



Annual State Manager Meeting
Denver, CO
August 26, 2010

FEDERAL RAILROAD ADMINISTRATION



Automated Track Inspection Program

2010 Operations Overview

August 26, 2010

Denver Colorado



FRA ATIP Organizational Chart



Operational Changes For 2010

- ATIP Discontinued Self Propelled Operations
- Discontinued use of OP Inspectors
- Instituted “Timetable” based scheduling
- Presented to Class 1 Transportation Mgrs
- Reduced Ensco Crew Size on Cars
- Reduced number of full time ATIP cars

Towed Operations

- Reduced per mile operating costs
- Discontinued OP inspectors – Regional Savings
- Eliminated Ensco Operator – Program Savings
- Removed restrictive Absolute Block Requirement
- Operate in flow of traffic
- General increase in operational mileage
- General decrease in operational delays

Changes for FY 2011

- Two Full Time Car Operation
- Two Part Time Cars
- Mileage Based Schedule
 - 200 Mile Days – Minimum
 - Minimize exceeding the HOS requirements
- Amtrak National Safety Assessment
 - DOTX 220 operating in Amtrak Revenue Service
- Quarterly Based Schedule - Possible
- 100,000 Mile Goal



ATIP Amtrak Safety Assessment

OVERVIEW

GOALS AND PURPOSE

DATA MANAGEMENT

LESSONS LEARNED



AMTRAK SAFETY ASSESSMENT

OUR GOAL:

- is to objectively conduct and proficiently collect creditable geometry and ride quality data information (semi-autonomously) in order to quickly understand the state of the nation railroad passenger routes
- provide immediate and reliable information and intelligence that will help with overall assessment of noncompliant track geometry and ride quality

AMTRAK SAFETY ASSESSMENT

The corridor routes of immediate interest are:

- Capitol Limited (Washington, DC to Chicago, Illinois)
- Silver Service (Washington, DC to Miami, Florida)
- Crescent Route (Washington, DC to New Orleans, Louisiana)
- City of New Orleans Route (New Orleans, Louisiana to Chicago, Illinois)
- Sunset Limited (New Orleans, Louisiana to Los Angeles, California)
- Texas Eagle (San Antonio, Texas to Chicago, Illinois)
- California Zephyr (Chicago, Illinois to Oakland, California)
- Southwest Chief (Chicago, Illinois to Los Angeles, California)
- Coast Starlight (Los Angeles, California to Seattle, Washington)
- Empire Builder (Seattle, Washington to Chicago, Illinois)
- Hoosier/ Cardinal State Route (Chicago, Illinois to Washington, DC)

