

# Federal Railroad Administration Non-Accident Releases (NARs) and Tank Car Safety

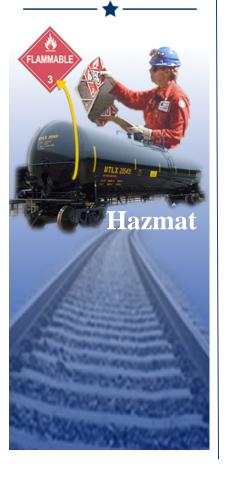
#### Kurt Eichenlaub

Hazardous Materials Division

Federal Railroad Administration

FRA HM Seminar Reno, NV June 25-27, 2013



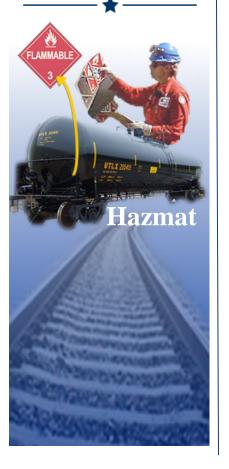


#### **Overview**

- NAR Defined
- Incident Reporting
- NAR Trend Analysis
  - Overview of DOT Incident data
  - Review of 2012 AAR/BOE Annual Report on NARs
  - AAR/BOE Statistics updated April 2013
- Common failures (PRDs, Vacuum valves, bottom outlet valves etc.)





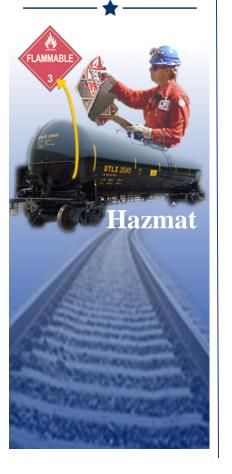


#### Definition of a NAR

"The unintentional release of a hazardous material while in transportation, including loading and unloading while in railroad possession, that is not caused by a derailment, collision or other rail related accident. NARs consist of leaks, splashes, and other releases from improperly secured or defective valves, fittings, and tank shells, and also include venting of non-atmospheric gases from safety relief devices."

Atmospheric gases: air, nitrogen, oxygen, argon, krypton, neon, xenon





## **Incident Reporting**

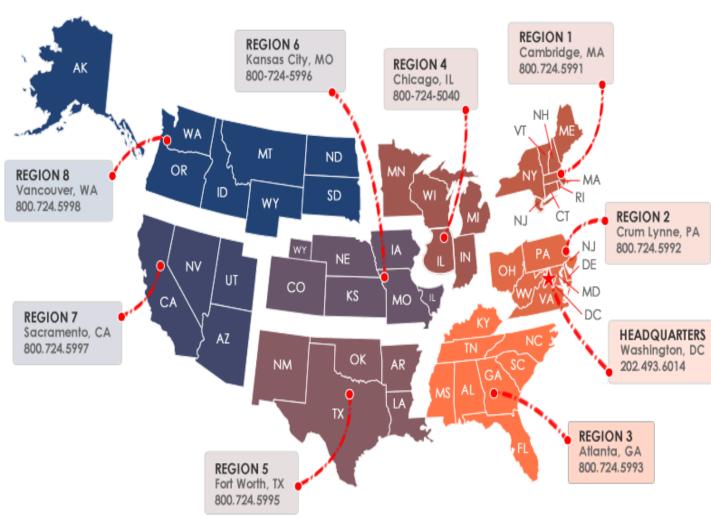
- 49 CFR, Section 171.16(a)(2)
   Must submit a DOT Form F 5800.1 for any unintentional release of a hazardous material during transportation
- DOT 5800.1 Form F:

