FIMCAR
Full Width Test:
Current Status and Way Forward

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Objective

- Derive metric to assess and control the alignment of vehicle structures in a common interaction zone
  - LCW Rows 3 & 4 (Part 581 zone)
Frontal Impact and Compatibility Assessment Research

Current Status

Stage 1
- **FWRB (1):**
  - Up to LCW force 200kN
  - \[ F_3 + F_4 > [100] \text{kN} \]
  - \(0.2 < \frac{F_4}{F_3+F_4} > 0.8\)
  - Yes → Pass
  - No → Fail

- **FWRB (2):**
  - Up to LCW force 200kN
  - \[ F_3 + F_4 > [100] \text{kN} \]
  - \(0.2 < \frac{F_4}{F_3+F_4} > 0.8\)
  - Yes → Pass
  - No → Fail

- **FWRB (3):**
  - Up to LCW force 200kN
  - \[ F_3 + F_4 > [100] \text{kN} \]
  - \(0.2 < \frac{F_4}{F_3+F_4} > 0.8\)
  - Yes → Pass
  - No → Fail

Stage 2
- Options for FWRB 'Stage 2' include:
  1. ORB test
  2. FWRB LCW assessment at later time
  3. Offset test assessment

Eligibility Assessment
- Options for assessment of 'Vehicle has high PEAS' include:
  1. Vehicle category, e.g. Off-road
  2. Full width test LCW assessment
  3. Offset test assessment

Stage 2 (to be determined)
FWRB vs FWRB

- **FWRB**
  - Direct measurement of forces without ‘filtering’ by deformable face
  - No possibility of load spreading by deformable face
  - No problems with stability of deformable face
  - Effectively already de-facto worldwide standard test

- **FWDB**
  - More representative of real world accident especially in initial stage of impact
    - More representative for initial deceleration of vehicle and loading of main rails and more representative test for restraint trigger sensors
  - Engine dump loading attenuated, so can make assessment of vehicle structural loading at later stages of impact
  - Can assess SEAS structures, so no need for supplementary test, e.g. ORB
  - Possibly can assess horizontal structures (bumper beams)
• FWRB and FWDB both have advantages and disadvantages but FWDB probably has the edge technically
  – Can make assessment later in impact
  – No need for supplementary test for vehicles which do not have PEAS in alignment with common interaction zone
• However, FWRB is already defacto worldwide standard test and hence has large advantage for harmonisation

Prioritise development of FWRB metrics
Current Status

Stage 1

FWRB (1)
- Up to LCW force 200kN
- F3 + F4 > [100]kN
- 0.2 < F4/(F3+F4) > 0.8
- Yes: Pass
- No: Fail

Stage 2

Eligibility Assessment
Options for assessment of 'Vehicle has high PEAS' include:
1. Vehicle category, e.g. Off-road
2. Full width test LCW assessment
3. Offset test assessment

Stage 2 (to be determined)

FWRB (2)
- Up to LCW force 200kN
- F3 + F4 > [100]kN
- 0.2 < F4/(F3+F4) > 0.8
- Yes: Pass
- No: Fail

Stage 2 (to be determined)

FWRB (3)
- Up to LCW force 200kN
- F3 + F4 > [100]kN
- 0.2 < F4/(F3+F4) > 0.8
- Yes: Pass
- No: Fail

Stage 2 (to be determined)

FWDB (1)
- Up to LCW force 200kN
- F3 + F4 > [180] kN
- F3 > [85] kN
- F4 > [85] kN
- Yes: Pass
- No: Fail

Stage 2

FWDB (2)
- Up to 40ms
- F3 > [75] kN
- F4 > [75] kN
- Yes: Pass
- No: Fail

Options for FWRB 'Stage 2' include:
1. ORB test
2. FWRB LCW assessment at later time
3. Offset test assessment

Options for assessment of 'Vehicle has high PEAS' include:
1. Vehicle category, e.g. Off-road
2. Full width test LCW assessment
3. Offset test assessment

Options for 'Stage 2' include:
1. ORB test
2. FWRB LCW assessment at later time
3. Offset test assessment
Way forward

- Establish feasibility of FWRB single stage metric
- Complete development of Stage 1 metric
  - Consider refinements to take into account lower load paths on cars
- Develop Stage 2 test and metric
  - FWRB LCW assessment
  - Override Barrier (ORB)
  - PDB
- Develop eligibility assessment
  - Vehicle category
  - LCW assessment
  - PDB assessment
- Validation
- Benefits and costs analysis
TEST SEVERITY
Test Severity

Percentage of occupants in injury severity groups against ETS (km/h)