

Status Report:

Crashworthiness-Glazing Task Force

RSAC Meeting, May 18, 2005

Washington, DC

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Federal Railroad Administration

Outline

- **Glazing**
- **Fuel Tanks**
- **Cab Car End Frames**
- **Crash Energy Management**
- **Next Steps**

Railroad Vehicle Glazing Standard

- **Revised Glazing Standard Presented at Task Force April 21 Meeting**
- **Task Force Voted to Accept Most Requirements Proposed in the Standard**
 - **Appendix A of 49 CFR part 223**

Glazing Issues

- **Large Object Impact Test**
 - **Consensus Contingent on Conducting Test Under Prescribed Conditions**
 - **Test to be Conducted this Summer**
- **Open issues:**
 - **Should Locomotive Side Windows Meet the More Stringent Front Facing Glazing Requirements?**
 - **Higher Ballistic Test Velocity, More Representative of Current 22 Caliber Bullets?**
 - **Should End Facing Windows in Trailing Passenger Cars Subject to Side Facing Glazing Requirements?**

Overview of Proposed Glazing Standard

- **Glazing Certified by an Independent Lab**
- **Glazing Material will be Recertified Every Three Years**
- **Large Object, Small Object and Ballistic Tests Required**
- **Criteria**
 - **Penetration of a 2 mil Aluminum Foil Witness Plate**
 - **3 Out of 4 Test Samples Must Pass Each Test**

Overview of Recommended Front Facing Glazing Tests

- **Ballistic Impact**

- **22 Caliber Long Rifle**
- **40 Grain Bullet**
- **Impact Velocity - 960fps**

- **Large Object Impact**

- **12 lb. Solid Steel Ball**
- **Impact Velocity - 62.5 fps (43 mph)**
- **Tests Glazing System, including Glazing, Gasket and Frame**

Overview of Recommended Side Facing Glazing Tests

- **Ballistic Impact**
 - 22 Caliber Long Rifle
 - 40 Grain Bullet
 - Impact Velocity - 960fps
- **Large Object Impact**
 - 12 lb. Solid Steel Sphere
 - Impact Velocity - 17 fps (11.6 mph)
- **Small Object Impact Test**
 - 0.42 lb Solid Aluminum Sphere
 - Impact velocity – 80 .7fps (55MPH)

Fuel Tanks

- **Accident Survey Presented at February 2-3, 2005 Crashworthiness-Glazing Task Force Meeting**
- **Development of Generic Passenger and Freight Locomotive Fuel Tank Crush Models Presented at February 2-3, 2005 Crashworthiness-Glazing Task Force Meeting**

Cab Car End Frame Optimization

- **Consensus on Fundamental Technical Requirements**
- **Consensus on Recommended 'Home' for Standards**
 - **Dynamic Standard -> FRA Regulation**
 - **Quasi-Static Standard -> APTA Standard**
 - **Approach Parallels FRA NPRM/AAR S-580**
- **Consensus Not Yet Achieved on Values for Energy Absorption**
 - **Additional Testing Needed for Consensus**

Cab Car End Frame Tests

- **Quasi-Static Tests to Help Define APTA Standard**
 - M-7 Collision Post (Completed, Bombardier)
 - M-7 Corner Post (Planned, Bombardier)
 - SOA Corner Post (Tentatively Planned, FRA)
 - TBD Collision Post (Tentatively Planned, FRA)
- **Dynamic Tests to Help Define Recommendations for FRA Regulation**
 - 1990's Corner Posts (Completed, FRA)
 - SOA Corner Posts (Completed, FRA)
 - TBD Collision Post (Tentatively Planned, FRA)

Estimated Schedule

Cab Car End Frame Optimization

- **APTA Standard**
 - **PRESS C&S Subcommittee Consensus Possible at August 10, 2005 Meeting**
 - **Consensus Pending Quasi-Static M-7 Corner Post Test**
- **Recommendations for FRA Regulations**
 - **Crashworthiness-Glazing Task Force Consensus Possible at August 11-12, 2005 Meeting**
 - **Potential Caveat on Energy Values, Pending SOA and TBD Tests**

Overview of Draft Cab Car End Frame Standards

- **Dynamic Standard**

- Cab Car Impact with Rigid Object with Prescribed Initial Locations, Weights and Impact Speed
- Criterion: No More Than 10 Inches Deformation of Collision/Corner Post

- **Quasi-Static Standard**

- Corner/Collision Post Severely Deformed for Load Applied 30 Inches Above Deck
- Criteria
 - › Minimum Prescribed Energy Absorbed
 - › No More Than 10 Inches Deflection of Collision/Corner Post into Operator's Cab
 - › No Complete Separation of Attachments

Crash Energy Management

- **Summary of Research and Development Presented at April 22, 2005 to RSAC Crashworthiness-Glazing Task Force**
- **Ad Hoc Working Group Being Formed by FRA, FTA, APTA, and Metrolink to Develop CEM Specifications**
- **CEM Technology Transfer Meeting Planned for June 29-July 1, 2005 in San Francisco**

Crashworthiness-Glazing Task Force

Next Steps

- Work Towards Consensus on Glazing Standard**
- Work Towards Consensus on Cab Car End Frame Optimization**
- Next Will Start to Develop Recommendations for Interior Occupant Protection Requirements**