

Denton ATD, Inc.

*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*

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GBUM Dummy Preparation Process (2009)

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

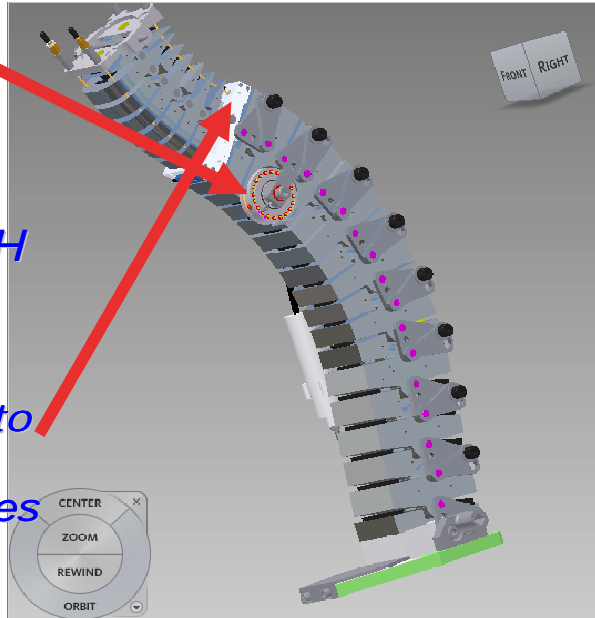
Revised Damper

Revised S1

One piece H Pt. Tool Mount

Updated T1 to be able to remove cables w/o cutting

Changed to SHCS w/ Washers

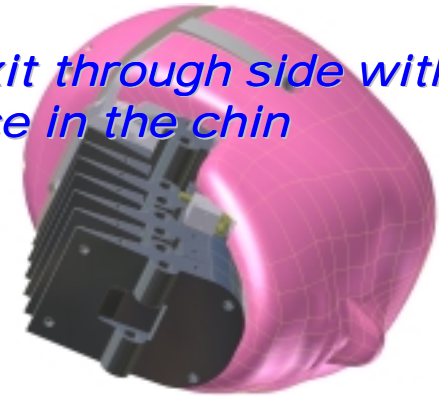


skull cap switch



Revised Clothing & Shoe specifications and updated manual

Head with cable exit through side with increased clearance in the chin



Thorax Flesh



Review of GBUM 2009 Dummy Updates



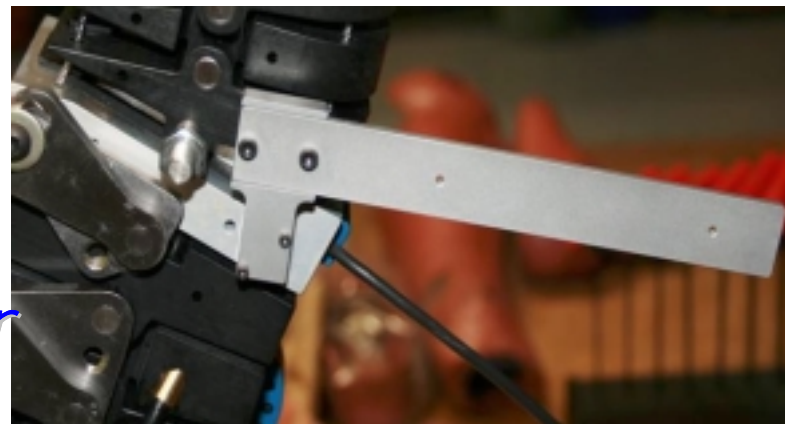
Updated Pelvis indicator tool

*Added notch for
tension cable routing*

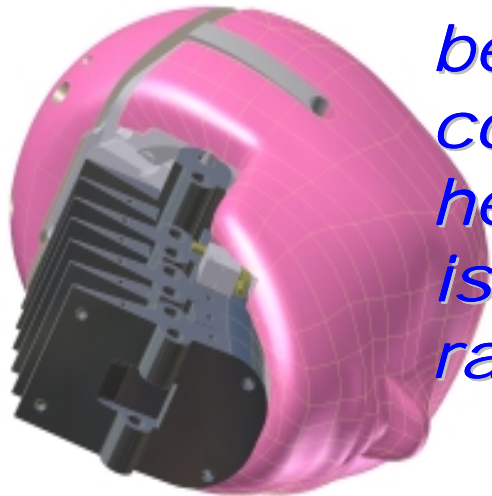
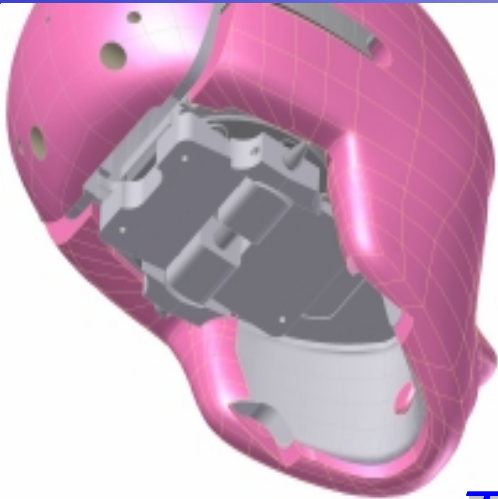


*Updated BIORID
Manual*

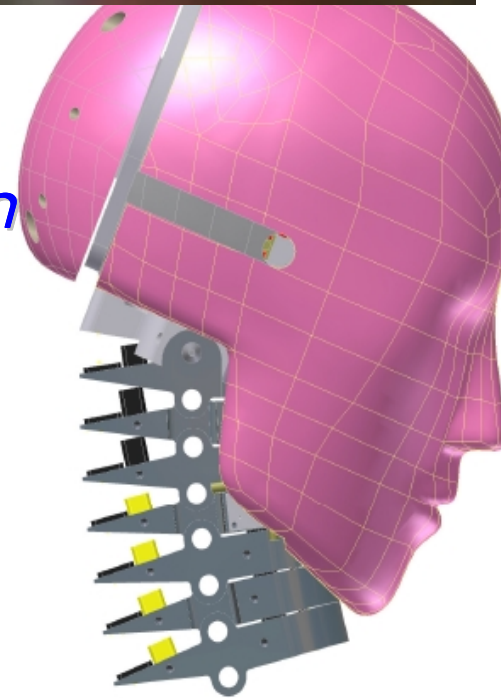
*T1
Indicator*



Revised Head Acceptance?



Testing has been completed with head and not issue was raised.



BIORID Jacket Acceptance?

