

Advancements in Rolling Stock Safety

Recent Updates and Active Research in Technology and Standards

Kevin Kesler
Chief – Rolling Stock R&D
Federal Railroad Administration
Wheel/Rail Interaction Conference
Chicago, Ill
7 May 2013

USDOT Goals

- **Safety (Top Priority)**- *RR Safety trends are excellent...the challenge is to maintain improvements as tonnage, density, speeds and passenger traffic grows*
- **Economic competitiveness** – *Making certain our transportation system meets the Nation's needs in an ever more global economy.*
- **Environmental sustainability** – *Reducing reliance on foreign oil...reducing emissions and greenhouse gases – **Natural gas coming as a locomotive fuel***
- **State of good repair**- *Assuring the nation's transportation infrastructure is fit for service – Improved designs, construction, inspection and maintenance*
- **Livable communities**- *Rail reduces highway congestion and commuter times. Improved crossings, Improved horns reduce impact on community.*

Two Primary FRA Offices

- Office of Railroad Safety
 - Rulemaking
 - Enforcement
- Office of Railroad Policy and Development
 - Grants
 - Research and Development
 - Rolling Stock
 - Human factors
 - Track
 - Train Control



Federal Railroad Administration

R&D Overview

- **R&D Budget**

- ~ \$35M annual funding
- - \$30M FY-2010 High Speed Rail R&D
Investigates Enabling technology

- **R&D Partnerships**

- Government Agencies
- Railroads
- Suppliers
- Universities

FRA R&D – A catalyst for Real World Impact

Key Developments in Rolling Stock Safety and Research

- **New Safety Standards for Passenger Rolling Stock**
 - Waiver Guidance out - NPRM due July 1013
 - Crashworthiness - For alternatively designed Passenger equipment
 - Vehicle/Track Interaction
- **Buy America vs. “Service Proven” Systems**
 - Challenge for Tier 3 – 151 to 220 mph
 - Will likely run over existing track in yards and stations
- **Next Generation Equipment Committee (NGEC)**
 - Established January 2010 - Amtrak, States, USDOT, Carbuilders, Suppliers, Consultants
 - 5 Specifications Bilevel, Single Level, DMU, Diesel Locomotive, Trainset
 - Fleet standardization --- for safety, life cycle cost, and jobs
 - 135 Bilevel cars on order --- 35 Next Gen Locos next
 - Crash Energy Management Required

Effectiveness of CEM in action



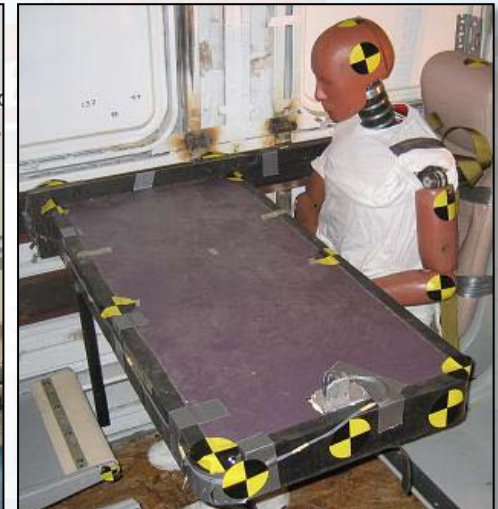
Occupant protection



Phase 1: Accidents
Investigated and causes of
fatality identified



Phase 2: Occupant dynamics
simulated and tested in
baseline interior



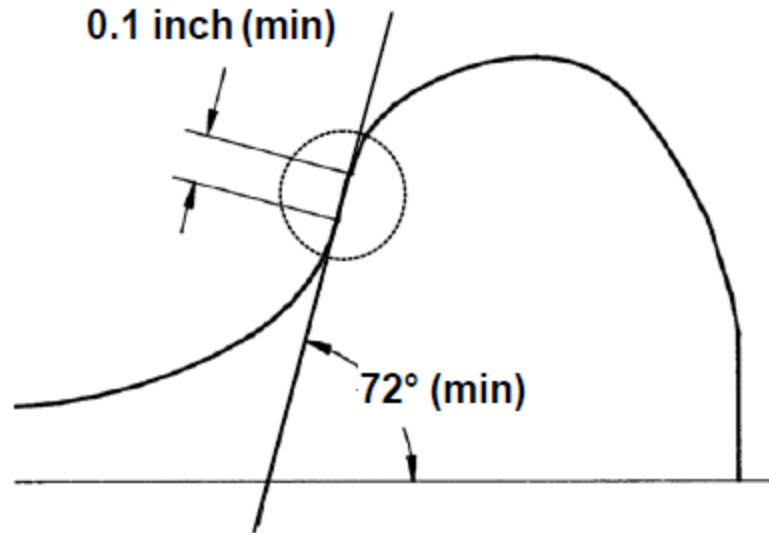
Phase 3: Alternative design
to compartmentalize
occupant and limit loads
developed and tested

Research results are applied to develop FRA regulations and industry standards. Technical information is provided to industry to develop service-designs compliant with standards and regulations

Developments in Safety and Research

- **Wheel Temperature Detector to Assure Brake Effectiveness**
 - New process developed for introduction of new technology for inspection
 - UPRR expected to request waiver within the next month
- **Natural gas Locomotive**
 - CN unit in trial service – two locomotives and a tender
 - BNSF – Planning trail service later this year
 - Natural gas released to atmosphere - **20 times** - greenhouse impact
 - AAR Technical Advisory Group / FRA – Adhoc R&D coordination
- **FRA Safety Advisory 2013-02;**
 - Low-Speed, Wheel-Climb Derailments of Passenger Equipment With ``Stiff'' Suspension Systems
 - 12 deg Curve – 3 in warp in 10 to 62 feet - .5 μ friction $L/V < \text{Nadal Limit}$
- **APTA Standard for Wheel Flange Angle SS-M-015-06**
 - 72 degrees -- critical to derailment prevention

FRA R&D Update



APTA Flange Angle Standard Criteria

(suggested tolerance $+3^\circ$ and -2°)

angle achieved at the gage point $3/8$ inch above the standard base line

Phased in June 30, 2007 to July 1, 2010.

While not new.....this is a key point to remember
This will prevent derailments on your railroad...

New FRA eLibrary – (under development)

- New search tool is being introduced to the FRA website which will enable improved search for technical reports
- <http://www.fra.dot.gov/eLib/Find>
- Key words for searches being defined
- Documents being loaded.

Thank you

Questions?

Discussion?

Kevin Kesler
Chief- Rolling Stock R&D
kevin.kesler@dot.gov
202-495-8633