



BNSF RAIL SAFETY OVERVIEW

MONTH XX, 2016
CITY, STATE

EX 0113-TSS



EX-0113-00001-TSS

Rail Transports Crude Safely

Since 1980, railroads reduced rates for employee injuries, train accidents and grade crossing collisions by **80 percent**.

In 2015 BNSF moved hazardous materials **99.99 percent** of the time without an accidental release.



BNSF's Safety Overview

- Rail is safest mode of land transportation.
- BNSF's safety vision is to prevent accidents in the first place.
- BNSF has a broad-based risk reduction program.



Prevention

Mitigation

Response

Safety Leader for Continuous Risk Reduction

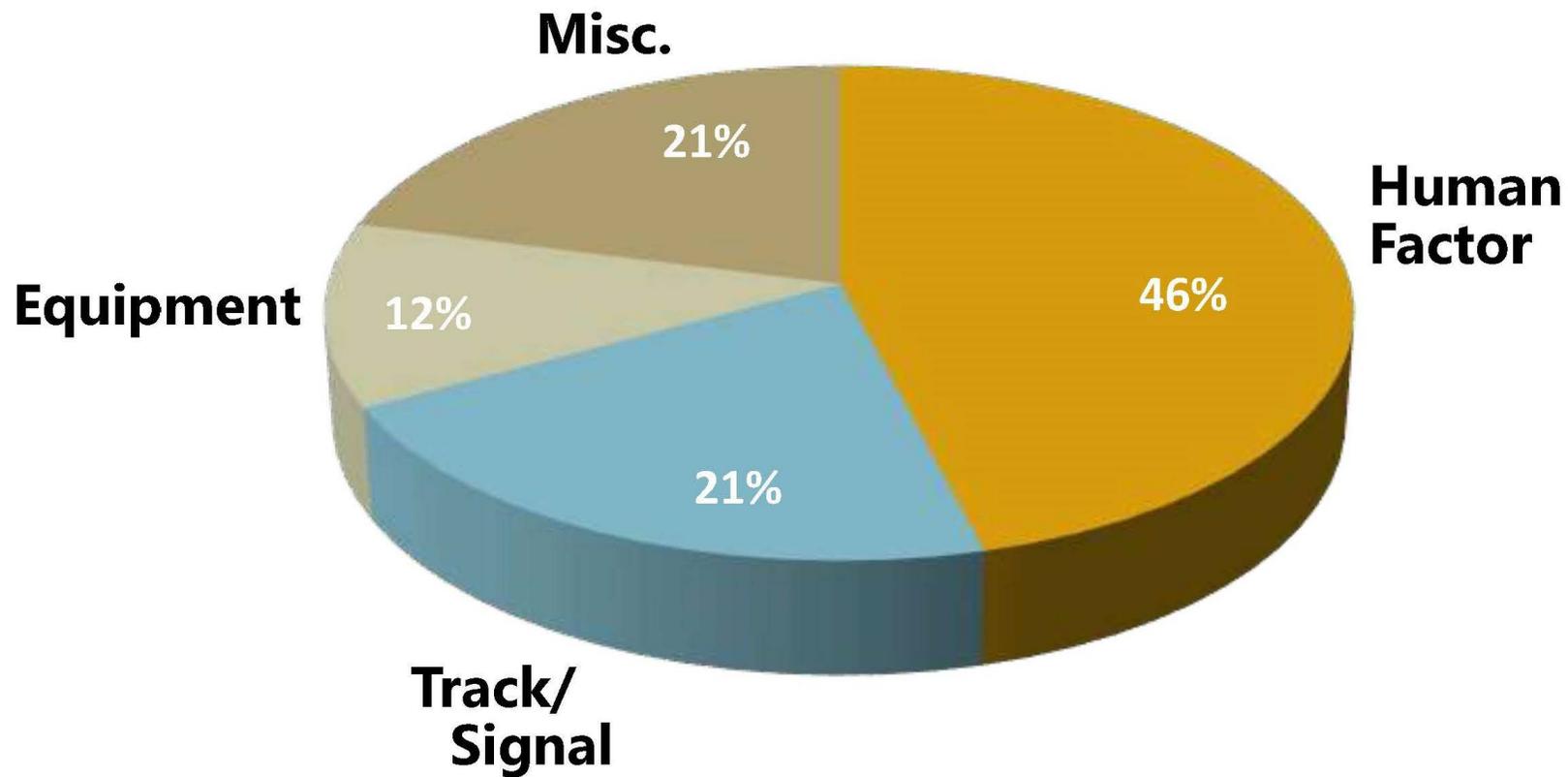
BNSF vs. Industry Reportable Rail Equipment Incident Rate *(Incidents per Million Train Miles)*