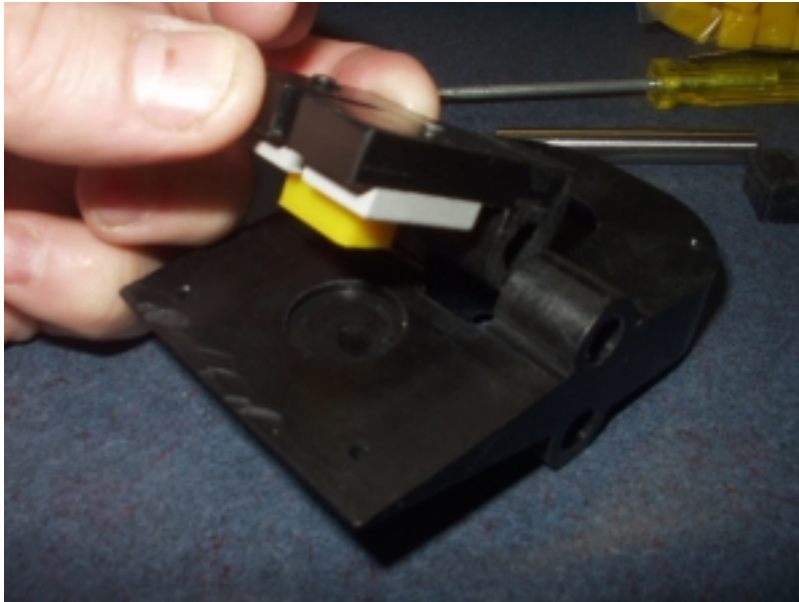


*Jackets will have flap &
Symmetry of right and left
side*

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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 BioRIDII 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 BioRIDII
 - 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

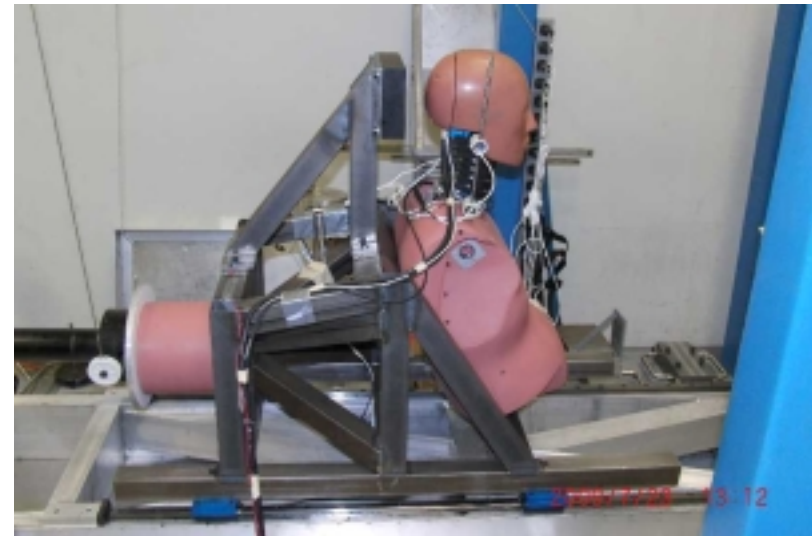
A head form used in place of the head for better repeatability

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.



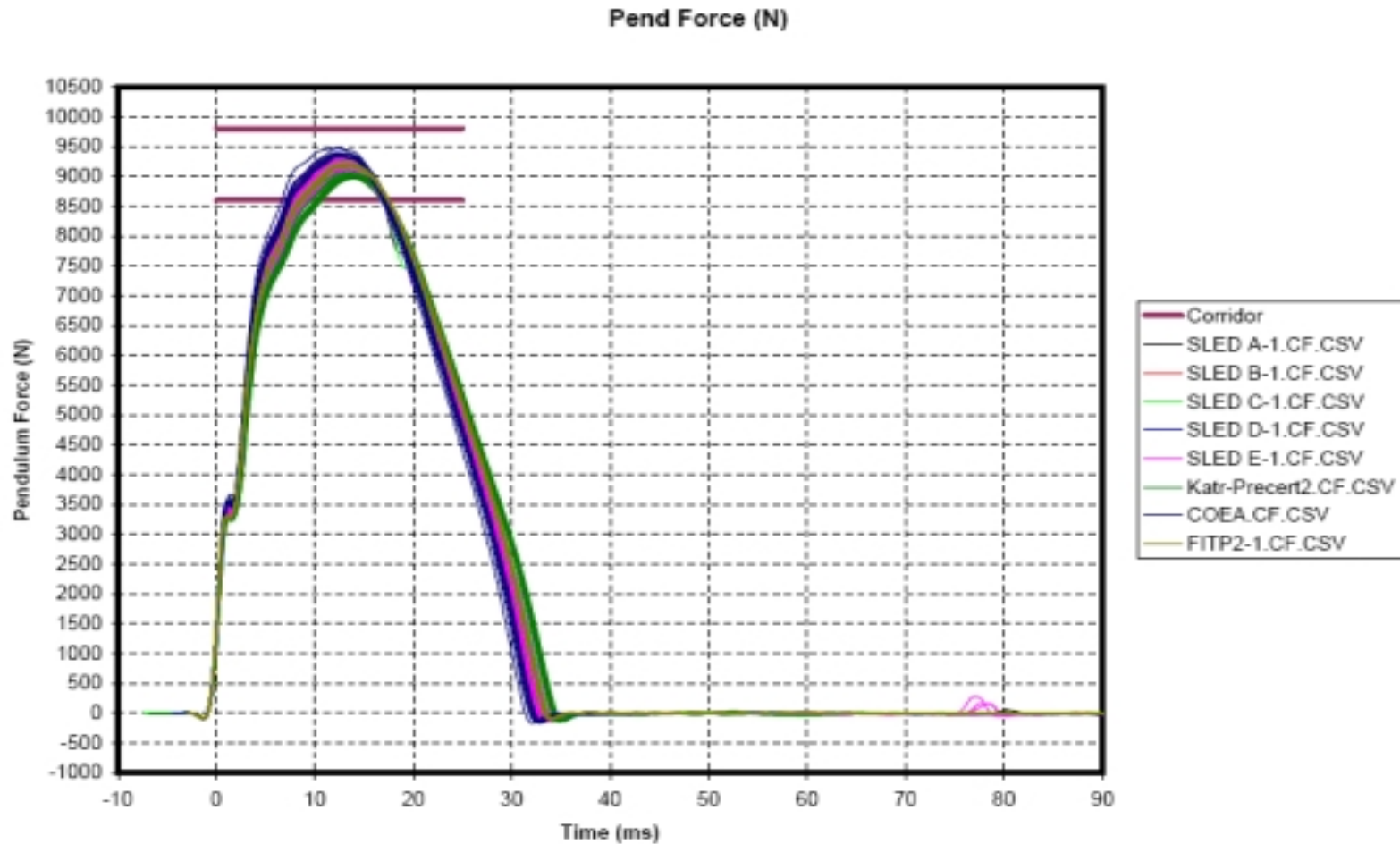
Advantages for Sled Test

- 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: 37.61kg +/- .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: 9200N +/- 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***

