

Side Impact Child Dummy Development

Dan Rhule

Applied Biomechanics Division
Vehicle Research and Test Center
NHTSA



Overview

- Side Child Dummy Concepts
- Biofidelity Evaluation Preliminary Review
- Development of Certification Procedures
- Preliminary Durability Concerns
- Current Developments
- Future Work
- Concluding Remarks

Overview

- **Side Child Dummy Concepts**
- Biofidelity Evaluation Preliminary Review
- Development of Certification Procedures
- Preliminary Durability Concerns
- Current Developments
- Future Work
- Concluding Remarks

Side Child Dummy Concepts

NHTSA evaluating two dummies

- Q3s
- Hybrid III 3 year-old with modified head/neck (HIII-3Cs)



Overview

- Side Child Dummy Concepts
- **Biofidelity Evaluation Preliminary Review**
- Development of Certification Procedures
- Preliminary Durability Concerns
- Current Developments
- Future Work
- Concluding Remarks

Preliminary Biofidelity Eval

- Head Drop
 - Frontal & Lateral
- Neck
 - Frontal, Lateral, & Twist
- Shoulder
 - ISO & NHTSA impact tests
- Thorax
 - ISO test
- Abdomen
 - FTSS reference test
- Pelvis
 - ISO Test

Preliminary Biofidelity Analysis

Q3s



head

neck

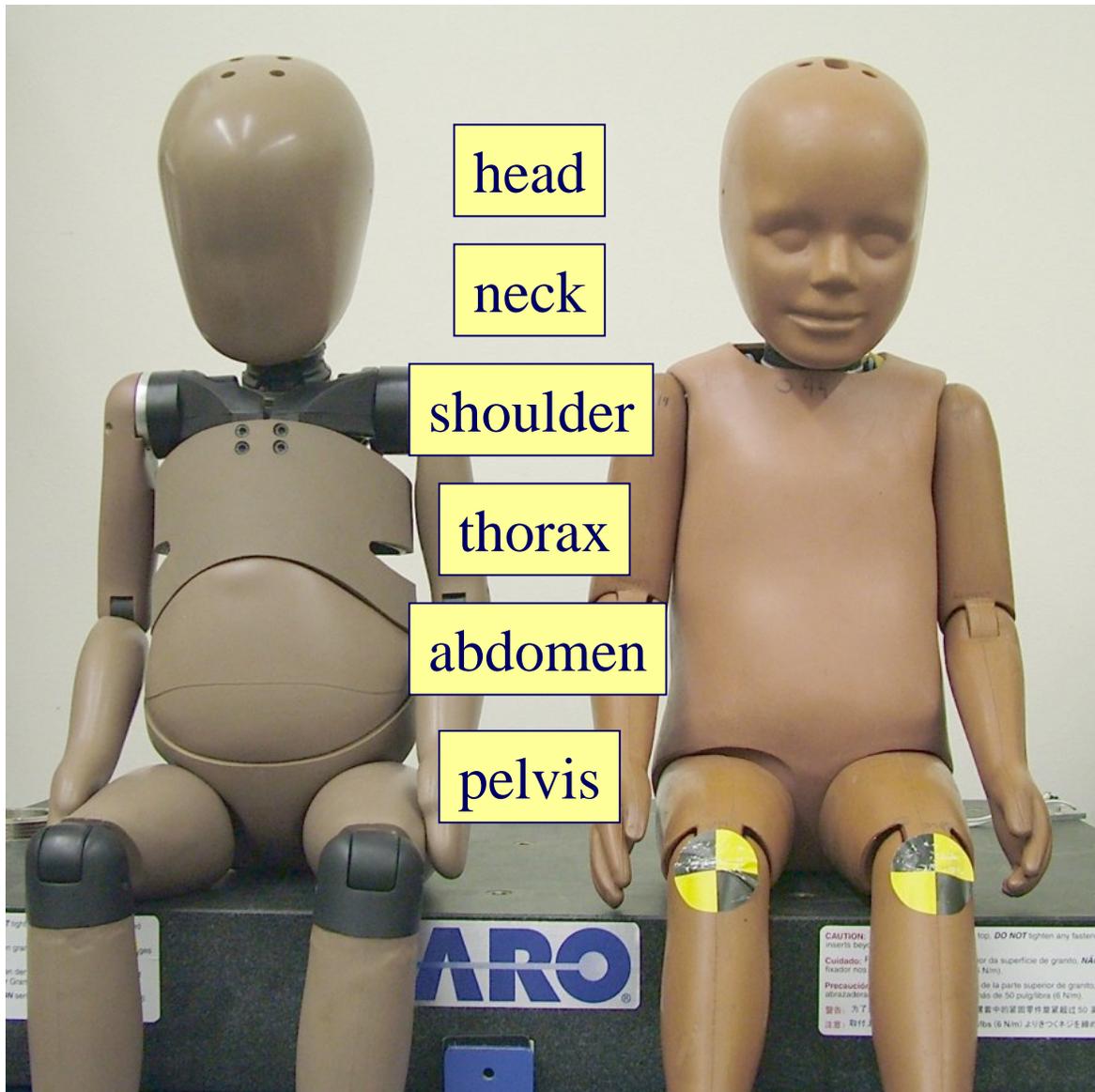
shoulder

thorax

abdomen

pelvis

3Cs

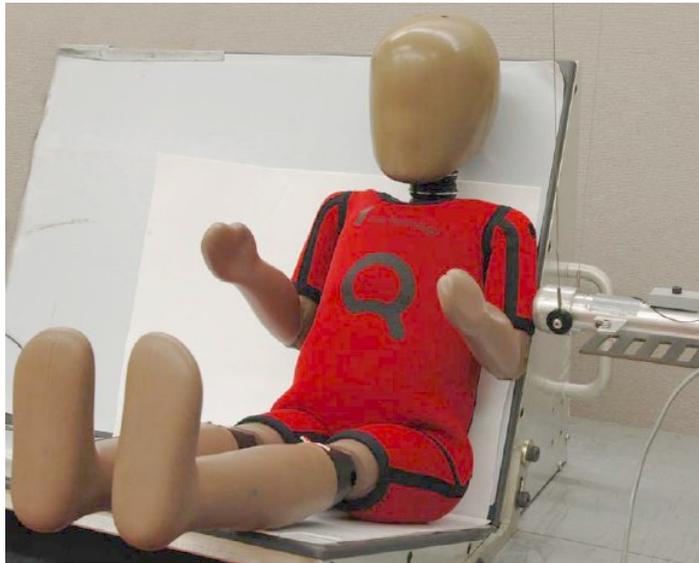


Overview

- Side Child Dummy Concepts
- Biofidelity Evaluation Preliminary Review
- **Development of Certification Procedures**
- Preliminary Durability Concerns
- Current Developments
- Future Work
- Concluding Remarks

Certification Procedures

- Adapt procedures to use of Bench Seat to improve R&R in certification tests
- Develop Thorax with Arm Test
- Fabricate and investigate 3.8 kg impactor

