Global BioRID-II User’s Meeting (GBUM)

Mike Beebe - GBUM Chairman
Alex Schmitt – Europe Advisor

Thursday December 3, 2009
Agenda

• **GBUM Dummy Preparation Process (2009)**
  - Dummy Updates
  - Open questions
  - Results from Nov 6 meeting at NHTSA
  – **Certification Test Project update**
    - Why Certification Test Project
    - Sled System Certification Corridors
    - First Look at Dummy testing with new sled system
    - KATRI Report

• **Seating Procedure Dummy Tool Proposal**

• **GTR Meeting Schedule**
Agenda

- **GBUM Dummy Preparation Process (2009)**
  - Dummy Updates
  - Open questions
  - DAS System
  - Results of November 6th meeting at NHTSA
    - **Certification Test Project update**
      - Why Certification Test Project
      - Sled System Certification Corridors
      - First Look at Dummy testing with new sled system
      - KATRI Report
- **Seating Procedure Dummy Tool Proposal**
Goal: Updates were done to make dummy easier to use, more durable, and reproducible without changing the biofidelity.

- Revise hardware as required based on users feedback
- Drawings *(UNECE)*
- Certification Testing
- R&R
- Users Manual
Review of GBUM 2009 Dummy Updates

- Revised Damper
- Revised S1
- One piece H Pt. Tool Mount
- Updated T1 to be able to remove cables w/o cutting
- Changed to SHCS w/ Washers
- skull cap switch
- Thorax Flesh
- Revised Clothing & Shoe specifications and updated manual
- Head with cable exit through side with increased clearance in the chin

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Review of GBUM 2009 Dummy Updates

Added notch for tension cable routing

Updated Pelvis indicator tool

Updated BIORID Manual

T1 Indicator
Revised Head Acceptance?

Testing has been completed with head and not issue was raised.
BIORID Jacket Acceptance?

Jackets will have flap & Symmetry of right and left side
Review of GBUM 2009 Dummy Updates

Bumper installation alignment tools
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Notes from November 6th meeting at NHTSA

- TASK Definitions
- Rear Impact:
  - BioRID II Drawing Package
    - 2D and/or 3D
    - GBUM will submit drawings to GRSP/Geneva
  - FTSS and Denton will meet on December 14 to get FTSS Drawing package input.
  - Results will be presented to the GBUM to discuss in January.
- Seating procedure
  - Review seating procedure of both standard and more upright design seating configurations.
  - Dummy manufacturers to review spine adjustments that are there already to accommodate.
  - Sensitivity of BioRID II to initial position should be investigated. Start with cert test.
- Biofidelity
  - NHTSA to complete testing on dummy/PMHS at low and high speed to assess biofidelity of Hybrid III, RID3D and BioRID II
  - Consider/consensus on evaluation of measures associated with biofidelity
    - Consider what volunteer and PMHS tests need to be used for biofidelity assessment. Should be documented.
  - Injury Risk Functions and Criteria to be further discussed. Specific group of experts should discuss?
  - IIHS to review insurance claim data relative to vehicle/seat ratings.
- Durability
  - No issues at this time
- R&R
  - Complete gage certification and round robin testing (GBUM activity)
  - GTR meeting in Geneva December 8, 2009
Goal for Certification Tests Revisions

- **Improve the test to have better repeatability and discern differences between dummies, so that dummy adjustment procedures can be fully analyzed for dummy reproducibility in sled testing.**
  - Add sled certification test
  - Add head rest certification test
  - Replace crushable foam with a reusable energy transfer device
  - A head form should be used in place of the head for better repeatability
  - Revise sled design to eliminate sled bounce
  - Revise sled to eliminate Jacket motion affect on Velocity Corridor and sled acceleration by the use of a higher mass sled.
  - Sled with greater rigidity
How the goal was achieved

Replace crushable foam with a reusable energy transfer device

A head form used in place of the head for better repeatability

Revise sled design to eliminate sled bounce

Revise sled to minimize Jacket motion affect on Velocity Corridor and sled acceleration by the use of a higher mass sled.

Sled with greater rigidity

Add head rest certification test
Rail and Sled Certification

- Rail certification with weight package fixed to the sled. Prior to running any dummy test, ensure the sled is set up properly.
- Velocity and weight of probe and sled were adjusted to achieve similar energy input levels of current tests.
Advantages for Sled Test

• Make certain sleds are not different
• Make certain the sleds are not different over time
• Check for misalignment of probe
• Weight check
• Energy transfer devices changes
• Frictional changes
• Other changes in sled systems
**Sled Test Requirements**

- Probe Velocity: 4.70 – 4.80 m/s
- Probe Weight: 37.61 kg +/- .1 kg
- Sled Weight w/o headrest: 44.25 kg +/- .05 kg
- Sled Weight headrest: 6 kg +/- .02 kg
- Sled weight w/headrest: 50.25 kg +/- .07 kg
- Sled equipment
  - Procedure for level and install
  - Set up procedures
- Pendulum Force: 9200 N +/- 600
- Peak sled acceleration: 127 M/s² +/- 9 M/s²
- Peak Sled Velocity: 2.8 +/- 15 m/s
- Velocity slope from 50 to 150 ms: 0 to -1.5 (m/s)/s

**BASED ON 5 SLEDS TESTED AT 5 Labs**
Peak Sled Velocity

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6 Dummies Tested in 4 different labs without Head Rest

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Neck Link Rotation About T1 Corridor Check (Pot B)

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T1 Accel

-300 -250 -200 -150 -100 -50 0 50

ms/s^2

-30 -15 0 15 30 45 60 75 90 105 120 135 150

Time (ms)

- Corridor
- SLED A-1.AF.CSV
- SLED B-1.AF.CSV
- SLED C-1.AF.CSV
- SLED D-1.AF.CSV
- SLED E-1.AF.CSV
- FITP0002G-1.AF.CSV
- IIHS 1D-29G.af.csv
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Sled Accel

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Sled Velocity

- Time (ms)
- Velocity (ms)

Graph showing velocity over time for different sled tests. Legend includes different test codes such as SLED A-1.CF.CSV, SLED B-1.CF.CSV, etc.

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Head to Headrest Distance Discussion

More variation is expected with the larger the backset distance to head rest Contact Point. The larger back set should help to detect dummies which need a new component, need the spine reset, or a bumper change.

For round robin testing the head rest has been set to 70 mm to compare with PDB testing.
Headrest test development
Sled Accel 70 +/- 2 mm Gap

Dummy has ability to show differences between gaps
Next Steps over next 4 weeks

- More data will be coming.
- Review PDB results
  - Compare certification data to sled testing
  - Determine certification tests can discern differences between dummies.
- Will put all data together
- This will include Head Restraint tests
- Create corridors for head only and with head restraint tests
- Review KATRI test results. Good comparison which shows that the new sled tests is able to show differences between dummies as compared to old sled design.
Next Steps (4 weeks)

- Analysis and report finding from Round Robin testing
- Create & finalize corridors for head rest certification tests
- Revise & finalize corridors for standard certification tests
- Revise manual with revision and new certification requirements
- Adopt new head design for cable exit on the side
- Adopt new torso flesh with single flap opening in the rear.
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Recommendation

✓ Proposal 4:
  ● This proposal could be reasonable for permanent solution.
  ● Tentative solution may need to consider depend on the modification difficulty.

<Proposal 4>
Develop a new comb to adjust spine

Current Tool

New Tool
THANK YOU
for your attention