Pendulum Force

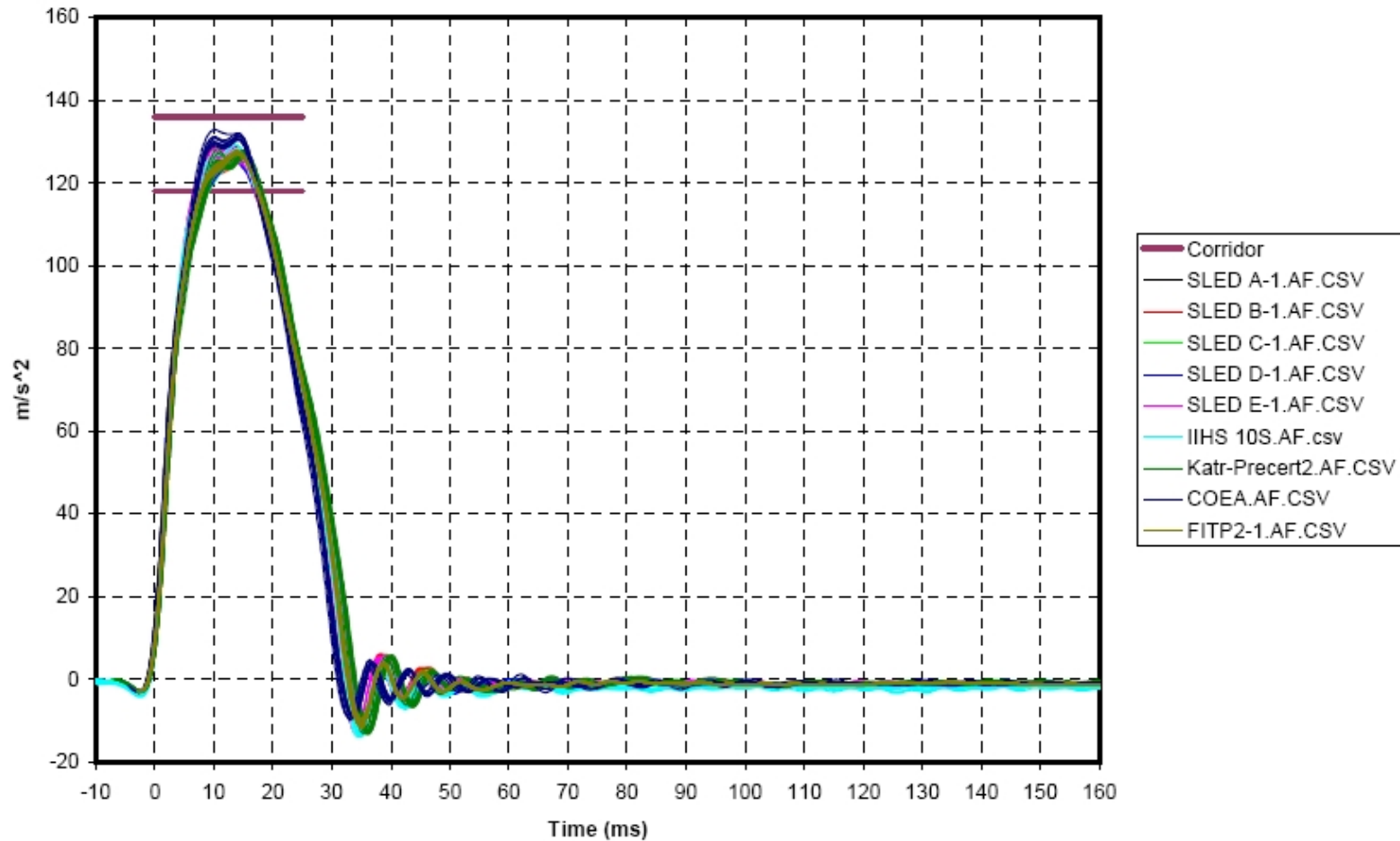


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Peak Sled Acceleration

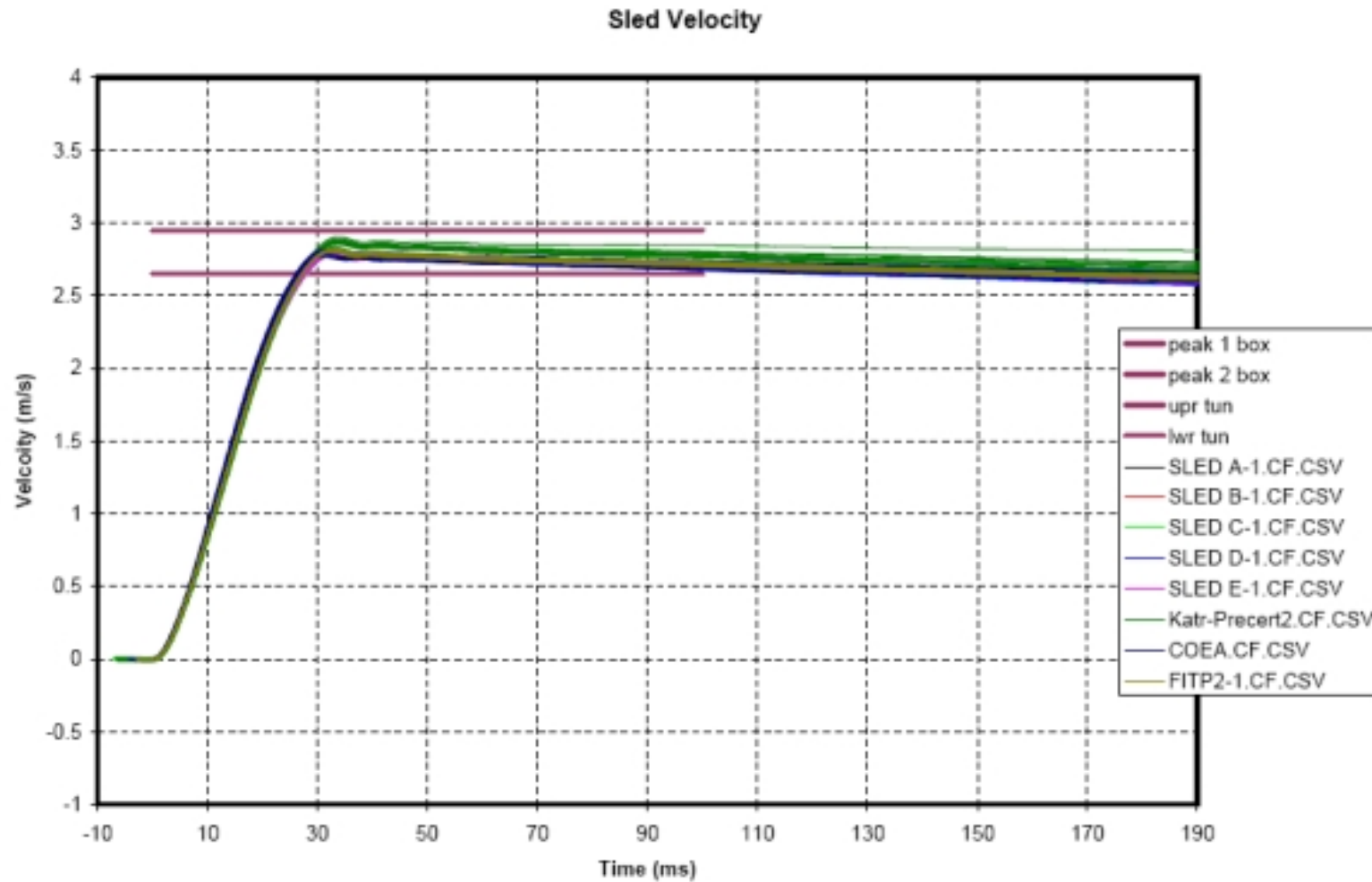
Sled Accel



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Peak Sled Velocity