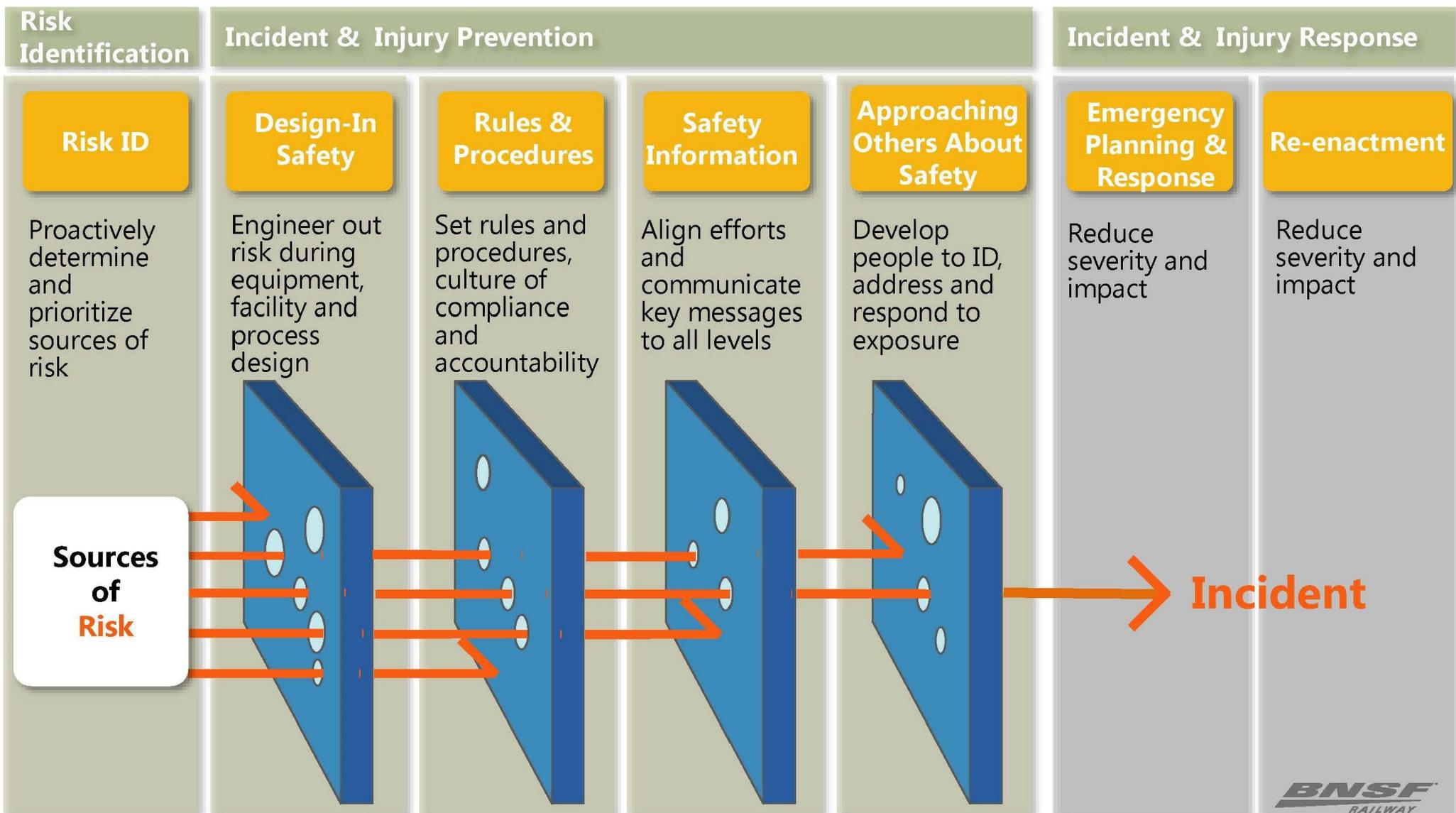
Source: FRA – Data for Calendar Year through Dec. 31, 2015

Prevention: Causes for Derailments

BNSF Reportable Train Accident Causes - 2015



Prevention: Risk-Reduction Efforts – Layers of Safety



Prevention: Reducing Risk

Human Factor

- Training
- Remote monitoring
- Positive Train Control
- Self reporting protocol

Equipment/Mechanical

- Ultrasonic inspection
- Detector network - dragging equipment
- Technology
 - Thermal/infrared scanning for warm bearing detection

Track/Signal

- Enhanced track inspection training
- Continued elimination of jointed rail
- Strong capital program for tie renewal
- Technology - ground penetrating radar and enhanced geometry testing

