

FIMCAR

GRSP Frontal Impact group

Meeting 12

March 30, 2011

Global Priorities from FIMCAR and Previous Work

Assessment requirements

	Structural Interaction		Front End Force / Deformation (Consisting of)		Compartment integrity		Restraint system	
	Alignment	Load Spreading (Load paths / connections)	Deformation forces of frontal structures	Energy Absorption Management	Sufficient for single vehicle accident	Enhanced for light vehicles in vehicle to vehicle accident	(Assess over range of pulses)	Test Restraint Capacity
Priorities For FIMCAR	1	1	2	1	1	2	1	1

Strong Evidence in FIMCAR and previous studies

Acceleration injuries need to be addressed

Current R94 / EuroNCAP gains must continue

Acceleration injuries need to be addressed, assess safety for a range of pulse

Planned FIMCAR Results

1. Full Width test will be proposed
 - In order to create a high deceleration pulse
 - Use of deformable barrier to be determined
 - Metric for structural alignment to be proposed
 - Possible concept for frontal force level requirements
2. Offset Barrier test will be proposed
 - In order to test compartment integrity
 - PDB is only barrier being investigated for load spreading evaluation
 - Existing ODB will be maintained if PDB cannot meet necessary performance requirements

Planned FIMCAR Results

3. MDB will be developed with a PDB barrier face
 - structural evaluation criteria will be tied to PDB research
 - MPDB barrier can address mass ratio compatibility issues which are probably not fully addressed in the fixed barrier tests
 - MPDB envisaged as a replacement for an offset barrier test
-

FIMCAR Selection Process

- Compatibility assessment is currently a subjective process
 - Vehicle performance is not easy to classify in "pass/fail" terms for all 8 characteristics presented above
- FIMCAR final selection process to be established before candidate assessments are conducted

Structural Interaction Issues

Key Areas for FIMCAR compatibility metrics from accident analysis

- 1) Structural Alignment: Structures hit structures
 - Priority on static loading conditions, no consideration of vehicle braking
 - 2) Load Spreading in both vertical and horizontal directions
 - Address fork effect, small overlap, and over/underride cases
-

Evaluation Procedure Priorities

- FIMCAR group has identified key issues that will be used when evaluating the test procedures
- Priorities for the issues identified are
 - Priority 1 - Must be answered during the project
 - Priority 2 – Should be answered during the project
 - Priority 3 – Not required during the project
- Issues need to be resolved by means of a decision to include or exclude in an assessment approach, assessment criteria are identified when needed

Structural Interaction

Alignment

Description	FIMCAR
<p>Common interaction zone</p> <ul style="list-style-type: none">• Relevant, initial crash loads applied in common interaction zone, Part 581 (406-508mm)• Mandatory to apply loads above and below 581 centerline (457mm), further load balance covered in load spreading	Priority 1

Structural Interaction

Load spreading - Vertical

Description	FIMCAR
Vertical load spreading (or load balance) in common interaction zone (Part 581)	Priority 1
Vertical load spreading assessed below common interaction zone – assess lower loadpath, above 180 mm	Priority 1
Vertical load spreading assessed above common interaction zone – primarily for side impact considerations	Priority 2

Structural Interaction

Load spreading - Horizontal

Description	FIMCAR
Horizontal load spreading between longitudinal members - prevent fork effect	Priority 1
Horizontal load spreading outside longitudinal members - reduce intrusion in small overlap at edge	Priority 2

Pulse Requirements

Description	FIMCAR
Field relevant pulse – reconstructions, car-car tests, and possibly EDR data	Priority 1
Two different pulses are desired for assessing restraint systems – expected to be fulfilled with 2 assessment procedures	Priority 2/3
Monitor pulses in the test procedure development	Priority 1

Test Severity (1)

Description	FIMCAR
Appropriate severity level for occupant protection for relevant accidents (full frontal) – trade off between fatal and serious injury, 50-56 km/h test speed current option	Priority 1
Address mass dependent injury risk – higher injury risk in lighter vehicles reported in accident analysis	Priority 2

Test Severity (2)

Description	FIMCAR
Compartment strength requirements maintained for off-set configuration - R94 is reference, acceleration and intrusion data used	Priority 1

Test Procedure General

Description	FIMCAR
<p>Repeatability/Reproducibility – minimum requirement is for 3 tests at 2 labs using 1 car model, additional data processing at other labs</p>	<p>Priority 1</p>
<p>Appropriate pass/fail thresholds – database of test data, vehicles grouped into known performance categories</p>	<p>Priority 1</p>
<p>Check step effects in metrics – theoretical analysis of metrics</p>	<p>Priority 1</p>

Test Procedure General

Description	FIMCAR
Assessment results reflect real world performance – limited to older vehicle data	Priority 1
<ul style="list-style-type: none"> • good car is rated good 	Priority 1
<ul style="list-style-type: none"> • poor car is rated poor 	Priority 1
<ul style="list-style-type: none"> • borderline car rating improves when car is improved – simulation approach 	Priority 2
<ul style="list-style-type: none"> • borderline car rating gets worse when car is worsened – simulation approach 	Priority 2

Test Procedure General

Description	FIMCAR
Detection of architectures/loadpaths - vehicles grouped into known performance categories	Priority 1

Additional Information

- FIMCAR will conduct future crash tests with a 5%ile female HIII dummy.
- BASt has offered to provide RIBEye measurement system to supplement existing chest deflection measurements
- HIII 50%ile male driver maintained for comparison to previous test data



<http://www.fimcar.eu/>