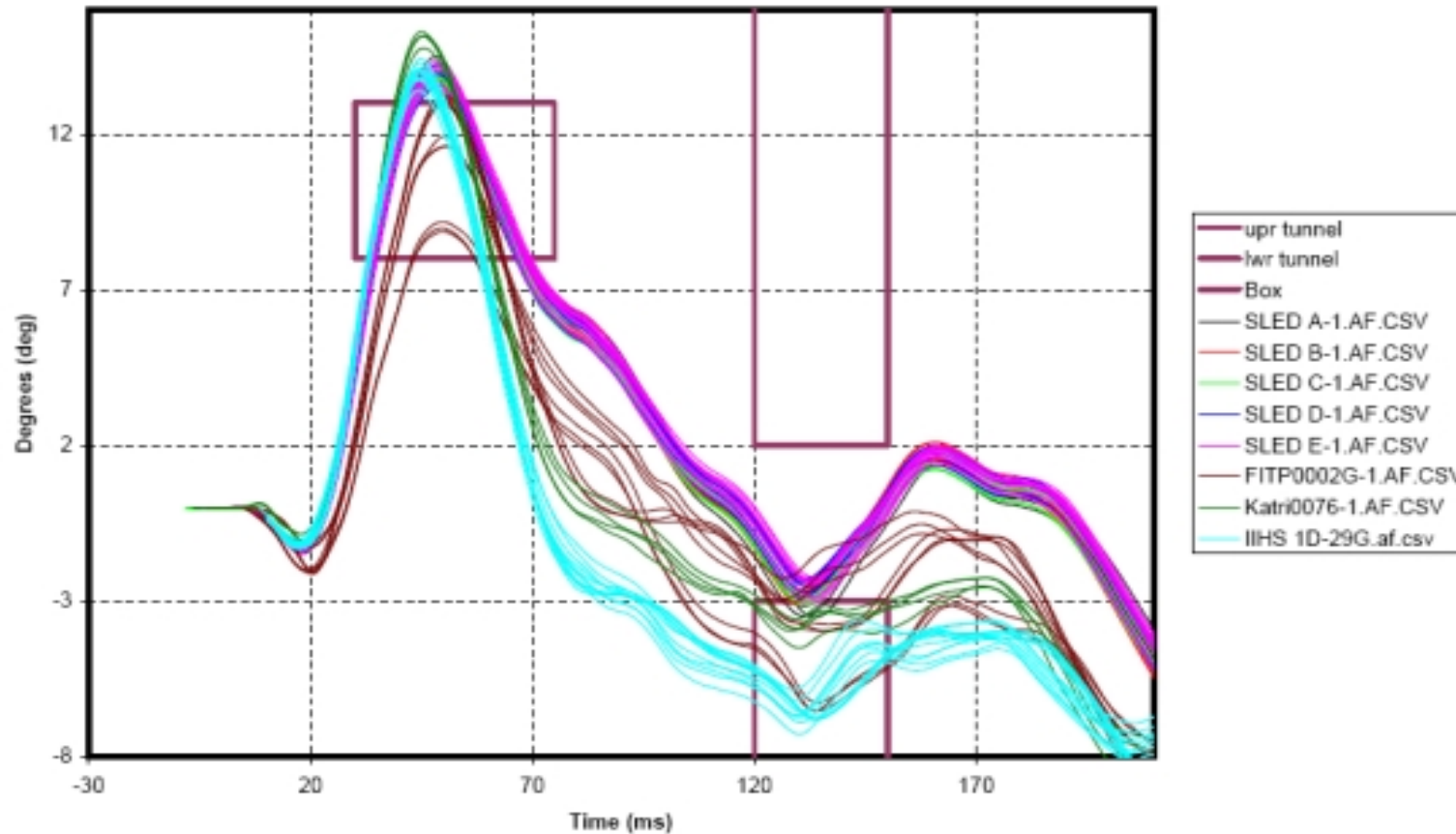


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6 Dummies Tested in 4 different labs without Head Rest

Head Rotation about OC Corridor Check (Pot A)