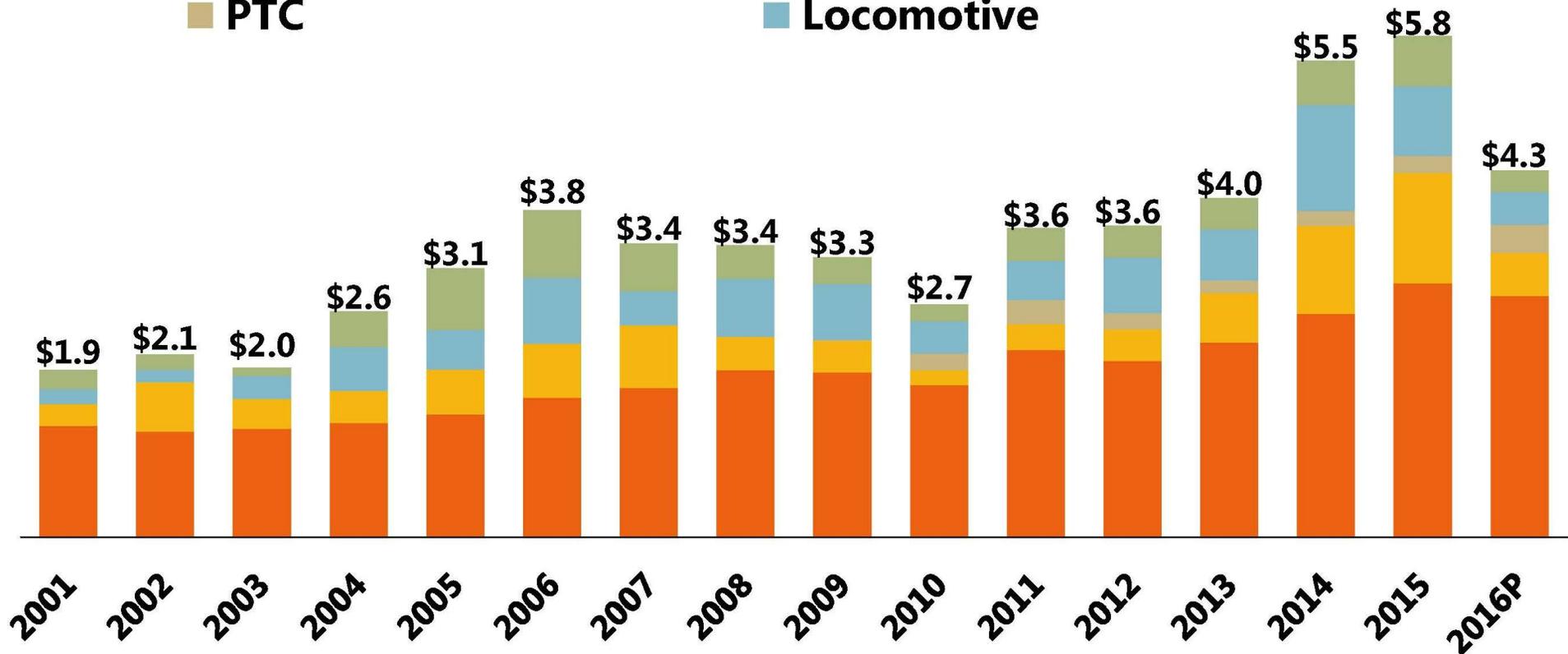


Our ongoing focus is on instilling a culture of commitment and compliance – a culture that is sensitive to exposure and risk.

Prevention: Record Capital Spending

BNSF plans to spend **\$4.3 billion** on capital projects in 2016 to support maintenance and expansion – \$2.8 billion for network maintenance

- Replacement Capital
- Expansion
- PTC
- Locomotive



Prevention: Approach to Inspections

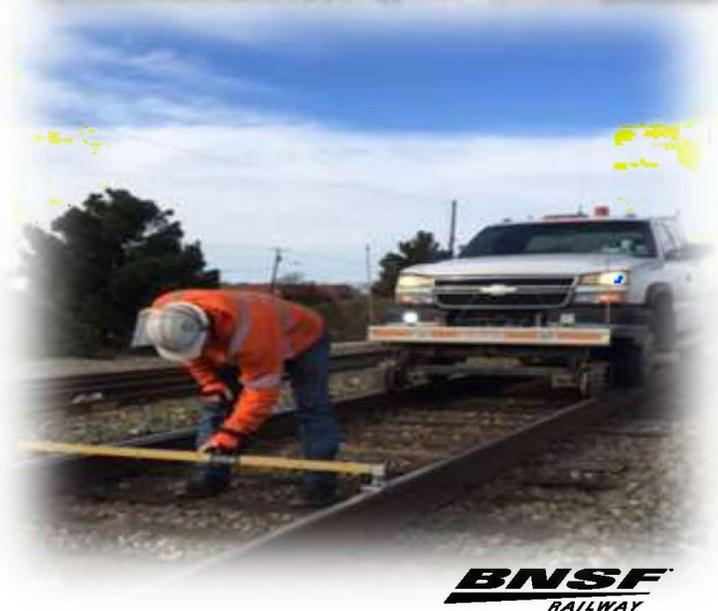
Bridge and Track Inspections

BNSF inspects tracks and bridges more often than required by FRA

- Most BNSF key routes inspected **four times weekly** and **busiest daily**
- Geometry car inspections performed **at least two times** on crude oil routes annually
- Track inspections with state-of-the-art technology to detect internal and external flaws in the rail and track structure
- Weather and earthquake inspections