AMTRAK SAFETY ASSESSMENT

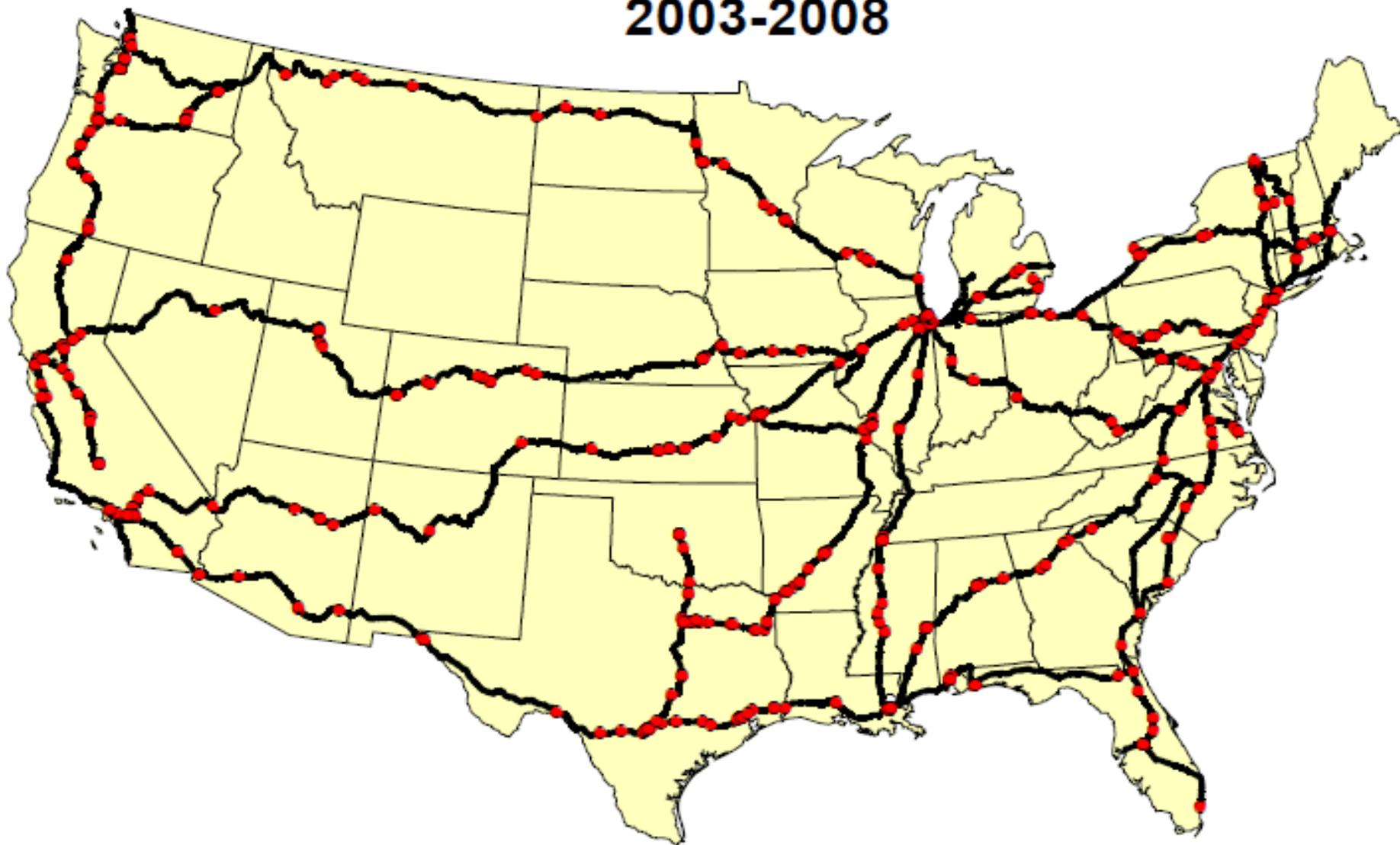
- **SCOPE:** The safety assessment is being conducted on approximately 18,000 miles of Amtrak passenger routes over a period of approximately two months beginning July 19, 2010. The safety assessment schedules are available for viewing and accessible on the FRA website at:
<http://atip.fra.dot.gov/secure/schedules/dotx-220/index.shtml>.

AMTRAK SAFETY ASSESSMENT

- Another objective of the safety assessment is the preparation of autonomous data gathering
- Nationwide use of autonomous measurement systems accuracy and feasibility
- Possible regulatory change and procedures necessary for future track geometry collection, safety assurance and compliance

