTW in Greece on 2009 (32% of the total fleet)
  - Passenger cars per inhabitant in the Athens area for 2009: 0.60
  - Motorcycles per inhabitant in the Athens area for 2009: 0.14
  - Mopeds per inhabitant in the Athens area for 2005: 0.11
  - Average yearly vehicle kilometres in urban areas are:
    - 7,176 for passenger cars, and 5,769 for PTW in Greece for 2008

- In 2008 in Athens, 208 accidents occurred with at least one powered two-wheeler rider involved with an alcohol level above the legal limit.
  - More than 50% of driver alcohol control results are unknown

- Roadside surveys in Athens for 2008, reveal use of helmet:
  - 74% for the front rider and 45% for the back rider
  - Helmet use reaches 95% outside urban areas (both riders), against 73% inside urban areas (front rider)
Number of killed and injured (1/2)

- PTW casualties and total casualties in Athens and in Greece per injury severity (2008)

<table>
<thead>
<tr>
<th></th>
<th>Killed</th>
<th>Seriously injured</th>
<th>Slightly injured</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All casualties* - Athens</td>
<td>232</td>
<td>345</td>
<td>7212</td>
<td>7789</td>
</tr>
<tr>
<td>PTW casualties - Athens</td>
<td>133</td>
<td>224</td>
<td>4334</td>
<td>4691</td>
</tr>
<tr>
<td>% PTW casualties - Athens</td>
<td>57,3%</td>
<td>64,9%</td>
<td>60,1%</td>
<td></td>
</tr>
<tr>
<td>All casualties* - Greece</td>
<td>1305</td>
<td>1611</td>
<td>14756</td>
<td>17672</td>
</tr>
<tr>
<td>PTW casualties - Greece</td>
<td>435</td>
<td>803</td>
<td>6969</td>
<td>8207</td>
</tr>
<tr>
<td>% PTW casualties - Greece</td>
<td>33,3%</td>
<td>49,8%</td>
<td>47,2%</td>
<td></td>
</tr>
</tbody>
</table>

*pedestrians not included

- Number of PTW casualties per 100,000 inhabitants in Athens (2008): 191

- Trends 2002 - 2008: PTW fatalities in the Athens area were increased by 28%, whereas total fatalities in the Athens area were reduced by 5%
- **Accident risk rates - drivers killed per million vehicle kilometres – per vehicle type and area type (Greece, 2004)**

<table>
<thead>
<tr>
<th></th>
<th>Moped</th>
<th>Motorcycle</th>
<th>Passenger car</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inside urban area</strong></td>
<td>31.8</td>
<td>73.0</td>
<td>5.7</td>
<td>11.8</td>
</tr>
<tr>
<td><strong>Outside urban area</strong></td>
<td>106.3</td>
<td>142.1</td>
<td>10.2</td>
<td>12.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>41.7</td>
<td>85.7</td>
<td>8.1</td>
<td>12.3</td>
</tr>
</tbody>
</table>

- **Accident risk rates per vehicle type and driver age (Greece, 2004)**

<table>
<thead>
<tr>
<th>Driver age</th>
<th>Moped</th>
<th>Motorcycle</th>
<th>Passenger car</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-17</td>
<td>54.7</td>
<td></td>
<td></td>
<td>54.7</td>
</tr>
<tr>
<td>18-24</td>
<td>26.7</td>
<td>202.0</td>
<td>25.2</td>
<td>40.6</td>
</tr>
<tr>
<td>25-34</td>
<td>18.4</td>
<td>62.3</td>
<td>7.7</td>
<td>11.9</td>
</tr>
<tr>
<td>35-44</td>
<td>45.3</td>
<td>59.5</td>
<td>6.3</td>
<td>9.3</td>
</tr>
<tr>
<td>45-54</td>
<td>42.5</td>
<td>30.1</td>
<td>5.3</td>
<td>6.3</td>
</tr>
<tr>
<td>55-64</td>
<td>26.6</td>
<td>141.9</td>
<td>6.5</td>
<td>7.9</td>
</tr>
<tr>
<td>&gt;65</td>
<td>357.8</td>
<td>115.4</td>
<td>11.5</td>
<td>17.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>40.1</td>
<td>77.8</td>
<td>8.0</td>
<td>11.8</td>
</tr>
</tbody>
</table>
Social costs

Road accidents cost in Greece

<table>
<thead>
<tr>
<th>Euros 2006</th>
<th>Cost of Accidents with</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Killed</td>
</tr>
<tr>
<td>Material Damage cost</td>
<td>36.076</td>
</tr>
<tr>
<td>Generalised cost</td>
<td>554.833</td>
</tr>
<tr>
<td>Human cost (vosl)</td>
<td>1.018.669</td>
</tr>
<tr>
<td>Total cost</td>
<td>1.609.577</td>
</tr>
<tr>
<td>Number of PTW accidents casualties in Athens</td>
<td>160</td>
</tr>
</tbody>
</table>

VOSL: value of statistical life

Estimated yearly benefit from the prevention of around 4,600 PTW road accidents with around 5,400 casualties in total in the Athens area: 490 million Euros
Identification of problems and causes

- High number of PTW
- Inappropriate behaviour of drivers and PTW riders
- Low helmet use
- Young riders, novice riders
- Motorcycle riders more risky than moped riders
- Inadequate traffic education
- Lack of targeted road safety measures and programmes for PTW safety
- Serious weaknesses of the structure and organisation of national and local authorities, with direct impact on road safety

- High risk sites and related problems identified
Selection of necessary interventions

*Good practice Guide was also taken into account*

- Enforcement intensification for:
  - riders speeding
  - helmet use
  - appropriate behaviour of drivers

- Targeted campaigns for:
  - young and novice riders
  - for drivers

- Target setting and selection of specific measures
- Systematic monitoring of the measures implementation and of the targets
- Strengthening road safety administration within the local Authorities
Selection of infrastructure interventions

- Raised junctions for reducing speed in residential areas
- Bollards for preventing illegal parking and improving visibility, especially at junction areas
- Guardrails for preventing illegal crossing by pedestrians and use of the sidewalks by PTWs
- Improved traffic signaling programmes
- Implementation or improvement of a complete set of road markings and traffic signs
- Improvement of lighting
The eSUM approach and the pyramid

- In general, the pyramid allows for a complete picture of the road safety phenomenon and useful insight on the road accidents causality.

- “Safety Performance Indicators” is the “weakest link” in the middle of the pyramid that impedes information flow.

- The links between the layers of the pyramid are as important as the layers.

- The pyramid can be used to complement the eSUM Action Pack, providing a yet more integrated framework for PTW safety improvement.
Conclusion

- The eSum Action Pack gathers and organises all necessary steps and related information in order to be usable by the local decision makers.

- It provides a comprehensive guide containing in an organized way all necessary steps for improving PTW safety at city level.

- The Action Pack may efficiently assist analyses and decisions not only at implementation level, but also at strategic level.

- There is need for wide dissemination of the eSUM Action Pack (and the related successful examples) to all local public Authorities in Europe.