Increased Rail Detection Testing Frequencies Along Critical Waterways

Increased rail detection testing along critical waterways from the FRA frequency of twice annually to **2.5 times in April 2015**



BNSF
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Prevention: Equipment Detection Technology

- More than 2,000 trackside detectors
- Hot Box Detector (HBD)
- Wheel Load Impact Detector (WILD)
- Trackside Acoustical Detector (TADS)
- Sonic Cracked Wheel/Axle Detector (CWAD)
- Machine Vision Systems
- Magnetic Particle Inspection
- Warm Bearing Detection System (WBDS)
- Hot Wheel Detectors (HWD)
- Truck Performance Detectors (TPD)



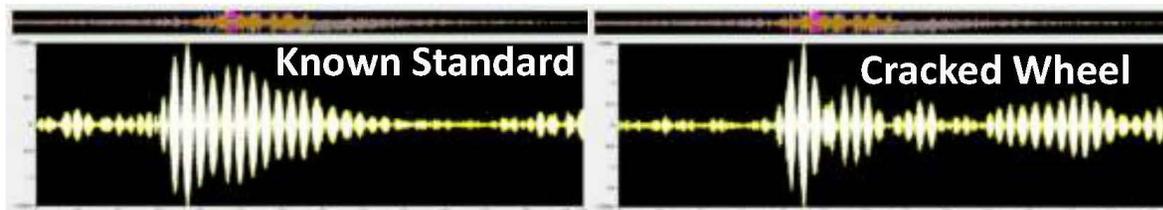
Prevention: Rail Equipment Detector Examples



- **Acoustic Bearing Detector (ABD)** – acoustic systems used to evaluate sounds generated by specific bearing component defects



- **Hot Box Detector (HBD)** – evaluates bearing temperature history for statistical outliers; brake issues, burned off journals



- **Cracked Wheel/Axle Detector (CWAD)** – Rail mounted sensors capable of detecting the difference between tones generated by normal vs. flawed wheels and axles

Prevention: Key Train Operations

A Key Train has one or more loads of Toxic Inhalation Hazard/Poisonous Inhalation (TIH/PIH) materials or a train with 20 or more tank loads of any hazardous materials.

Special Handling for Key Trains

- Special identification and tracking
- Speed restrictions for crude and ethanol
 - **BNSF requires a speed of 35 mph for all shale crude trains through municipalities of 100,000 or larger as of March 2015**
 - 50 mph for all Key Trains as of July 2014
 - Municipal speed restriction of 40 mph for crude oil trains consisting of one or more DOT111 tank cars, including CPC 1232 tank cars, moving through High Treat Urban Areas issued by the Department of Transportation on July 1, 2014.
- **Risk-based Routing:** Applied PHMSA's *Rail Corridor Risk Management System* and its 27 Risk Factors, defining the "most safe and secure" routes for trains carrying TIH/PIH, to crude unit trains starting July 2014.
- **Key Train Routes:** Wayside wheel bearing detector spacing, frequency of track inspections, minimum track maintenance standards for tracks used to meet or pass Key Trains.
- **Unattended Trains:** Crude oil trains left unattended require specific job safety briefing between train crew and train dispatcher.
- **Locomotive Cab Securement:** Key Trains left unattended have reverser removed and cab doors locked.

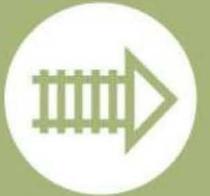
Prevention: Risk Reduction for Crude Trains

Derailment Prevention – Increased Trackside Safety Technology

BNSF-SPECIFIC ACTION	INDUSTRY ACTION
<p>Hot Bearing Detectors spacing of 10 miles on crude routes that parallel critical waterways, which is a higher standard than the industry maximum of 40 mile spacing. Key Trains stopped by Hot Bearing Detectors must set-out the indication car.</p> <p>Effective March 2015</p>	<p>Additional Hot Bearing Detectors on crude oil routes (maximum 40 mile spacing).</p> <p>Effective July 2014</p>
<p>Increase rail detection frequencies along critical waterways as BNSF went from the FRA frequency of twice a year to 2.5 times.</p> <p>Effective April 1, 2015</p>	
<p>Key Trains with Level II Wheel Impact Load Detector (WILD) defect (120-140 Kilopound) will be handled as LEVEL I defect (immediate set-out).</p> <p>Effective March 2015</p>	

