Motorcycles and the Roadside. A Spanish Update

February 9th, 2012. Madrid, Spain

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Figures on Motorcyclists
Road Safety in Spain

- Motorcycles Fleet (2.010) = 5,0 Million
- Total Vehicles Fleet (2.010) = 35,5 Million
- % Motorcycles on Fleet = 18 %
- Spanish Population = 45 Million inhabitants
- Motorcycles per inhabitant = 0.10

Spain is a country clearly oriented to motorcycles like most of South-European countries.
Milestones on Motorcyclists Road Safety Actions in Spain

• **In 2.002**, there were public manifesto and massive claims of motorcyclists demanding to Road Administrations for more road safety, specially, regarding collisions with guardrails.

• **In 2.003**, under a mandate by Central Administration, a reduced Working Group created inside the CTN 135 Committee of Spanish Standardization Body (AENOR), started to work on a Performance Based Standard for evaluating Safety Barriers against full scale motorcyclists impacts.
Milestones on Motorcyclists
Road Safety Actions in Spain

- **In September 2003**, a first UNE Report was published as UNE 135900-1 IN, -2 IN.
- **In December 2004**, General Road Directorate of Spanish Ministry of Fomento issued the order O.C.18/2004 with Deployment Guidelines and obligation of compliance with UNE 135900-1 IN,-2 IN.
- **From beginning 2004 till March 2005**, both the GRD and a private company started to conduct tests at CIDAUT (crash test house in Spain), in order to “test”, set up and improve the UNE Report/Std.
Milestones on Motorcyclists Road Safety Actions in Spain

- **In October 2005**, the Spanish standard UNE 135900-1, -2 is published.
- **In April 2007**, General Road Directorate of Spanish Regional Administration of Castilla & León issued the technical instruction 1/2007 with Deployment Guidelines for regional roads, which is complimentary to O.C. 18/2.004.
- **During 2007**, more than 300,000 linear metres of MPS (Motorcyclists Protecting Systems) on Guardrails have been installed in Spain.
Milestones on Motorcyclists Road Safety Actions in Spain

- **In September 2008**, the Spanish standard UNE 135900-1, -2 is reviewed.
- **In January 2011**, CE Marking is mandatory for safety barriers.
- **Update 2011**, more than 2,000,000 linear metres of MPS (Motorcyclists Protecting Systems) on guardrails have been installed in Spain.
Spanish Std. UNE 135900

- UNE 135900 is a Norm for **EVALUATING THE PERFORMANCE UNDER MOTORCYCLIST IMPACT** of a Safety Barrier (any type of barrier).
- UNE 135900 is a **CRASH-TESTING** Std. involving full-scale Impacts between Dummies and Longitudinal Barriers.
- UNE 135900 approach to motorcyclists safety evaluation regarding safety barriers is based on a **PROTOCOL** by LIER, dated in 1.998.
Spanish Std. UNE 135900

• Among all the variety of possible motorcyclist roadside accident scenarios electable for the definition of the impact tests, it was chosen:

• A motorcyclist’s body separated of motorcycle sliding on ground, totally extended with the face up and the head in advance, impacting a roadside barrier. The trajectories of motorcycle and rider are deemed to be different.
Spanish Std. UNE 135900

The Std. defines two different types of Motorcyclists Protecting Systems (MPS):

* **Punctual Systems** (PS). Post Absorbers
* **Longitudinal Systems** (LS). Continuous Systems able to contain Motorcyclists Impacts.
Spanish Std. UNE 135900

MPS Crashworthiness

= Full scale impact tests characterized by:

- Instrumented dummy (Hybrid III). Equipped, including Helmet.
- Full-scale safety barrier section, incl. terminals
- Two launchings per MPS, both at 60 km/h and 30°, with different trayectories (3)
Spanish Std. UNE 135900
Impact Tests Punctual Systems (PS)

SAFETY BARRIER + PUNCTUAL MPS (PS)

IMPACT TRAJECTORIES
1. IMPACT AT POST CENTRE
2. IMPACT AT OFFSET POST CENTRE

FULL SCALE IMPACT TESTS ACCORDING TO UNE 135 900
Spanish Std. UNE 135900
Impact Tests Longitudinal Systems (LS)

**SAFETY BARRIER + LONGITUDINAL MPS (LS)**

FULL SCALE IMPACT TESTS ACCORDING TO UNE 135 900
Spanish Std. UNE 135900
Biomechanical Parametres and Severity Levels

<table>
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<th>SEVERITY LEVEL</th>
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<td>HIC₃₆</td>
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<tr>
<td>II</td>
<td>1000</td>
<td>Diagram 4</td>
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</tbody>
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Spanish Std. UNE 135900
Biomechanical Parametres and Severity Levels

• The severity Level I of an impact test is only satisfied if, and only if, all parameters are within Level I range.
• Severity level of a MPS is the higher severity level among the required tests.
• If only one biomechanical parameter is over the max, limit of Level II, the test fails.
Spanish Std. UNE 135900

Other Acceptance Criteria:

• Cuts in the dummy permitted (despite cuts in the equipment are allowed).
• No separation of extremities permitted (only the breakaway mechanism of shoulder is allowed).
• No dummy’s snagging permitted.
• No part of dummy shall overpass the MPS.
• No pieces over 2 kg shall be detached from MPS.
Spanish Std. UNE 135900
Impact Tests with Dummy
Spanish Std. UNE 135900
Impact Tests with Dummy
A safety barrier with MPS is a New Safety Barrier different of the original and therefore is to be fully tested to EN 1317-2
Deployment Guidelines.
O.C. 18/2004-18bis/2008 Ministry of Fomento

Applies to RGE (national road network).

RGE = Motorways and main roads.

Only Longitudinal MPS (LS) are permitted

The Installation of MPS is recommended at outside shoulders in curves, in the following cases:

(i) **Dual Carriageways**
   - * Radius lower than 750 m
   - * Deceleration lanes in exits

(ii) **Single Carriageways with Shoulder over 1,5 m:**
   - * Radius lower than 200 m

(iii) **Any highway**
   - * When Speed Reduction at curve is higher than 30 km/h
CONCLUSIONS:

- Motorcycle is widely used in Spain
- Meanwhile Road fatalities are being reduced
- Motorcyclists fatalities are growing
- A testing standard (UNE 135900) for Motorcyclists Protecting Barriers is used
- Deployment Guidelines for MPSs existing but still to be more developed
- Big investment programmes of Road Administrations in MPSs.
Thanks for your attention

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