http://www.phmsa.dot.gov/hazmat/incident-report

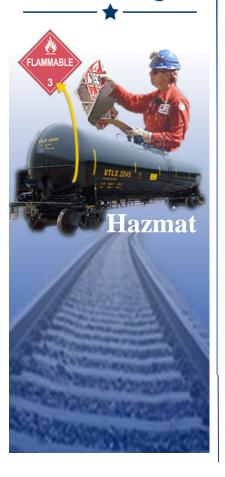




# FRA Regional Map

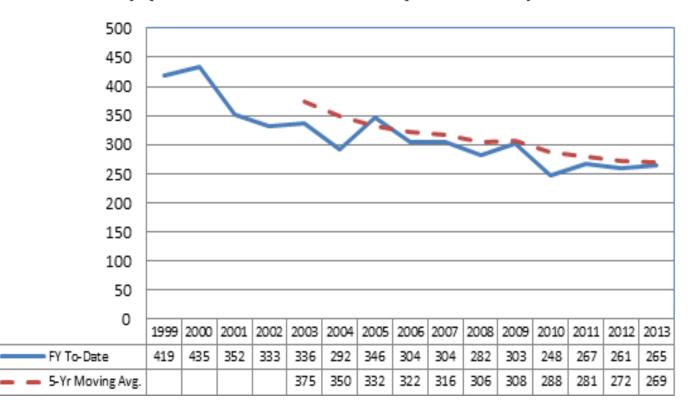




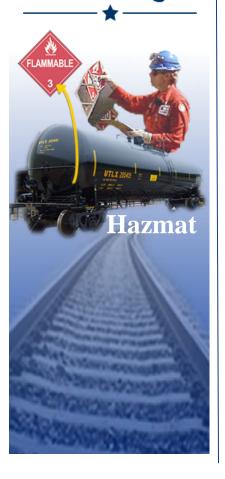


#### **Incident Data**

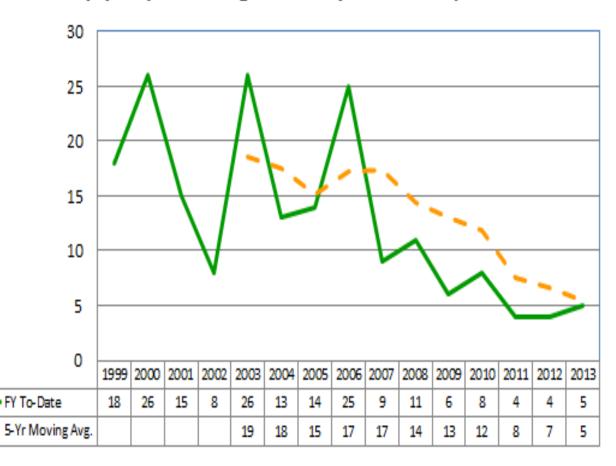
#### All Regions NARs (by incident location, US only, Oct. - Mar.)