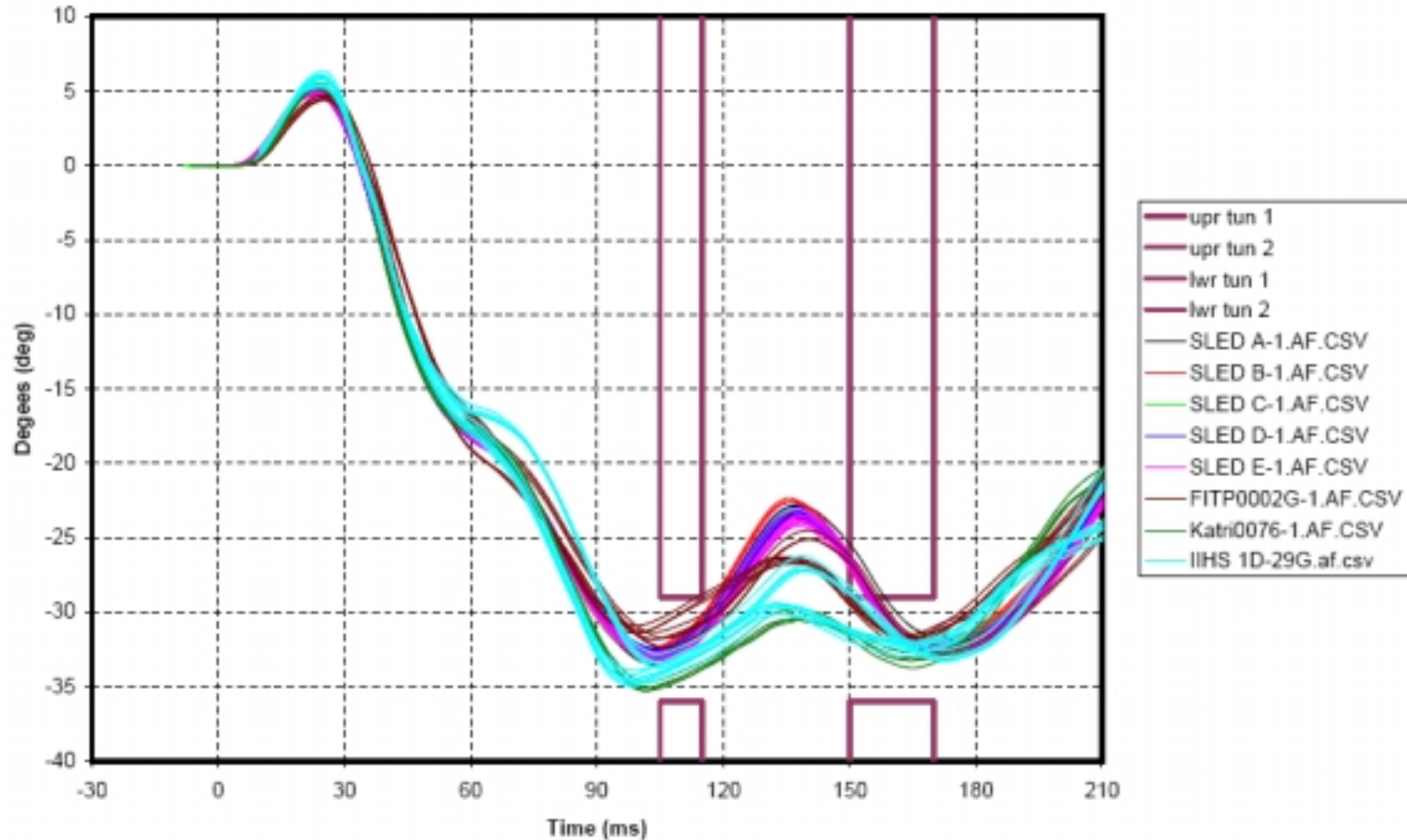


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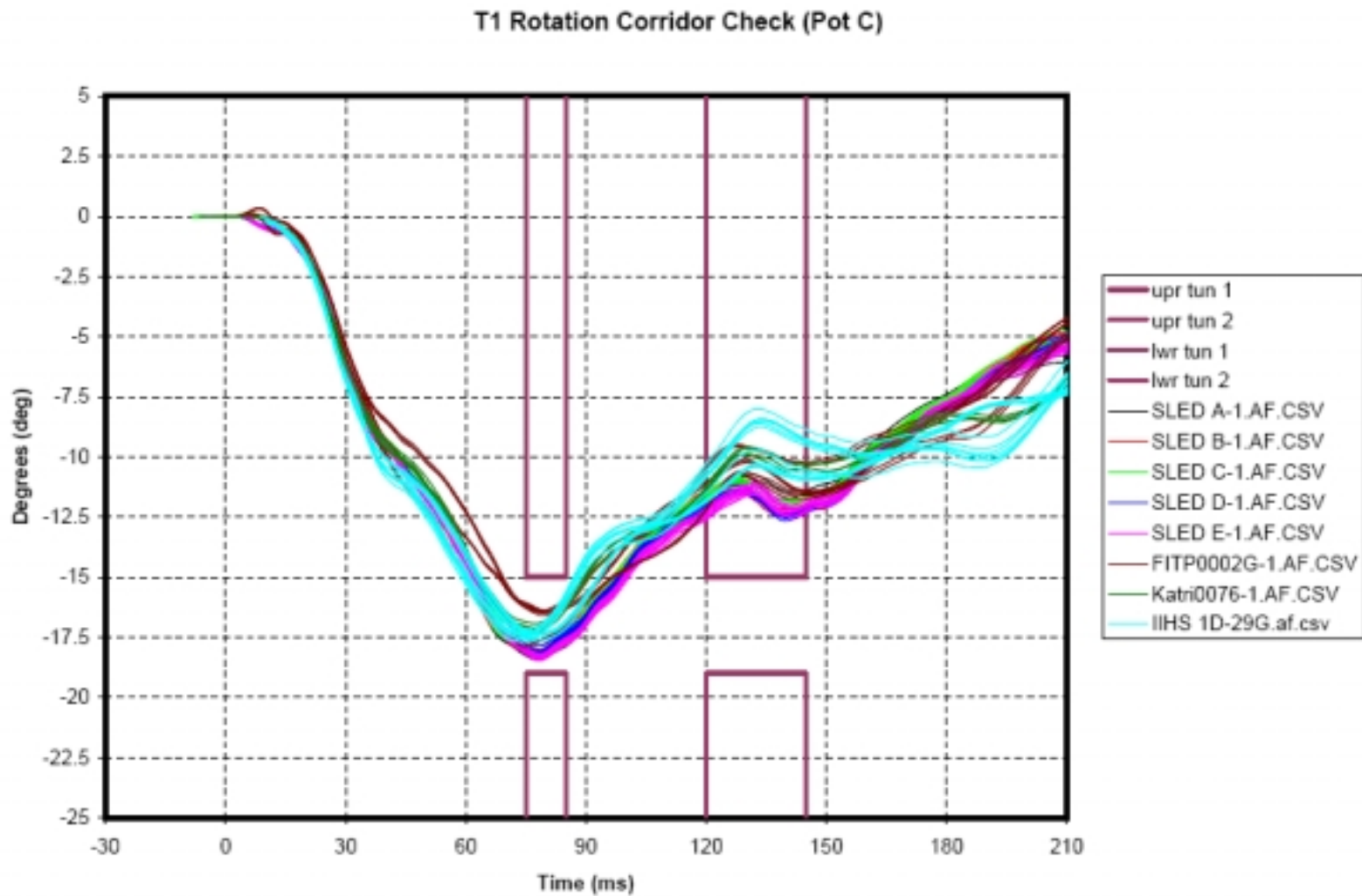
Neck Link Rotation About T1 Corridor Check (Pot B)



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6 Dummies Tested in 4 different labs without Head Rest

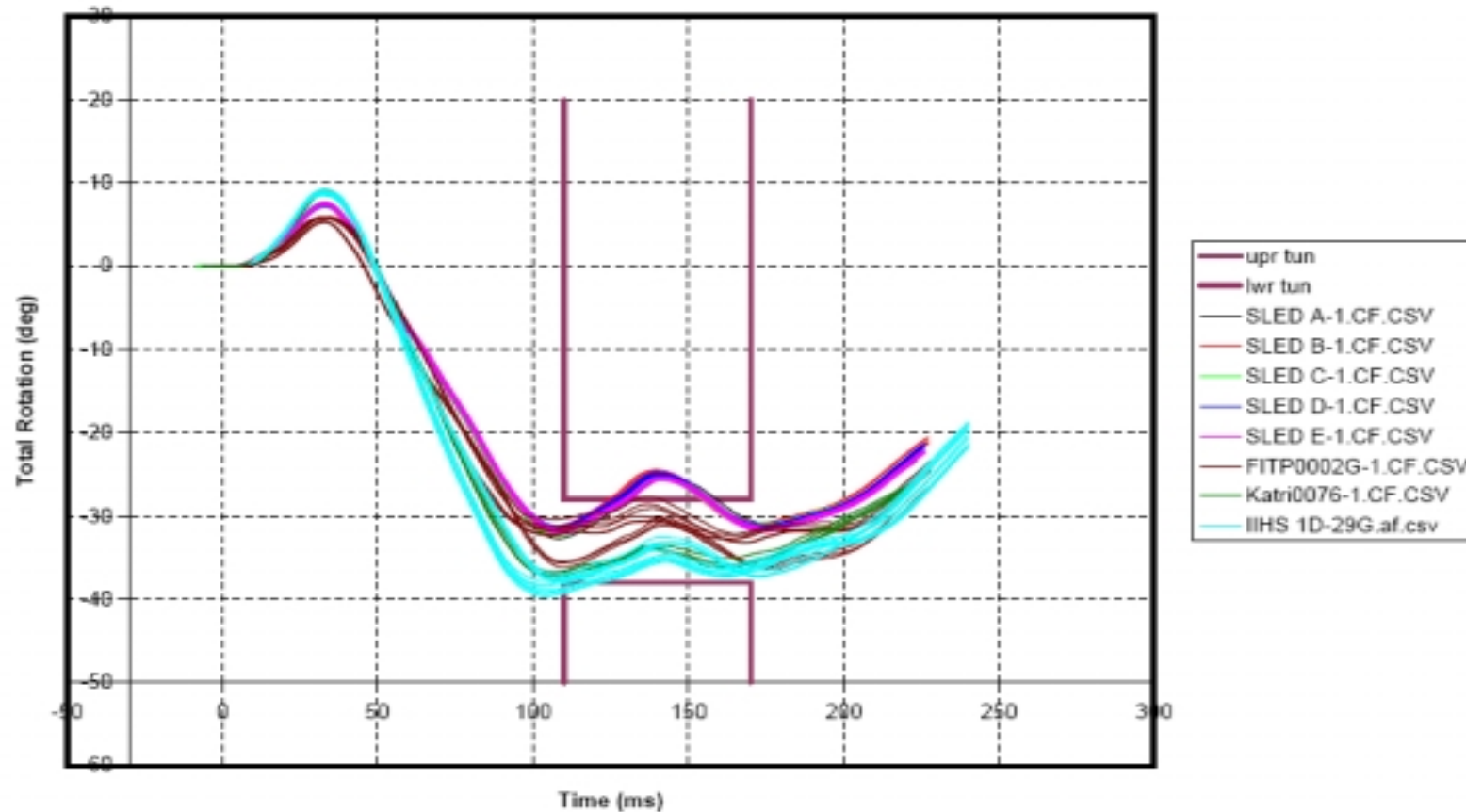


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6 Dummies Tested in 4 different labs without Head Rest