Geometry Caused Derailments On Amtrak Operated Routes

2003-2008





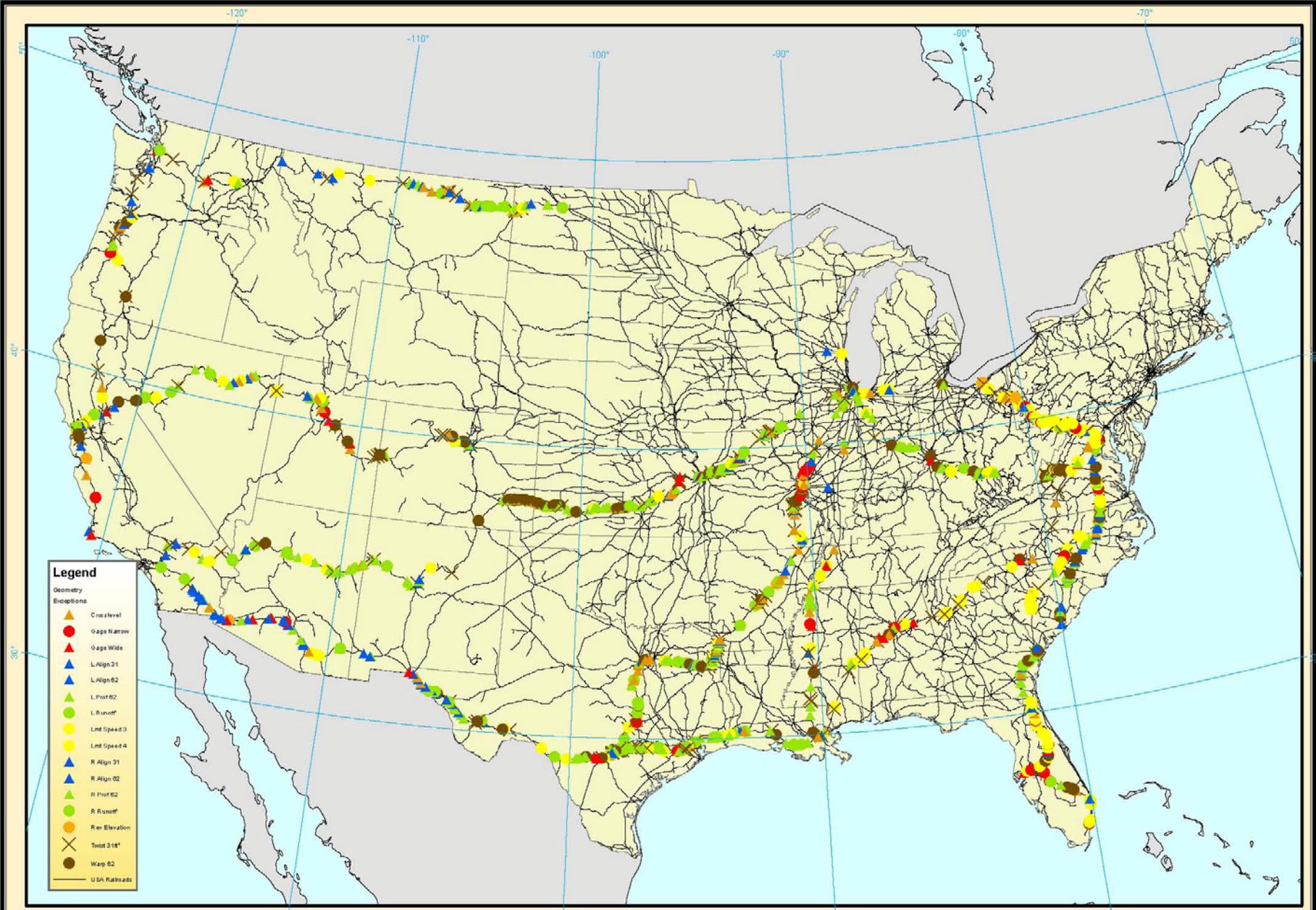
Legend