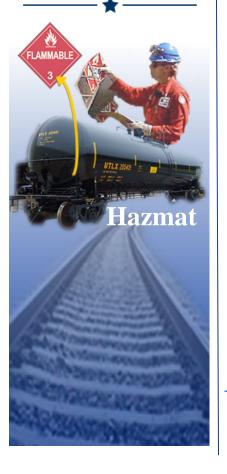




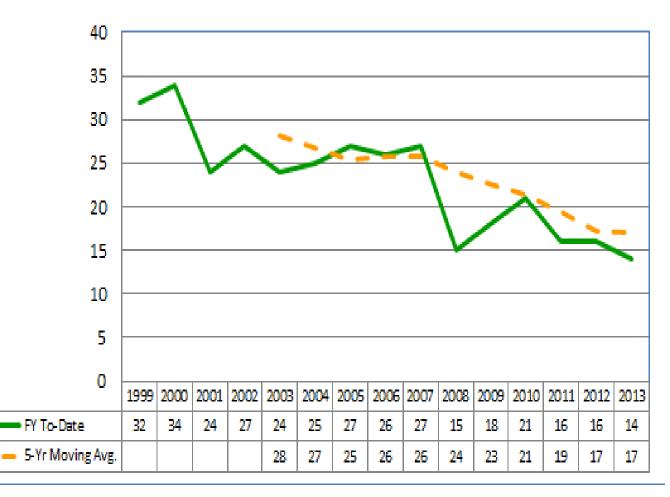
#### Region 1 NARs



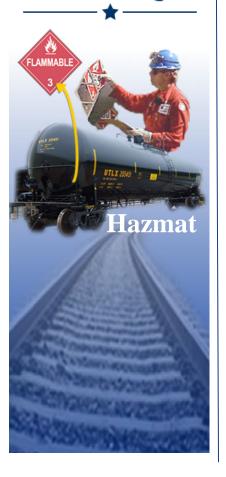




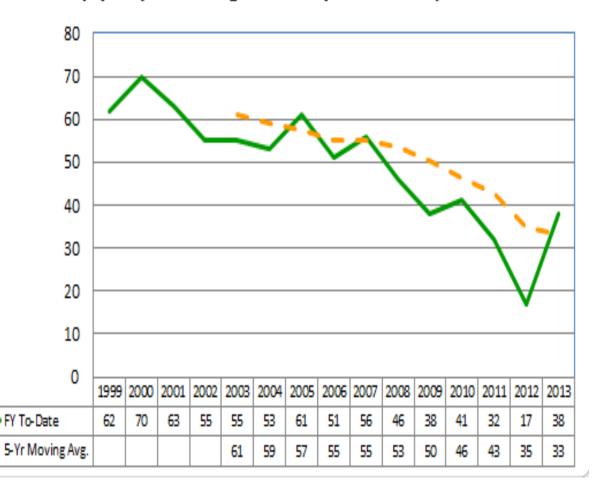
# Region 2 NARs



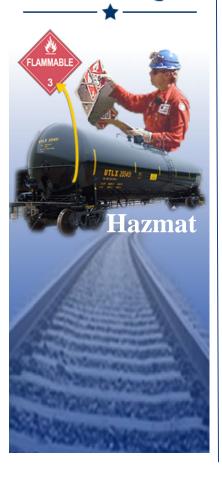




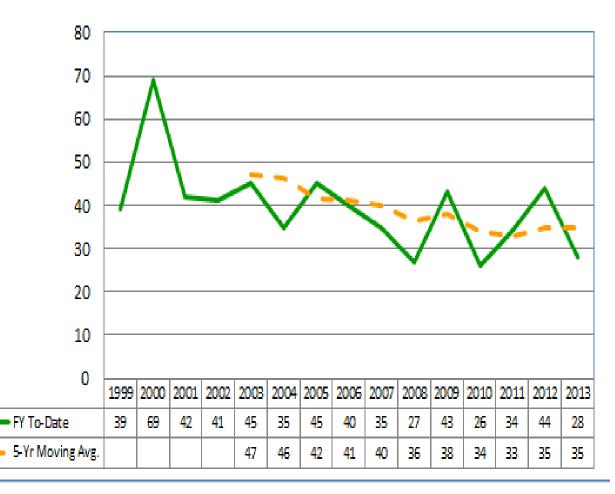
#### Region 3 NARs







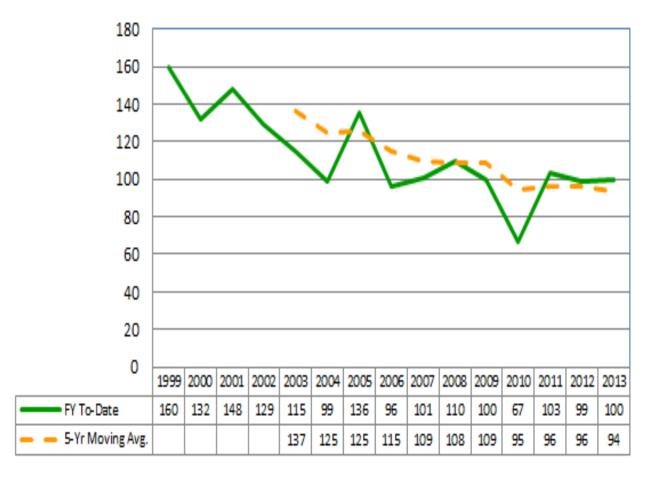
### Region 4 NARs



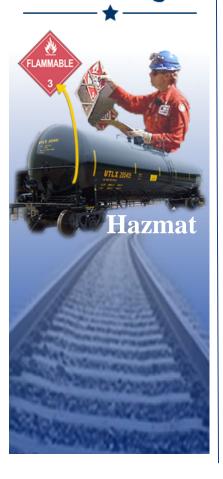




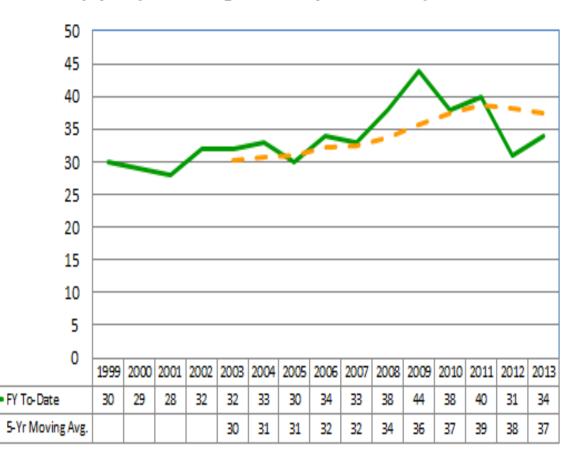