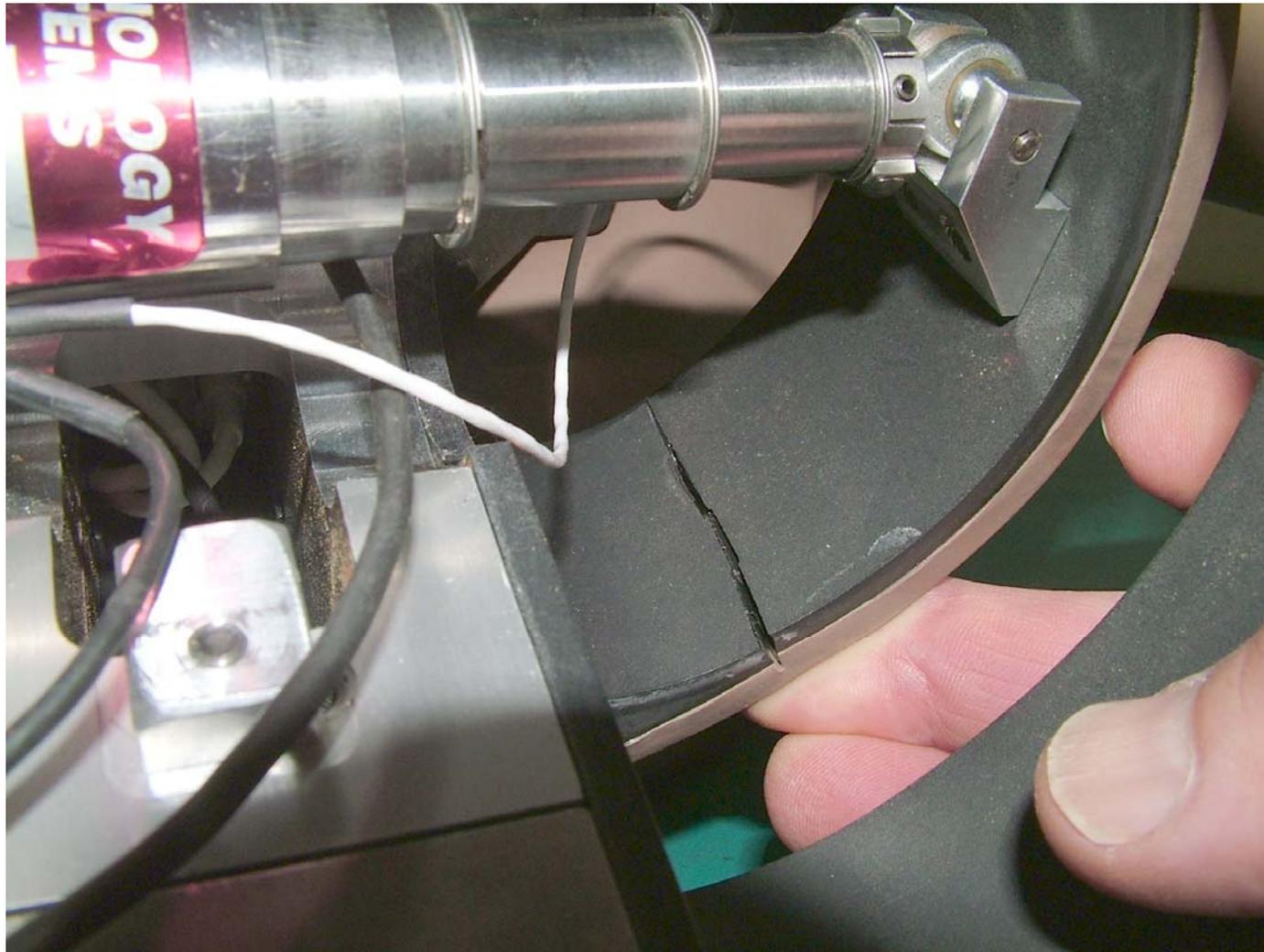


Overview

- Side Child Dummy Concepts
- Biofidelity Evaluation Preliminary Review
- Development of Certification Procedures
- **Preliminary Durability Concerns**
- Current Developments
- Future Work
- Concluding Remarks

Durability Concerns

- Thorax cracking



Overview

- Side Child Dummy Concepts
- Biofidelity Evaluation Preliminary Review
- Development of Certification Procedures
- Preliminary Durability Concerns
- **Current Developments**
- Future Work
- Concluding Remarks

Current Developments

- Improve Q3s thorax durability via materials
- Incorporate 3Cs neck design into the Q3s dummy
- Evaluate positioning tool to improve R&R for pelvis certification test

Overview

- Side Child Dummy Concepts
- Biofidelity Evaluation Preliminary Review
- Development of Certification Procedures
- Preliminary Durability Concerns
- Current Developments
- **Future Work**
- Concluding Remarks

Future Work

- Conduct sled tests for additional biofidelity assessment
- Assess new Q3s neck and improvements to thorax
- Conduct R&R testing for certification procedures using 3.8 kg impactor

Overview

- Side Child Dummy Concepts
- Biofidelity Evaluation Preliminary Review
- Development of Certification Procedures
- Preliminary Durability Concerns
- Current Developments
- Future Work
- **Concluding Remarks**

Concluding Remarks

- Q3s and 3Cs both legitimate options for use in possible CRS regulation