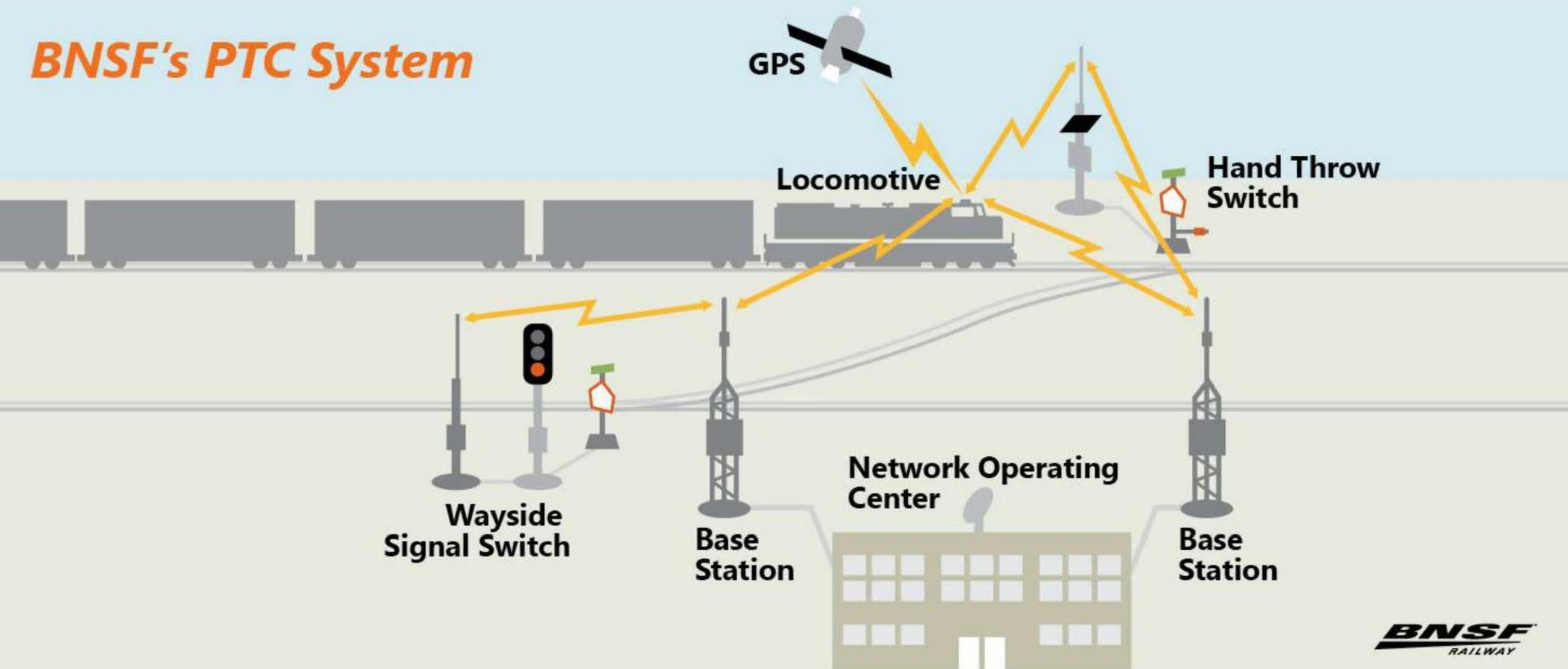
Prevention: Positive Train Control (PTC) Deployment Will Enhance Safety

PTC is a digital wireless communication technology



The Future

BNSF's PTC System



Mitigation: U.S. DOT Final Rule

Final Rule Issued May 2015 and Effective July 7, 2015

(various aspects of the new rule are currently being challenged in court and with the U.S. DOT)

New Braking Standards

- Requires End-of-Train (EOT) device or Distributive Power (DP) braking
- Electronically Controlled Pneumatic (ECP) braking system for High Hazard Flammable Unit Trains (HHFUT) (70+ cars) by Jan. 1, 2021 or 30mph speed limit – Crude Oil
- ECP braking for High Hazard Flammable Trains by May 2023 or 30 mph speed limit – All Other HHFUT

Note: The FAST Act requires an independent evaluation of the electronic brakes standard, which may result in the repeal of the electronic brakes mandate.

New Operational Standards

- Reduced operating speeds - **BNSF-specific standards exceed**
- Routing requirements
- Notification information for government agencies

New Classification Requirements

Document sampling and testing program

Ruling applies to HHFT (High-hazard flammable trains) = ≥ 20 loaded tank cars in a continuous block or ≥ 35 or more loaded tank cars dispersed through a train