#### Region 5 NARs



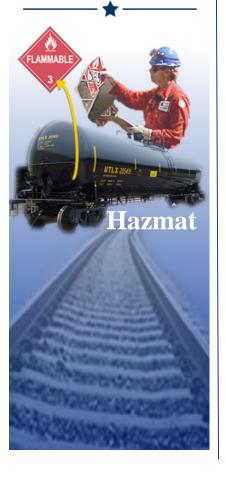




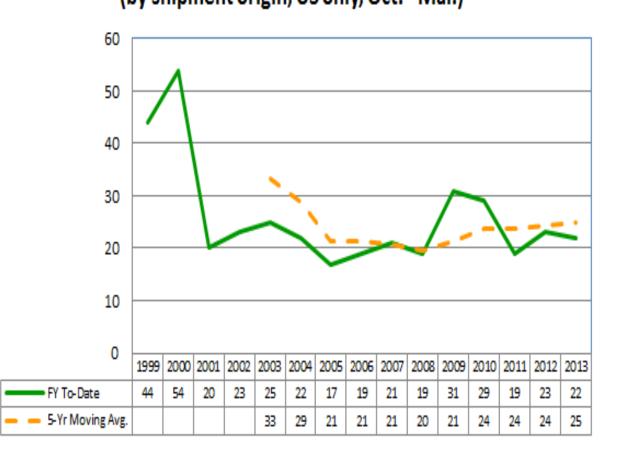
#### Region 6 NARs



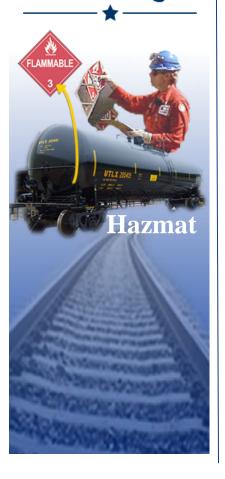




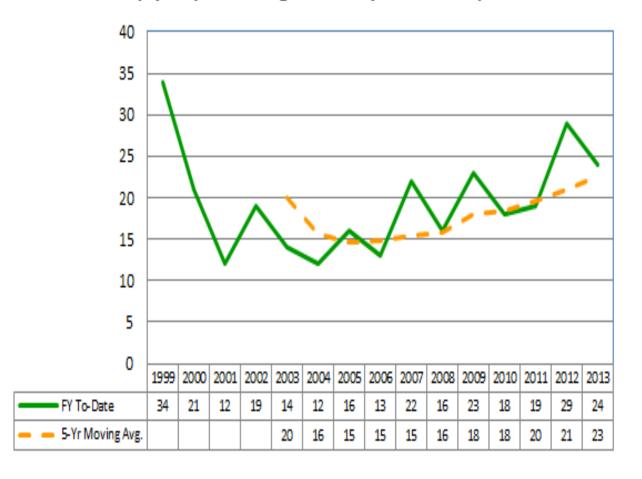
#### Region 7 NARs (by shipment origin, US only, Oct. - Mar.)



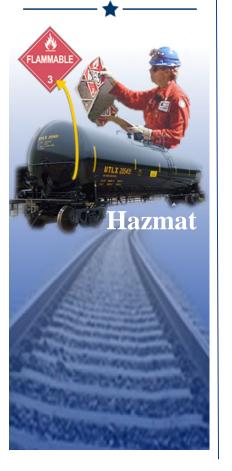




#### Region 8 NARs







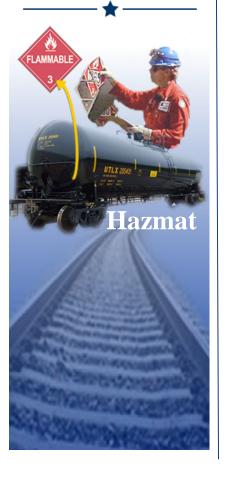
## 2012 AAR/BOE Report

 Annual Report of Non-Accident Releases of Hazardous Materials Transported by Rail (July 2012) for calendar year 2011