Ride Quality

Exceptions

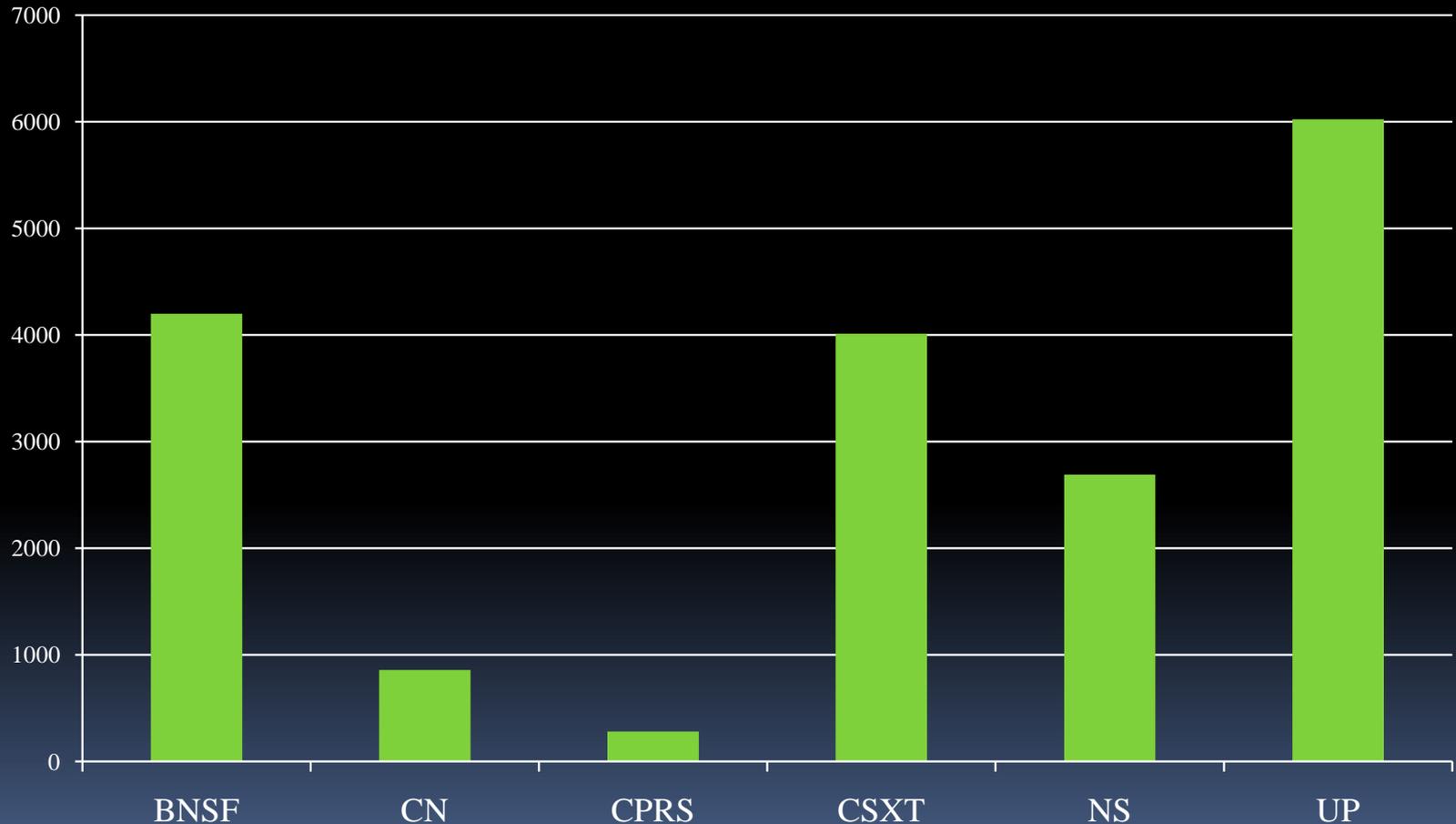
- CBL Peak to Peak*
- CBV Peak to Peak*
- USA Railroads

