European Modular System

Roundtable on EMS

16th IRF World Road Meeting - Lisbon
European Modular System

EMS – Overview
- What’s an EMS
- Interesting features (for us)

EMS – The Question of Mobility
- Could EMS be useful for mobility?
- Some results

European situation for Road Restraint Systems
- What is a RRS and how is it tested?
- What is the level that a RRS can reach today?
- What is the level of safety present in Europe?

EMS – The RRS point of view
- Could EMS be an issue?
- Could EMS be welcome on the EU infrastructure as it is?
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EMS - Overview

- What's an EMS

- Range Weight: 40 to 60 tons
- Max Length: 25,25 m
- National Traffic: Sweden & Norway
- Testing in:
  - Netherlands
  - Denmark
  - Germany (?)
  - France (?)
EMS - Overview

- Interesting features (for us)

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  - Germany (?)
  - France (?)

...Speed Limit? Let’s say 80 km/h
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EMS - The Question of Mobility

- Could EMS be an interesting solution?

...Yes, they could...
EMS – The Question of Mobility

- Some results

Example of traffic on a given road, with a given flow and a certain weight of transported goods:

<table>
<thead>
<tr>
<th>Infrastructure Type</th>
<th>Vehicles Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Case</strong></td>
<td></td>
</tr>
<tr>
<td>Motorway, 2 lanes</td>
<td>Max 44t</td>
</tr>
<tr>
<td><strong>2nd Case</strong></td>
<td></td>
</tr>
<tr>
<td>Motorway, 2 lanes</td>
<td>Max 60t</td>
</tr>
</tbody>
</table>
### EMS – The Question of Mobility

- **Some results**

<table>
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<th>2nd Case</th>
<th>Infrastructure Type</th>
<th>Vehicles Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motorway, 2 lanes</strong></td>
<td><strong>Max 60t</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Max weight: 44 Tons**

7:00 AM → No Jam
EMS – The Question of Mobility

- Some results

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</tr>
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Max weight: 44 Tons

8:00 AM → Traffic Jam
EMS – The Question of Mobility

- Some results

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</tr>
<tr>
<td>2nd Case</td>
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</tbody>
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Max weight: 60 Tons

8:00 AM → No Jam
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www.irf2010.com
A proper RRS avoid this:

Accident entre Trieste et Venise sur l’A4 :
7 morts
(10/08/2008)
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European Situation for Road Restrain Systems

- What is a RRS and how is it tested?

Safety Barriers

Regulated by

Norm
EN 1317

Containment Level

Mass

Speed

Angle

20°
**European Situation for Road Restraint Systems**

- **What is a RRS and how is it tested?**

## Containment Levels

<table>
<thead>
<tr>
<th></th>
<th>N2</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
</tr>
</thead>
<tbody>
<tr>
<td>kg</td>
<td>1.500</td>
<td>10.000</td>
<td>13.000</td>
<td>16.000</td>
<td>38.000</td>
</tr>
<tr>
<td>km/h</td>
<td>110</td>
<td>70</td>
<td>70</td>
<td>80</td>
<td>65</td>
</tr>
</tbody>
</table>

→Different Barrier=Different Quantity of Energy Absorbed

[www.irf2010.com](http://www.irf2010.com)
What is the level that a RRS can reach today?

**Containment Levels**

- **Normal Level**
- **High Level**
- **Very High Level**

**Side Impact Energy (kJ)**

- N1: 43 kJ
- N2: 43 kJ
- H1: 43 kJ
- H2: 462 kJ
- H3: 462 kJ
- H4a: 462 kJ
- H4b: 462 kJ
European Situation for Road Restrain Systems

- What is the level that a RRS can reach today?

![Graph showing energy vs. mass with different laws and thresholds for different speeds and masses.]

- Transversal Energy

www.irf2010.com
European Situation for Road Restrain Systems

What is the level that a RRS can reach today?

[Diagram showing the energy levels and corresponding laws for different vehicles and speeds.]
What is the level of safety present in Europe?

<table>
<thead>
<tr>
<th>Country</th>
<th>Side Barrier</th>
<th>Central Barrier</th>
<th>Bridge Barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>H2</td>
<td>H2</td>
<td>H3</td>
</tr>
<tr>
<td>Belgium</td>
<td>H2</td>
<td>H2</td>
<td>H4b</td>
</tr>
<tr>
<td>Denmark</td>
<td>H1</td>
<td>H2</td>
<td>H3</td>
</tr>
<tr>
<td>Finland</td>
<td>N2</td>
<td>N2</td>
<td>H2</td>
</tr>
<tr>
<td>France</td>
<td>N2</td>
<td>H1</td>
<td>N2</td>
</tr>
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</table>
# European Situation for Road Restrain Systems

What is the level of safety present in Europe?

<table>
<thead>
<tr>
<th>Motorways:</th>
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<tbody>
<tr>
<td>Germany</td>
<td>H2</td>
<td>H2</td>
<td>H4</td>
</tr>
<tr>
<td>Ireland</td>
<td>N2</td>
<td>H2</td>
<td>H2</td>
</tr>
<tr>
<td>Italy</td>
<td>H2</td>
<td>H3</td>
<td>H4b</td>
</tr>
<tr>
<td>Norway</td>
<td>N2</td>
<td>N2</td>
<td>H2</td>
</tr>
<tr>
<td>Spain</td>
<td>H1</td>
<td>H2</td>
<td>H3</td>
</tr>
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</table>
European Situation for Road Restraint Systems

- What is the level that a RRS can reach today?

![Graph showing the energy levels reached by different weights and speeds](image)

- Law $V \leq 120$ km/h
- Law $V \leq 90$ km/h if $M \geq 7.5$ t
- Law $M \leq 44$ t

<table>
<thead>
<tr>
<th>$E$ (kJ)</th>
<th>725kJ</th>
<th>572kJ</th>
<th>462kJ</th>
<th>287kJ</th>
<th>127kJ</th>
<th>82kJ</th>
<th>43kJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M$ (t)</td>
<td>H4b</td>
<td>H4a</td>
<td>H3</td>
<td>H2</td>
<td>H1</td>
<td>N2</td>
<td>N1</td>
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Transversal Energy
European Situation for Road Restrain Systems

- What is the level that a RRS can reach today?

![Diagram showing the level of energy a RRS can reach today.](image-url)
European Situation for Road Restrain Systems

- What is the level that a RRS can reach today?

![Graph showing the energy levels for road restraint systems in different countries](image)

...But...

France
European Situation for Road Restrain Systems

- What is the level of safety present in Europe?

Truck vs H2 Barrier
European Situation for Road Restrain Systems

- What is the level of safety present in Europe?

Truck vs H4b
Higher speed then testing
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- Could EMS be an issue?

...Of course, it could be...
EMS – The RRS point of view

- Could EMS be welcome on the EU infrastructure as it is?

The improvement of the infrastructure needed to safely welcome an EMS is not much bigger than the one needed to welcome a 44 tons.. Which is already welcome!!
Thank you for your attention