AAR/BOE NAR Reduction Program

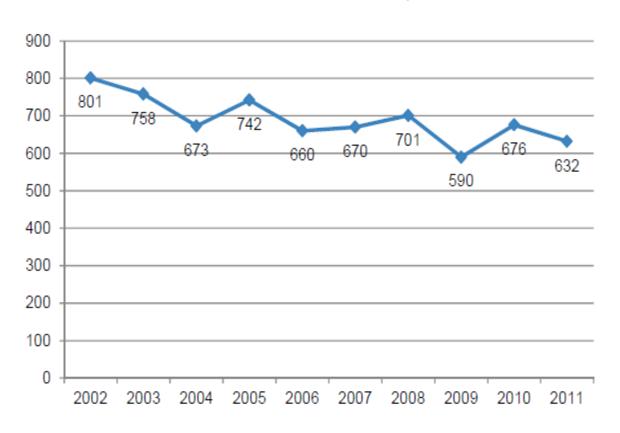
http://nar.aar.com/



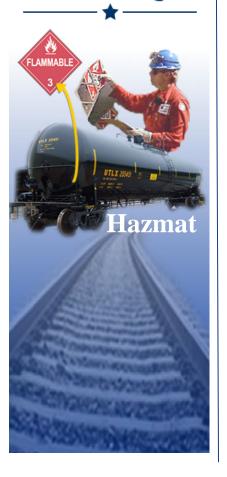


#### **Historical Overview**

Number of Tank Car Non-Accident Releases, U.S. and Canada: 2002-2011

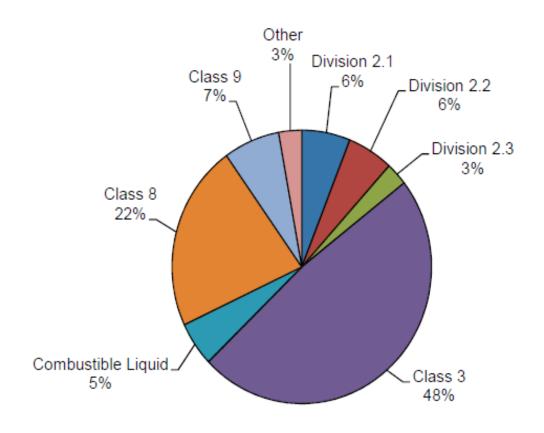




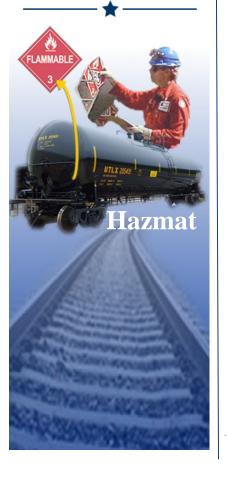


#### **Hazard Class**

Tank Car Non-Accident Releases by Hazard Class, U.S. and Canada: 2011

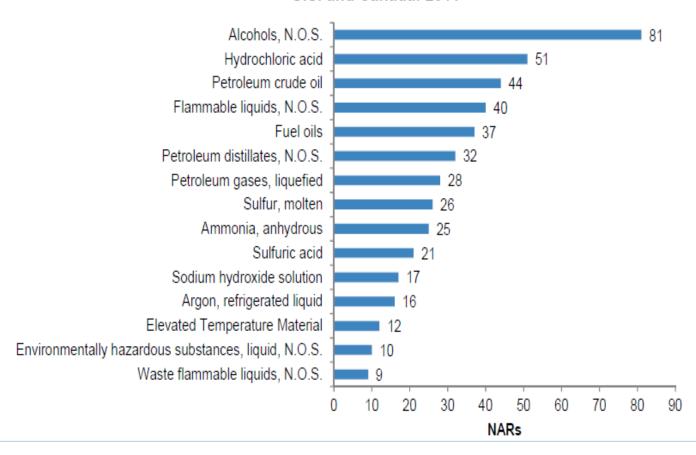




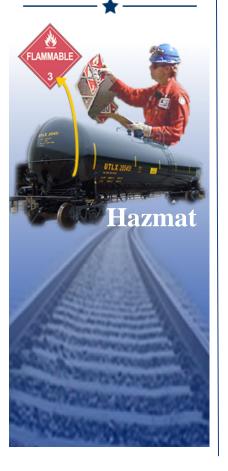


## Commodity

Top 15 Commodities Involved in Tank Car Non-Accident Releases, U.S. and Canada: 2011

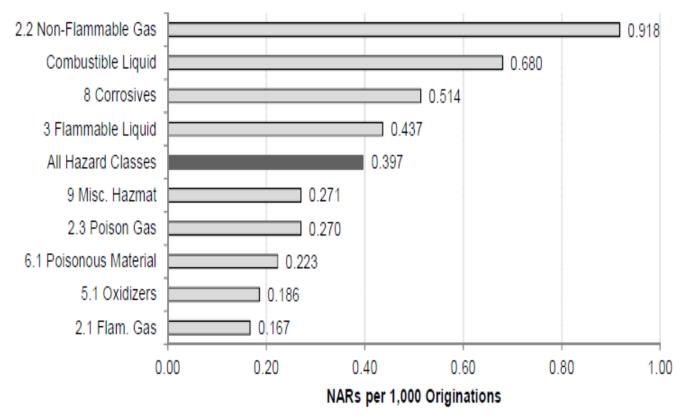




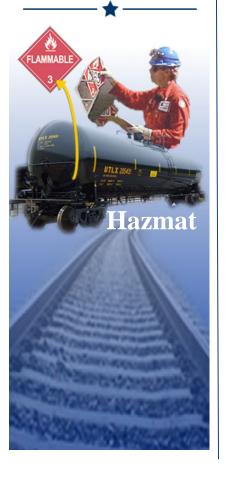


# NAR Rates By Hazard Class

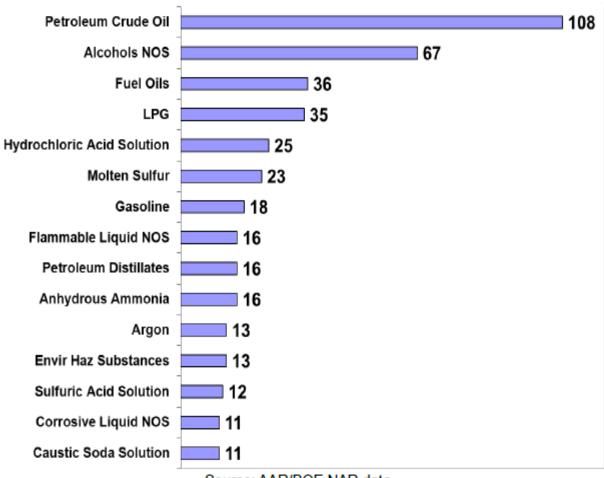
Tank Car Non-Accident Releases per 1,000 Loaded Originations by Hazard Class, U.S. and Canada: 2011