Ride Quality Exceptions
DOTX-220 Amtrak Survey Operations

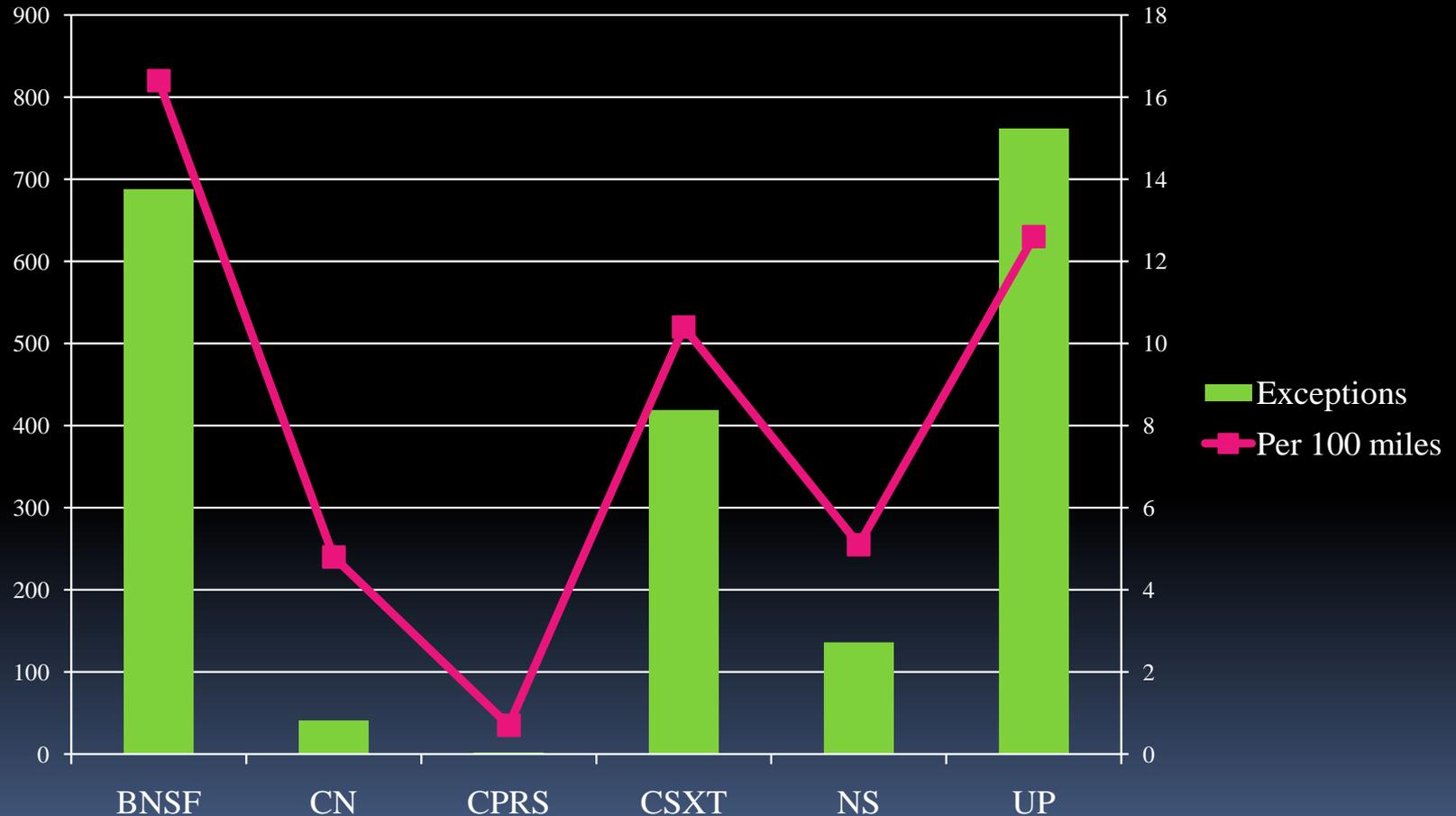


Geometry Exceptions
DOTX-220 Amtrak Survey Operations

Amtrak Assessment Survey Miles by Railroad



Amtrak Assessment Exceptions by Railroad



LESSONS LEARNED

- Data is Accurate
- Snow and Freezing Rain Cause Common Collection Failures
 - Reschedule for Seasonal Weather Climates
- Identify and Stock Critical Spare Parts Onboard
- Railroad Ownership Issues
 - Better Up-To-Date Railroad Timetable, Track Chart Information, and Advance Notification
 - Know Which Railroad Track is being Assessed
 - Some Railroad Personnel Unfamiliar Or Lack the Tools to Use GPS Coordinates To Find Exceptions
- Improve Data Distribution From Car

