Evaluation Procedures of Motorcyclist Roadside Protection Devices

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DISCUSSION PAPER
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Road Infrastructure Safety of Powered Two-Wheelers

www.irfnet.eu/en/position-papers

www.eurorap.org/news

www.irf2010.com
Motorcyclist Accidents

- About 33 million PTWs in EU 27 (~ 14% of private vehicle fleet)
- 17% of fatalities on the roads (but only 2% of the total distance travelled)
- About 10% of PTW accidents are against infrastructure with a prevalence of impacts with road restraint systems
- In collision with crash barriers, riders are 15 times more likely to be killed than a car occupant
Motorcyclist Accidents

Current existing test procedures:

• France: LIER test protocol (since 1998) then a French standard

13 July 2008:

• CEN Technical Committee on Road Equipment (TC226) resolution to develop a European standard to reduce the impact severity of motorcyclist collisions with safety barriers

EN 1317 – part 8
LIER test procedure

Hybrid II dummy with a Hybrid III head and neck

Speed : 60 km/h  -  Angle : 30°

2 test configurations:

- dummy parallel to the barrier
- 30° angled dummy position (direct impact with the head)
LIER test procedure
LIER test procedure

Dummy values acceptance criteria:

<table>
<thead>
<tr>
<th>Head</th>
<th>Neck</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIC$_{36}$</td>
<td>Fx</td>
</tr>
</tbody>
</table>

Qualitative acceptance criteria:

No dummy part must pass through the barrier line
Vehicle verification tests:

One or more vehicle tests to check that the overall system works under EN1317 conditions

• For a new barrier system: 2 tests according to EN1317 – parts 1 & 2

• For a modified existing barrier: only the containment test (i.e. with the heaviest vehicle)
LIER test procedure
UNE-135900 (Spanish standard)

Performance assessment of the roadside motorcyclist protective devices

- Localised vs. Continuous protection systems
- Hybrid III dummy
- One launching position (30°)
- Two impact speeds: 60 km/h and 70 km/h

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Example of continuous protection systems

Moto-Tub (Sodirel)

Motocyclist protection shield
(public domain)
Example of a discontinuous protection system
UNE-135900 (spanish standard)

Trajectory 1: post centered

Discontinuous and Continuous Protection Systems
UNE-135900 (spanish standard)

Trajectory 2: post offset
Discontinuous Protection Systems
UNE-135900 (spanish standard)

Trajectory 3: mid-span
Continuous Protection Systems
Performance Classes

- **the protection level**, determined by the impact speed of the tests performed (60 or 70 km/h)

and

- **the severity level**, determined by the level of the biomechanical indices from data obtained from the ATD instrumentation

see the European standard project
13 July 2008
CEN Technical Committee on Road Equipment (TC226) resolution

To develop **EN1317 - Part 8** for the performance evaluation of motorcyclist protection devices

- Draft standard in 2009 with adoption in 2010
- Evaluation of barriers when rider is sliding along the ground
- Other types of impact will be considered as a second step
- The resulting test procedure shall be read and used together with the existing parts of EN1317
EN 1317 – Part 8 (draft)

• Launch of an Anthropomorphic Test Dummy against the road restraint system

  • modified Hybrid III 50th percentile male dummy
  • equipped with a tri-axial acceleration transducer at the head CoG
  • upper neck load cells for forces and moments measurements

• The ATD shall be dressed in a motorcycle suit, leather gloves, and leather boots and be fitted with an integral type, production motorcycle helmet

• The ATD is sliding with its back and legs in contact with the ground

• Two nominal impact speeds are defined: 60 km/h and 70 km/h
EN 1317 – Part 8 (draft)

Trajectory 1: post centered
- TM.1.60
- TM.1.70

Trajectory 2: post offset
- TM.2.60
- TM.2.70

Trajectory 3: bay centered
- TM.3.60
- TM.3.70
EN 1317 – Part 8 (draft)

Performance Classes

• the protection level, which is determined by the impact speed of the tests performed (60 or 70 km/h)

• the severity level, which is determined by the level of the biomechanical indices coming from data obtained from the ATD instrumentation during the test.
## Performance Classes

### Maximum Admissible Values

<table>
<thead>
<tr>
<th>Severity level</th>
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<tbody>
<tr>
<td></td>
<td>HIC$_{3_6}$</td>
<td>F$_x$ (N)</td>
</tr>
<tr>
<td>I</td>
<td>650</td>
<td>Diagram</td>
</tr>
<tr>
<td>II</td>
<td>1000</td>
<td>Diagram</td>
</tr>
</tbody>
</table>
EN 1317 – Part 8 (draft)
EN 1317 – Part 8 (draft)

Vehicle Impact Performance

Any road restraint system with an MPS added to it, or any integrated system must also conform to the requirements of the other parts of this standard pertaining to the type of road restraint system in question, for the appropriate containment level.
Laboratoire d'essais Inrets Equipements de la Route

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crash tests

computer simulations