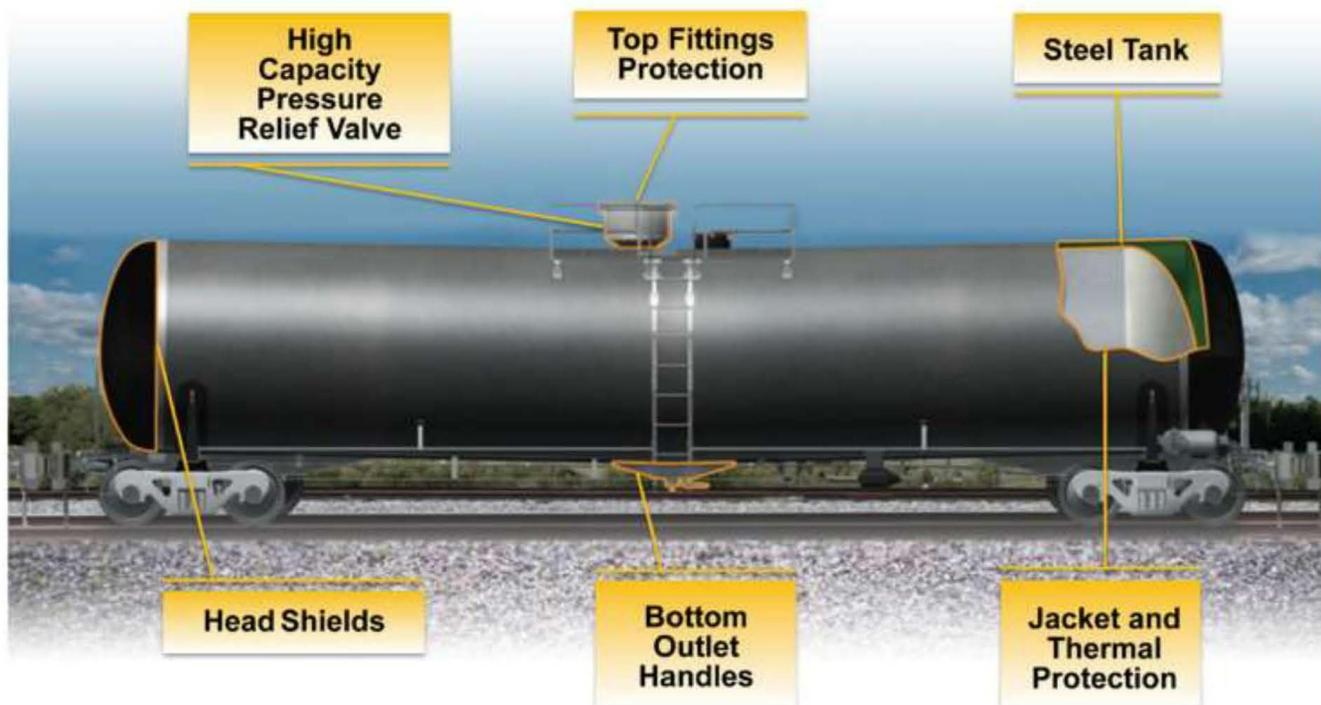


Mitigation: New Tank Car Standards

Tank Cars for High-Hazard Flammable Trains (HHFT)

New tank cars built after Oct. 1, 2015, must meet enhanced DOT 117 design or performance criteria for HHFT:

- Increased thickness from 7/16 inch to 9/16 inch steel
- Thermal protection required
- Jacketing with minimum 11-gauge steel and weather-tight
- Full-height Head Shield - 1/2-inch thick



Mitigation: New Tank Car Standards

Car specification /Service	U.S. Retrofit Timeline	Car specification /Service	Canadian Retrofit Timeline
DOT111 (NJ)/PGI	January 1, 2017* January 1, 2018	DOT111 (NJ)/Crude Oil	May 1, 2017
DOT111 (J)/PGI	March 1, 2018	DOT111 (J)/Crude Oil	March 1, 2018
CPC-1232 (NJ)/PGI	April 1, 2020	CPC-1232 (NJ)/Crude Oil	April 1, 2020
DOT111 (NJ)/PGII	May 1, 2023	DOT111 (NJ)/Ethanol	May 1, 2023
DOT111 (J)/PGII	May 1, 2023	DOT111 (J)/Ethanol	May 1, 2023
CPC-1232 (NJ)/PGII	July 1, 2023	CPC-1232 (NJ)/Ethanol	July 1, 2023
CPC-1232 (J)/PGI and II and all remaining cars in PGIII	May 1, 2025	CPC-1232 (J)/PGI and II all remaining cars in other flammable liquid service	May 1, 2025

Response: First Responder Coordination

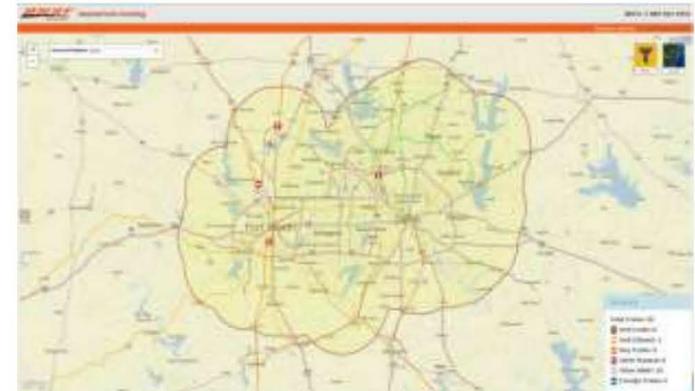
- **Shipment information access** by first responders
- **Training** first responders, employees and customer employees
- **Mobilizing** in the event of an incident

Response: First Responder Access to Information

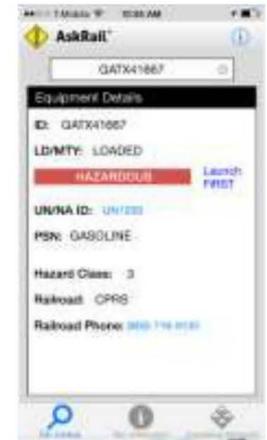
Historically, BNSF has provided local first responders information about hazmat shipments upon request.