ASA Phase II Data Reporting

- Geometry Data is gathered and sent by HQ to applicable Railroads and FRA Regions in two reporting categories:
 - **Critical Exceptions** are immediately sent from the car for review and verification
 - on posted track class 3-5, the exception must NOT meet class 2 to be counted
 - on posted track class 1-2, the exception must NOT meet class 1 to be counted
 - **Noncompliant Exceptions** are sent from the car when a survey (RUNID) is complete (per applicable track Class, defaulting to Class 4 standards where track class is unknown)

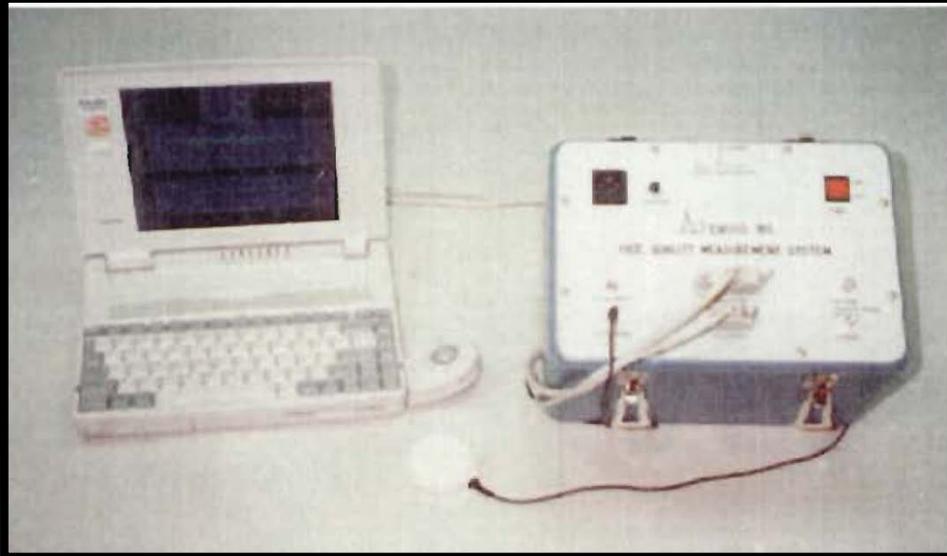


Ride Meters

New Technology



Ride Meter



Project Objectives and Approach

Objective

- Develop a tool to quantify rough ride locations that inspectors can use on a regular basis

Approach

- An Ultra-Portable Ride Quality Meter (UPRQM) designed to work in conjunction with a laptop which will allow for real-time display of data channels and real-time GIS-based mapping of current location



Background

- Rail car vertical and lateral accelerations can be used to indicate poor track conditions or irregular vehicular response
 - 49CFR213.333
- Large accelerations can lead to accelerated deterioration of track components
- Frequency-weighted acceleration levels can be correlated to passenger comfort
 - ISO 2631-1:1997, ISO 2631-4:2001
 - ISO 10056
 - UIC 513 and 518
 - BS EN 12299:2009



Problem

- Current practice of recording accelerations is subjective
 - FRA inspectors ride locomotives and Amtrak passenger cars
 - They manually note “rough ride” locations
 - What constitutes “rough ride” conditions will vary between inspectors
- Current ride meters have one or more deficiencies
 - Too heavy and bulky for inspectors to utilize
 - High maintenance



Development



GPS window mount
with GPS receiver

Inspector Laptop

USB Tri-Axial
Accelerometer



Development

- The SBIR program was used as a competitive contracting mechanism for the procurement of the ultra-portable ride quality meter.
- **Phase 1: March – September 2007**
 - The Small Business and Innovative Research (SBIR) program ensures that the nation's small, high-tech, innovative businesses are a significant part of the federal government's research and development efforts. Eleven federal departments participate in the SBIR program.
 - Demonstrate proof of concept and prototype software
- **Phase 2: August 2008 – Present**
 - Software Build #1: Beta tested by four inspectors in FRA Regions 1-4
 - Software Build #2: Currently being beta tested by eight inspectors in FRA Regions 1-8
 - *Build 2* includes numerous features that were incorporated based on feedback received from four *Build 1* beta testers
 - Software Build #3: Build 3 will be delivered to FRA in September 2010
 - *Build 3* will include numerous features that are incorporated based on feedback from eight *Build 2* beta testers.
- **Phase 3: The Future**
 - **Wireless Accelerometers**
 - **Ambient Noise Quantifier**
 - **Performance standards based on new regulations**



