

# **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

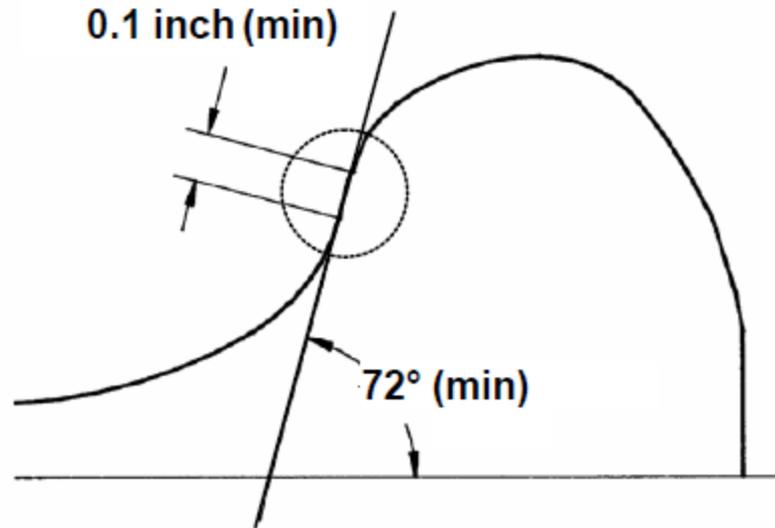
Phase 3: Alternative design to compartmentalize occupant and limit loads developed and tested

***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  $\mu$  friction L/V < 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  $-2^\circ$ )

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](mailto:kevin.kesler@dot.gov)**  
**202-495-8633**