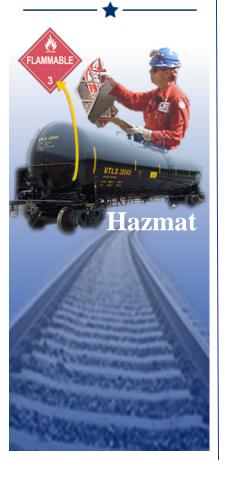


# Top Commodities for NARs 2012 US & Canada

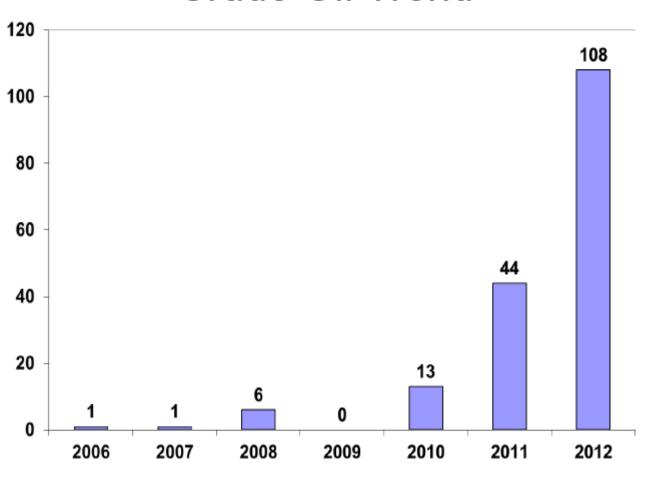


Source: AAR/BOE NAR data



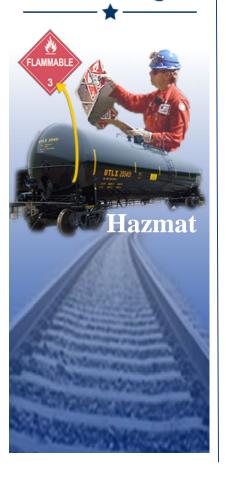


#### Crude Oil Trend

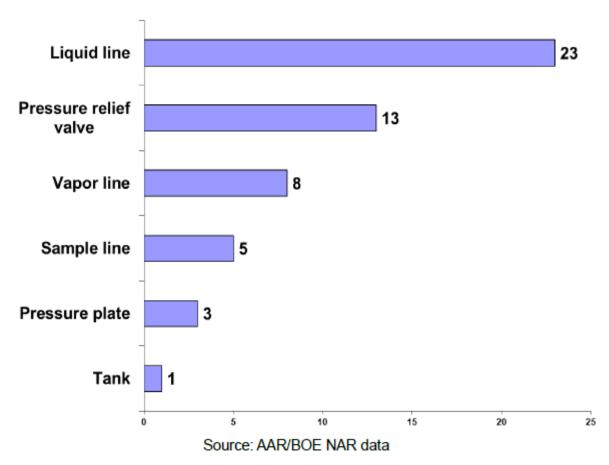


Source: AAR/BOE NAR data

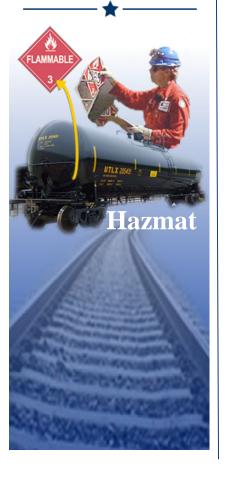




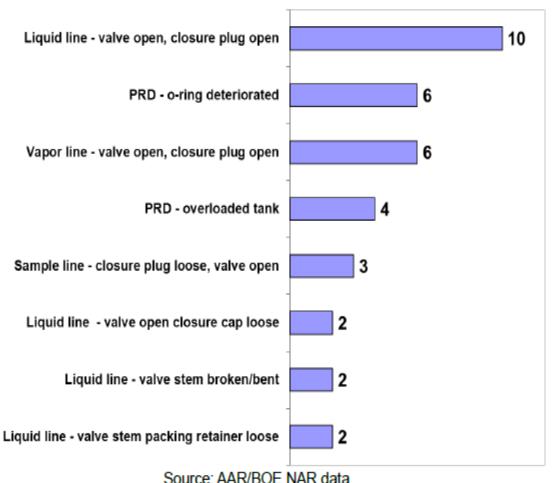
# Pressure Car NARs by Component



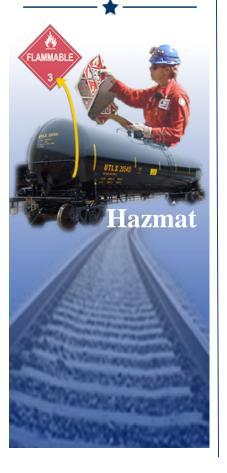




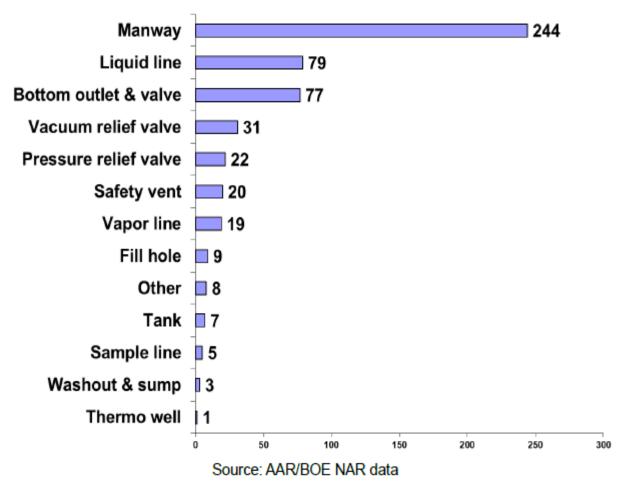
# Top Specific Causes for Pressure Cars 2012



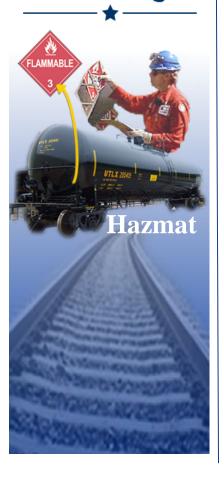




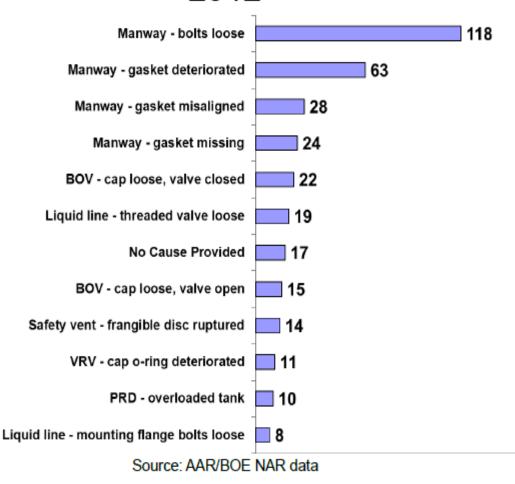
# Nonpressure Car NARs by Component 2012



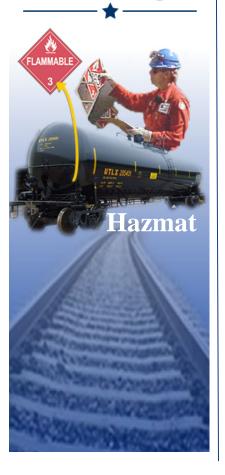