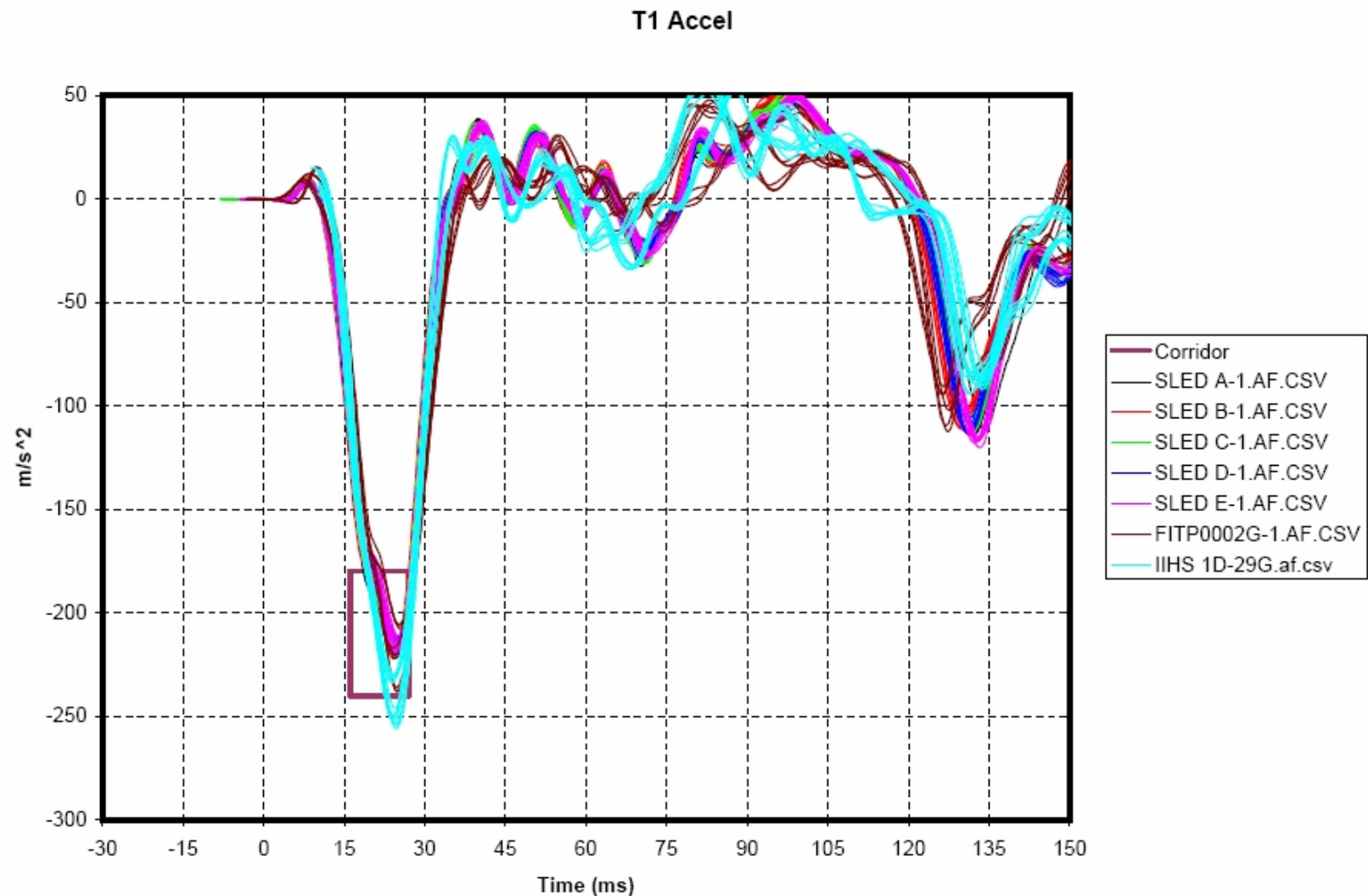
Total Head Rotation ab T1 Corridor Check



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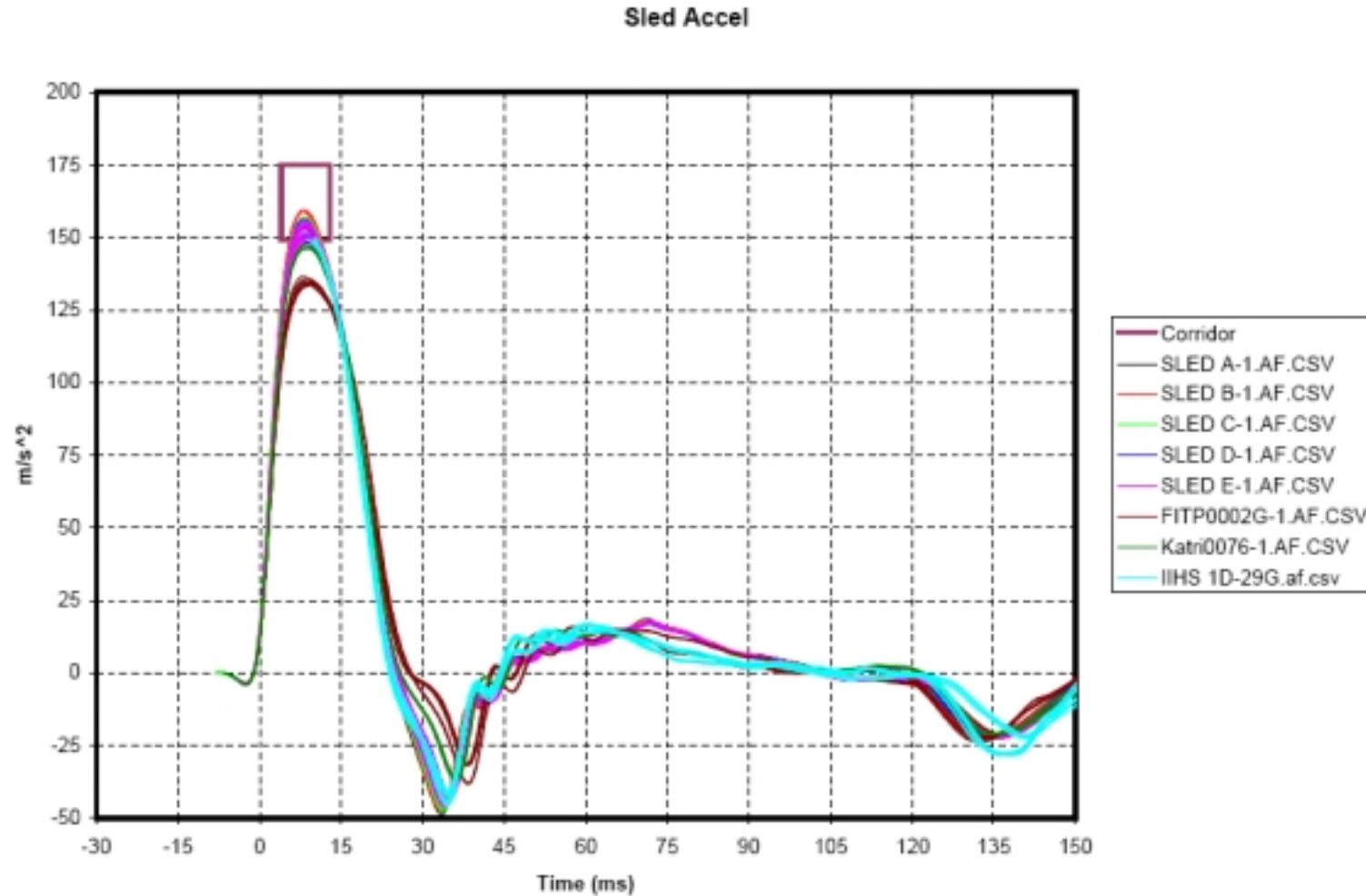
6 Dummies Tested in 4 different labs without Head Rest