Hardware Components



Ride Meter Demonstration



Data Collection

Metrix® ATK NEC SOUTH TRENTON - PHILA Inspection Loaded (7/21/2010 11:28:26 AM)

File Edit Inspection Analysis Reports Help

Accelerometer GIS Graph X Y Z Window

SR001053	Value
Summary	
ID	1
Date / Time	7/21/2010 11:36:47
Details	
Performance Standard	USA - DOT - FRA - 49cfr213.333
Axis	Z
Threshold	Carbody Vertical Peak to Peak
Level	Alarm (0.600 g)
Max Value (g)	0.63
Duration (ms)	1,012.50
Location	
Distance to Milepost (ft)	1,541.44 NE of MP 60
Speed (mph)	104.31
Latitude	40.183460
Longitude	-74.784945
Altitude (ft)	42.98
Valid GPS Fix	True
Memo	



Data Report

Ride Quality Inspection Exception List Report

Inspection Name: ATK NEC SOUTH TRENTON - PHILA

Inspection Timestamp: 7/21/2010 11:28:26 AM

ID	Timestamp	Accelerometer	Performance Standard	Level	Max Value (g)	Duration (ms)	Latitude	Longitude	Memo
1	7/21/2010 11:36:47	SR001053	USA - DOT - FRA - 49cfr213.333	Alarm (0.600 g)	0.63	1,012.50	40.183460	-74.784945	
			Carbody Vertical Peak to Peak						
2	7/21/2010 11:37:32	SR001053	USA - DOT - FRA - 49cfr213.333	Alarm (0.600 g)	0.60	907.50	40.164897	-74.793237	
			Carbody Vertical Peak to Peak						
3	7/21/2010 11:40:19	SR001053	USA - DOT - FRA - 49cfr213.333	Alarm (0.600 g)	0.81	1,110.00	40.104717	-74.855248	
			Carbody Vertical Peak to Peak						



Future Plans

- Based on feedback from *Build 2* beta testers, software features will again be modified
- Build 3 Features will include:
 - Multiple Accelerometer (up to 3) Support
 - Street Level GIS data
 - Auto FTP Upload
 - More Reports
 - Ride Comfort and Health Analyses
 - Frequency Domain Analyses
- Final build (*Build 3*) will be delivered by September 2010





Regulation Update

Track & Structures Division



Regulations Implemented

- Continuous Welded Rail Safety Standards
 - Final Rule published on August 25, 2009
 - Effective dates
 - Class 1 – October 9, 2009
 - Class 2 – November 23, 2009
 - Class 3 – February 22, 2010
- Bridge Safety Standards
 - Final Rule published on July 15, 2010
 - Implement Bridge Management Program
 - Load Capacity
 - Bridge Inspections

Regulation Proposed

- RWP - Adjacent Controlled-Track Safety Standards
 - NPRM published November 25, 2009
 - Comments received, Final Rule considered
- Vehicle/Track Interaction Safety Standards
 - NPRM published May 10, 2010
 - Comments received, RSAC TF reviewing
- Concrete Crosstie Safety Standards
 - NPRM published August 26, 2010

Regulations foreseen

- Rail Integrity
 - RSAC Track Safety Standards Working Group reached consensus – one non-consensus item
 - Full RSAC to consider in September 2010
- Track Inspection Time Study
 - RISA required study report to Congress by October 2010
 - RISA requires regulation within two years of study



QUESTIONS?

THANK YOU