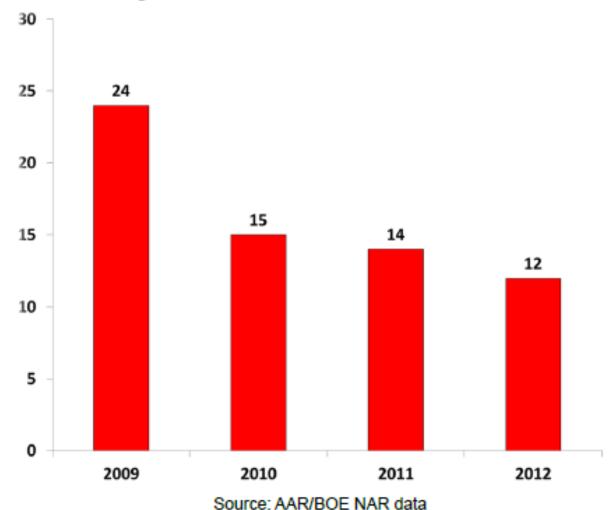
# Top Specific Causes for Nonpressure Cars 2012







## Injuries due to NARs



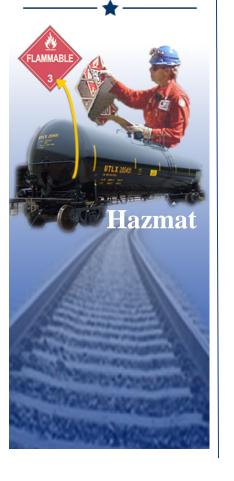




#### Vacuum Relief Valve

 Vacuum relief valves: The number of failures are on the decline, perhaps due to discontinued use, or replacement with "no-step" designed vacuum valves.





## Manways

- Proper selection and application of gasket. Is it the right size and material for the service?
- Measurable/Repeatable securement of manway cover, including the tightening sequence.
- Apply proper torque. Too much can damage manway cover and bolts, and too little could cause the manway to come loose.
- Examine/clean/replace manway bolts as appropriate.