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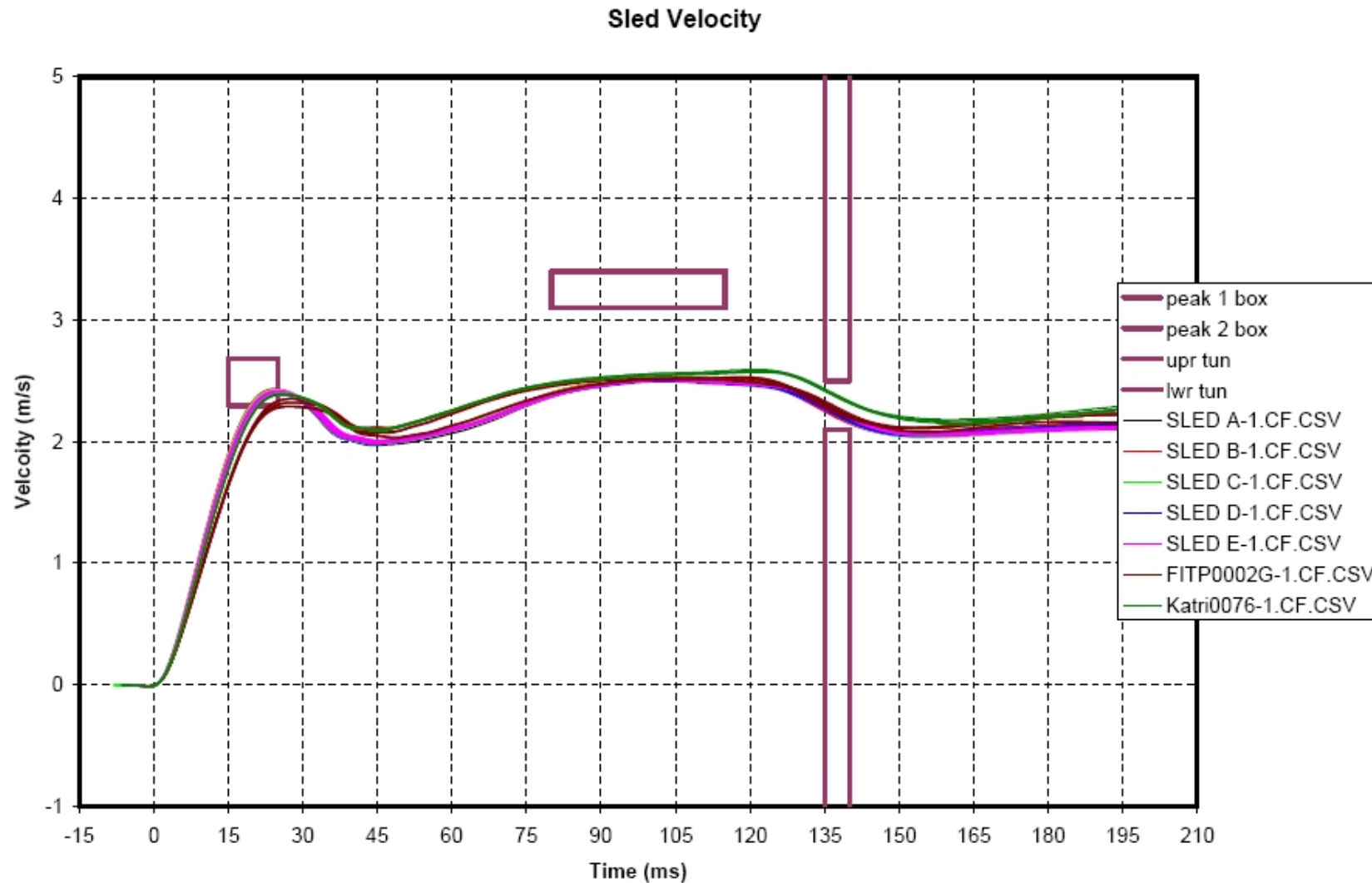
6 Dummies Tested in 4 different labs without Head Rest



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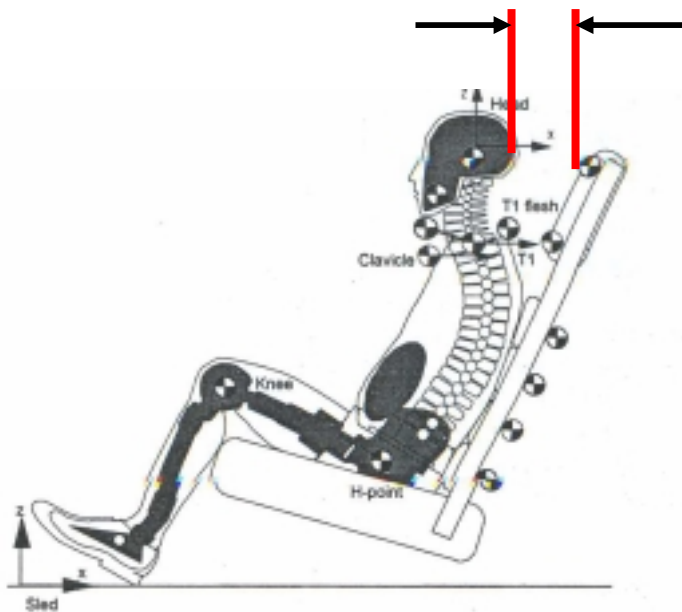
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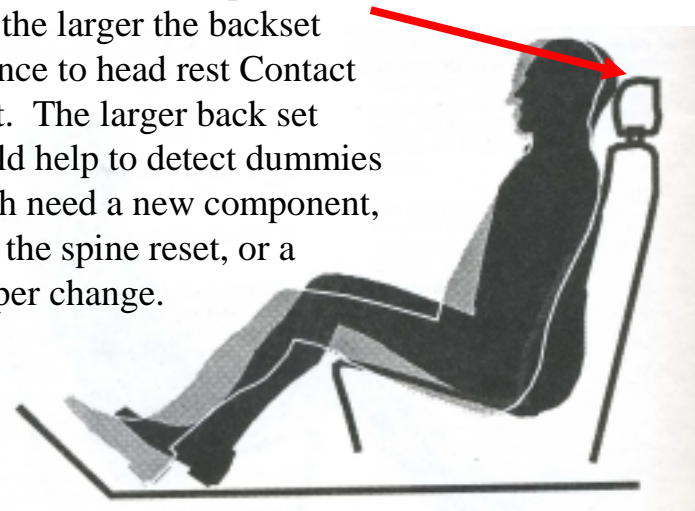
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Head to Headrest Distance Discussion