Today we go even further

- Since July 2014, BNSF provides **State Emergency Response Commissions with Bakken crude traffic train counts** on transport of 1 million+ gallons.
- BNSF **offers SECURETRAK** website, a real-time Geographic Information System tracking program, to state and/or regional fusion centers.
- Industry **launched AskRail app** to provide first responders with car-specific data for hazmat contents and railroad contacts during incident.
- BNSF **developed national inventory of resources** for first responders, staging of emergency response equipment and community notification contacts.
- BNSF launched www.BNSFHAZMAT.com website to provide information such as training and emergency response plans to first responders.



SECURETRAK Website



AskRail App

Response: First Responder Training

BNSF and the railroad industry train first responders in their communities under a longstanding program called “TRANSCAER” (*Transportation Community Awareness and Emergency Response*)

- Hands-on equipment in field – Instructor lead
- Train list / shipping papers
- Placards
- Equipment
- Incident Assessment



- BNSF trained **more than 10,000** local emergency responders in 2015.
- More than **80,000 emergency responders** trained by BNSF since 1996.

Response: Training First Responders at National Facilities



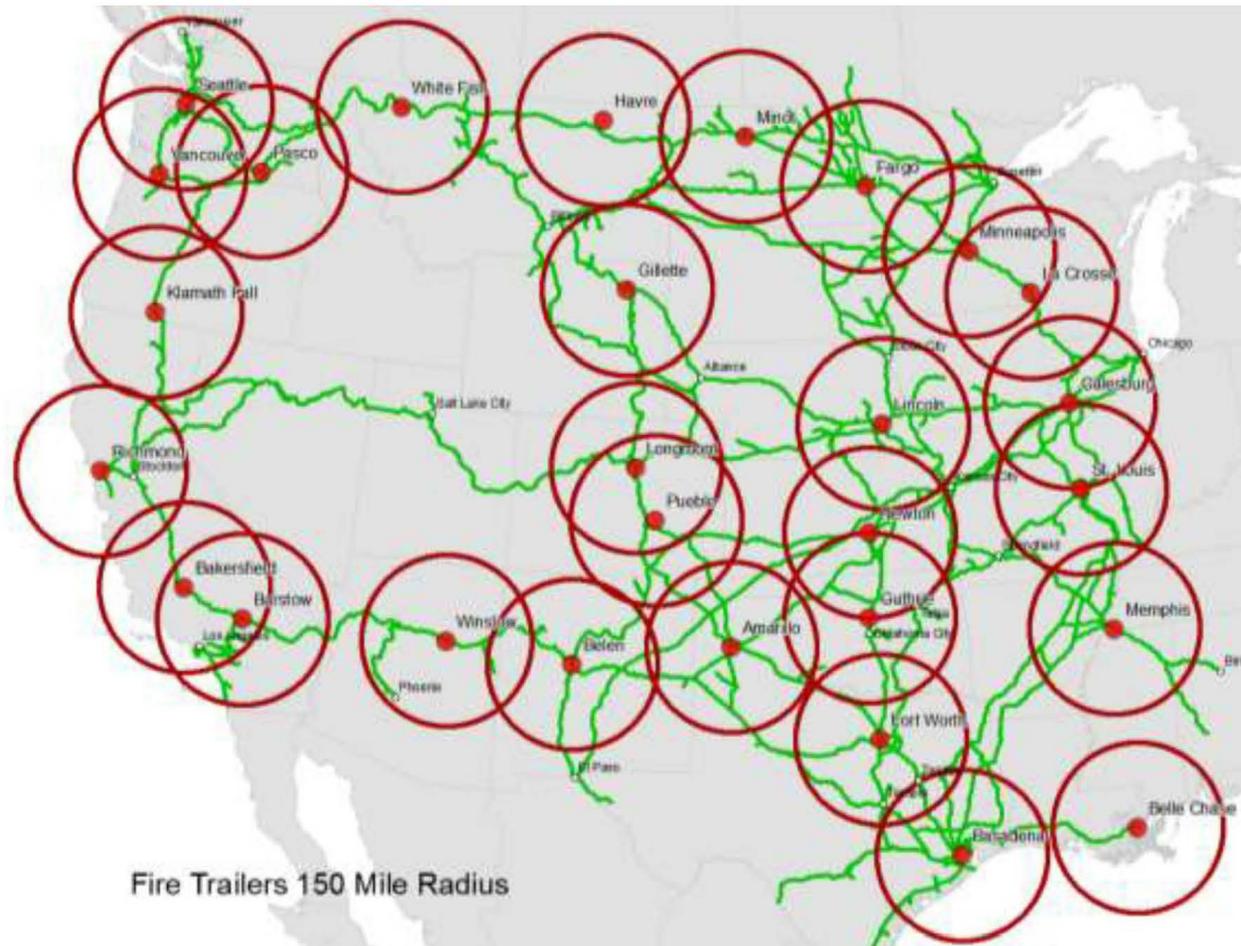
- Security and Emergency Response Training Center (SERTC) at national railroad research/training facility
- First responders learn crude incident techniques in three-day class with 24 hours of training
- In 2015, industry trained 1,700 first responders. In 2014 and 2015, BNSF sponsored more than 1,200 local emergency responders; In 2016, BNSF is sponsoring 360 responders to attend SERTC and Texas A&M
- BNSF believes first responders must be properly trained to respond safely