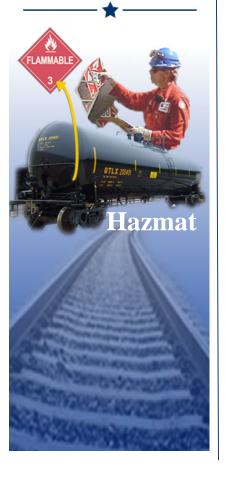




# Pressure Relief Valve (Safety Relief Valve) PRV/SRV

 Although it doesn't quite come through in the statistics of NARs, FRA has noted a significant increase in the number of stem failures on PRDs, causing the entire stem/spring internals to fall into the tank, primarily in ethanol service, but notably increasing in crude oil service as well.

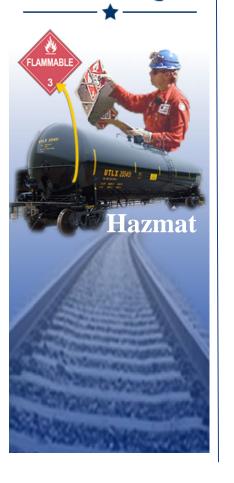




#### PRV/SRV Failures

- Possible causes:
  - Stress (bending/flexing) due to forces experienced during transportation.
  - Excessive hydrostatic pressure surges.
  - Corrosion
  - Some combination of the above
- A pressure relief valve may be lifted with minimal effort manually if the stem has failed. Requires replacement by AAR certified tank car facility.

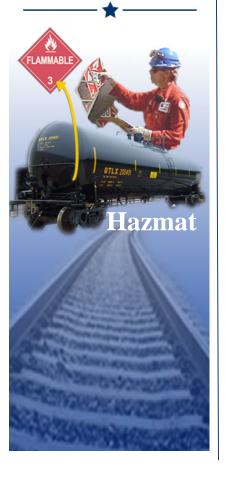




# Bottom Outlet Valves (BOVs)

- Most common problem is damage to the ball (dents/scratches) due to buildup of solid particles at the BOV.
- Requires repair by certified tank car facility, and could likely be prevented with appropriate maintenance qualification program.
- Stem packing leaks could be prevented by proper examination and securement of packing gland nut.





## **NAR Inspections**

- Regional Specialists receive reports of NARs that originated or occurred in their region.
- Regional Specialists communicate with other affected regions and prioritize and assign responsibility for investigation, as appropriate given resources and circumstances.
- Facilities with recurrent NARs may be subject to more frequent inspections.





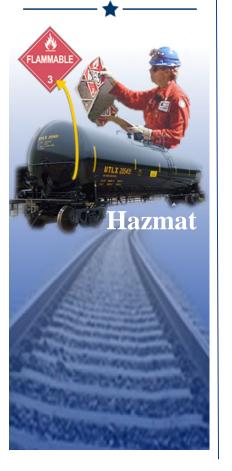


#### Resources

 AAR/BOE Pamphlet 34, Recommended procedures for loading/unloading pressure and non-pressure tank cars

http://www.aar.com/CPC-1245%20Pamphlet%2034.pdf





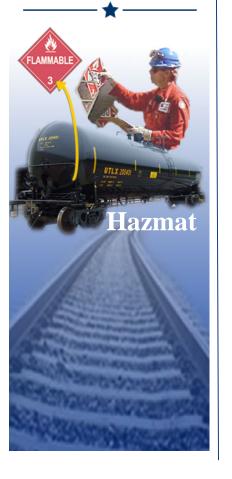
#### Resources

 Renewable Fuels Association – Guidelines for Assembly of Hinged and Bolted Manway Covers.

 FRA Safety Advisory 2009-2: Inspection of Bottom Outlet Valves and Assemblies

http://www.gpo.gov/fdsys/pkg/FR-2009-10-16/html/E9-24927.htm





#### Resources

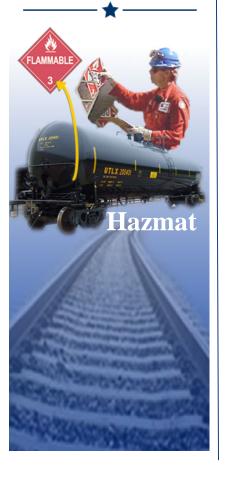
PHMSA incident data/reporting:

http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents

AAR/BOE NAR Reduction Program

http://www.nar.aar.com/





#### Questions?



#### Still have Question?

- Contact me at: 202-493-6050
- Visit FRA's web page: <u>www.fra.dot.gov</u>
- Visit PHMSA's web page: <u>www.hazmat.dot.gov</u>
- E-mail me at kurt.eichenlaub@dot.gov OR
- E-mail HMASSIST@dot.gov