Passenger Safety on Modern Vehicle Restraint Systems

Dr. Thomas Edl – DELTA BLOC®
What is a MODERN VEHICLE RESTRAINT SYSTEM?
What is a MODERN VEHICLE RESTRAINT SYSTEM?

- Crash Tested VRS
- NOT Crash Tested VRS
What is a MODERN VEHICLE RESTRAINT SYSTEM?

- Crash Tested VRS
- NOT Crash Tested VRS
Modern Vehicle Restraint System

What is a MODERN VEHICLE RESTRAINT SYSTEM?

► Crash Tested VRS

► 2011: with CE Marking

► 2011: without CE Marking
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What is a MODERN VEHICLE RESTRAINT SYSTEM?

- Crash Tested VRS
- 2011: with CE Marking
- Performance at State of the Art
- Performance from Yesterday

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Modern Vehicle Restraint System

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The Basics of Passenger Safety

We develop safety.
The Basics of Passenger Safety

How can we evaluate the Quality of a Restraint System in Terms of Passenger Safety?
The Basics of Passenger Safety

How can we evaluate the Quality of a Restraint System in Terms of Passenger Safety?

European Standard EN 1317

- **ASI** (Acceleration Severity Index)
- **THIV** (Theoretical Head Impact Velocity)
- **PHD** (Post Impact Head Deceleration)
How can we evaluate the Quality of a Restraint System in Terms of Passenger Safety?

**European Standard EN 1317**

**ASI** (Acceleration Severity Index)

<table>
<thead>
<tr>
<th>ASI class</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$\text{ASI} \leq 1,0$</td>
</tr>
<tr>
<td>B</td>
<td>$1,0 &lt; \text{ASI} \leq 1,4$</td>
</tr>
<tr>
<td>C</td>
<td>$1,4 &lt; \text{ASI} \leq 1,9$</td>
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How can we evaluate the quality of a restraint system in terms of passenger safety?

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ASI (Acceleration Severity Index)

<table>
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<tr>
<th></th>
<th>ASI</th>
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</tr>
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<tr>
<td>A</td>
<td>1,0</td>
<td>ASI ≤ 1,0</td>
</tr>
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For a detailed explanation and data, please visit www.delta bloc.com.
The Basics of Passenger Safety

How can we evaluate the Quality of a Restraint System in Terms of Passenger Safety?

► European Standard EN 1317
  ► Part 5: CE-Marking starting 2011 !!!
  ALL EU-COUNTRIES !!!
The Basics of Passenger Safety

How can we evaluate the Quality of a Restraint System in Terms of Passenger Safety?

The Vehical Behaviour

- What happens inside the Vehicle?
- Drivers Control of the Vehicle
- Stability and Roll Over Risk
The Basics of Passenger Safety

How can we evaluate the Quality of a Restraint System in Terms of Passenger Safety?

Let us ask Mr. FABIAN from Austria!
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The Influence of ...

► the impacting Vehicle Type
► the Application of the Restraint System
► the Measuring and Testing Method

... on Passenger Safety!
... the impacting Vehicle Type

- Light Passenger Cars  TB11
- Heavy Passenger Cars  TB32
- Busses  TB51
- Trucks  TB81
... the impacting Vehicle Type

<table>
<thead>
<tr>
<th>Normal containment</th>
<th>N1</th>
<th>N2</th>
<th>TB 31</th>
<th>TB 32 and TB 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher containment</td>
<td>H1</td>
<td>H2</td>
<td>H3</td>
<td>TB 42 and TB 11</td>
</tr>
<tr>
<td>Very high containment</td>
<td>H4a</td>
<td>H4b</td>
<td>TB 71 and TB 11</td>
<td>TB 81 and TB 11</td>
</tr>
<tr>
<td>Higher containment – Enhanced safety</td>
<td>L1</td>
<td>L2</td>
<td>L3</td>
<td>TB 42 and TB 32 and TB 11</td>
</tr>
<tr>
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NOTE 1 Low angle containment levels are intended to be used only for temporary safety barriers. Temporary safety barriers can also be tested for higher levels of containment.

NOTE 2 A successfully tested installation at a given containment level shall be considered as having met the...
The Influence of ...

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- the Measuring and Testing Method

... on Passenger Safety!
The Application of the Restraint System

The Safety Barrier Types:

- Flexible Barriers
  - Steel Guardrails
  - Precast Concrete Barriers
- Rigid Barriers
  - In Situ Concrete Barriers
  - Precast Concrete Barriers
... the Application of the Restraint System
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At a Glance ...

- soft impact behaviour
- reliable break through prevention
- safe Vehicle Behaviour
- as less Maintenance as possible
- low ASI at small and big cars
- CE certified safety barriers
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