Response: Incident Mobilization

BNSF pre-positions equipment across its network



- Industrial fire-fighting foam trailers
- Emergency breathing air trailers
- Chlorine kits
- Midland kits
- Air monitoring assets



Restoration of sites

BNSF will restore the site



Cameron, Texas, post derailment

- BNSF is responsible for mitigation of the spill and any restoration tasks
- BNSF contracts with pre-approved consultants and contractors to perform the remediation and restoration
- State agencies oversee the work and BNSF must obtain their concurrence before a site is acceptably closed

Future Technology Plays a Key Role in Driving Safety Improvements



Unmanned Aerial Vehicles

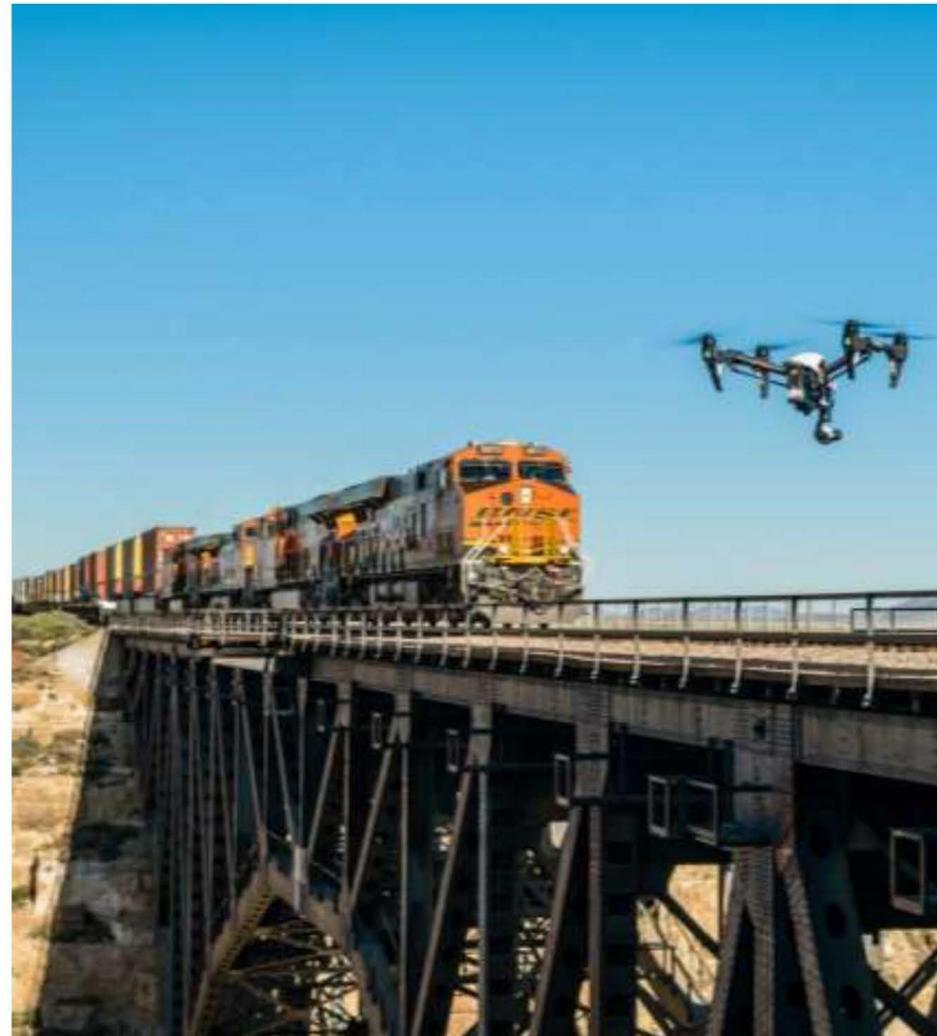
BNSF is one of only a few companies in the United States – and the first railroad – to take the lead in the use of Unmanned Aerial Vehicles (UAVs)

Supplemental track and structure inspection

- Small multi-rotor aircraft
- Operations governed by FAA Section 333 Exemption

Track integrity flights for key train operation

- Larger fixed wing aircraft
- Initially governed by FAA Research Agreement (CRDA)





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