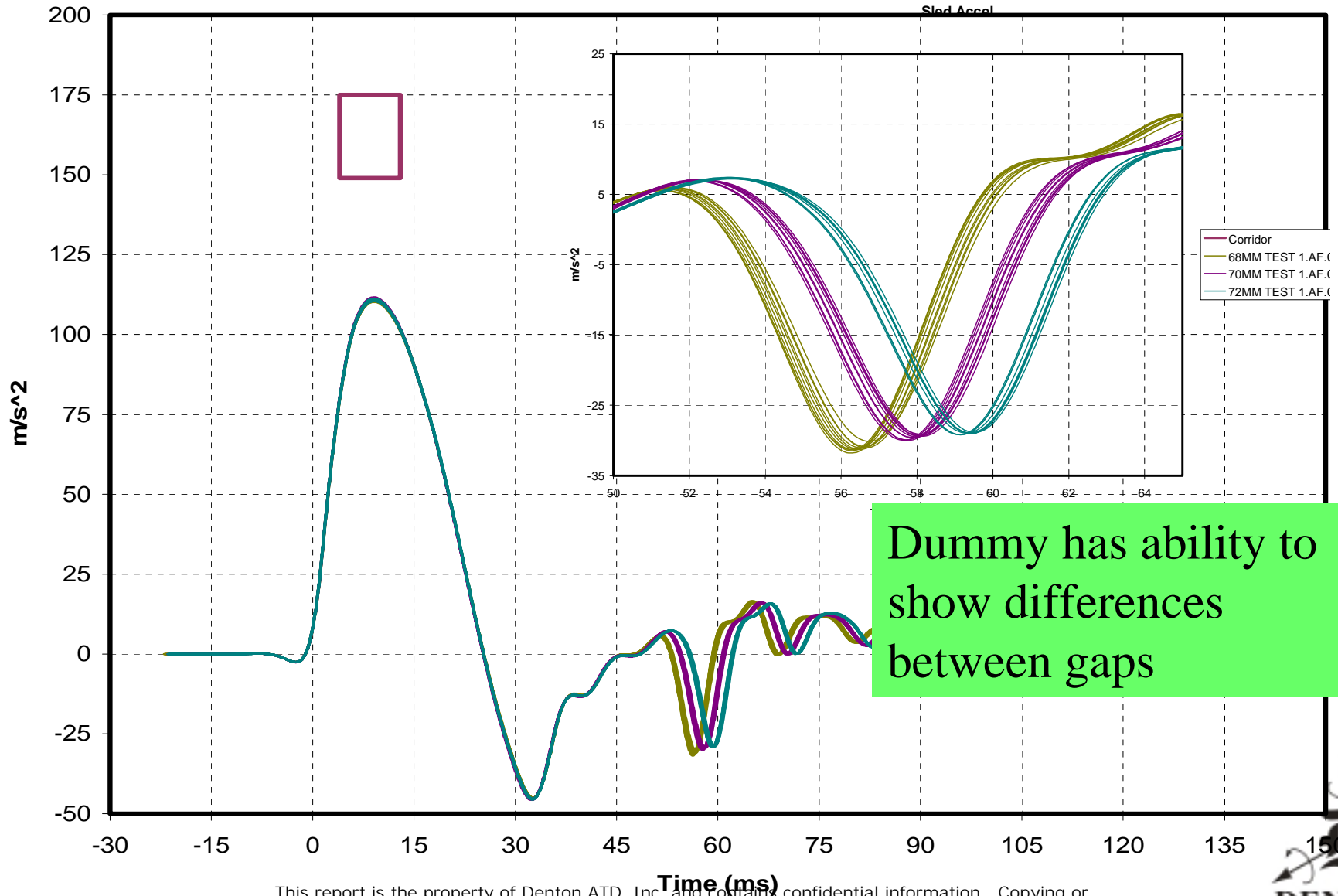
More variation is expected with the larger the backset distance to head rest Contact Point. The larger back set should help to detect dummies which need a new component, need the spine reset, or a bumper change.



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



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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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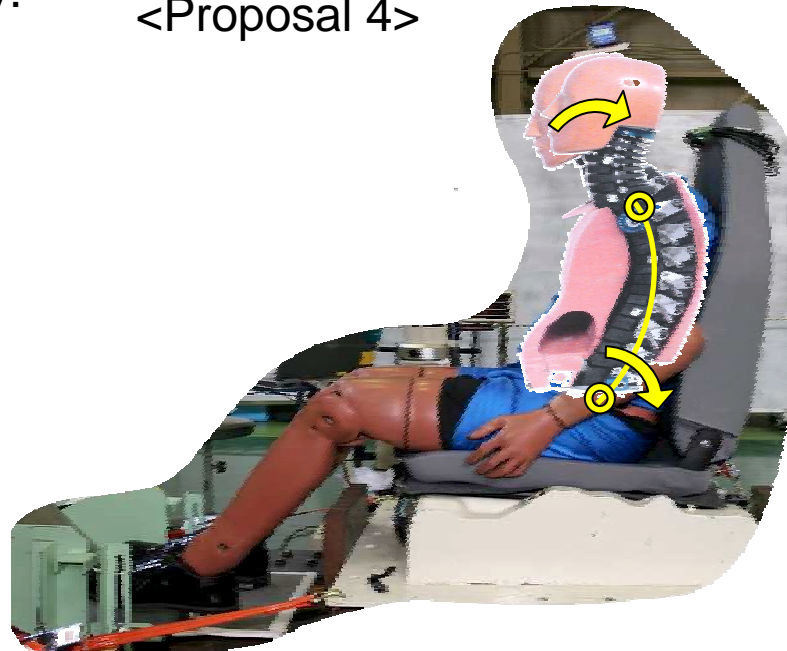
JAMA proposal to adjust spine for small seat back angles

Recommendation

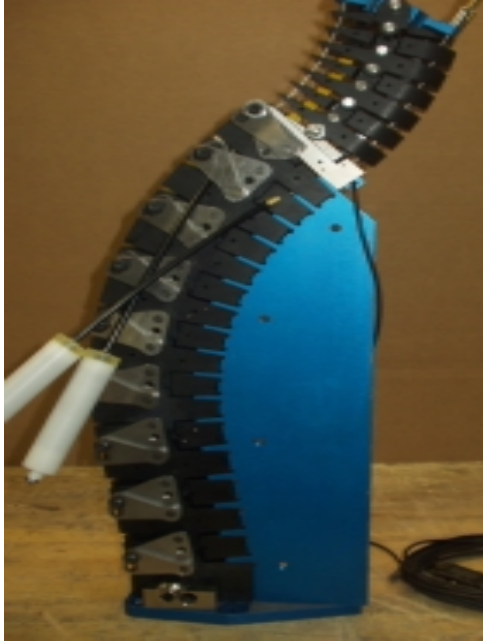
✓ Proposal 4:

- 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

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