Freight Rail & Hazmat Safety

KEY TAKEAWAY

Railroads play a crucial role in safely transporting hazmat, ensuring the well-being of communities, their employees and the environment. Beyond complying with strict regulations and operating practices, railroads have advocated for more stringent tank car standards, voluntarily developed an app for first responders and worked with the FRA to create software to determine the safest and most secure rail routes for hazmat.

From the chlorine used to purify drinking water to the chemicals used in fertilizers, railroads provide a safe solution for moving the hazardous materials (hazmat) essential to daily life. Railroads work daily with customers, suppliers, communities and federal regulators — like the U.S. Department of Homeland Security — to safely and securely deliver the freight they are legally required to move under a common carrier obligation.

Railroads follow rigorous design standards for rail cars carrying hazmat, developed specialized first responder mobile apps, and worked with the U.S. Federal Railroad Administration to create software that determines the safest, most secure rail routes for hazmat. Coupled with the rail industry’s ongoing commitment to infrastructure investment, technology deployment and rigorous employee training, the hazmat accident rate is down 73% since 2000, and the 2022 hazmat accident rate was among the lowest ever.

While freight rail is the safest way to move goods over land, and more than 99.9% of all hazmat moved by rail reaches its destination without a release caused by a train accident, recent derailments remind us that such incidents can profoundly affect a community. Freight rail is dedicated to protecting the health and safety of our workers, our communities and the environment. Class I railroads are taking immediate actions to further enhance rail safety, from installing more inspection technologies to training more first responders. Below are key facts about freight rail’s proactive approach to hazmat safety.

Rigorous Inspection & Operating Requirements

Railroads comply with federal regulations as well as industry-wide and railroad-specific operating procedures to ensure safe operations. Industry and railroad-specific procedures cover employee training, train speeds, inspections, rail yard practices and locomotive operation.

Federal regulations from various agencies, including the FRA and the Pipeline & Hazardous Materials Safety Administration (PHMSA), dictate safety practices in areas such as placement of railcars carrying certain commodities in the train “consist,” hazmat routes, an inspection of equipment and track, speed restrictions and more. While federal regulations dictate the frequency of inspections, railroads often inspect their infrastructure with greater regularity than the federal government requires.
Specialized Equipment & Operational Modifications

America’s freight railroads transport most hazmat using a fleet of specialized rail tank cars. Thanks to rail industry advocacy, in 2015, USDOT released regulations requiring new, tougher tank car standards for certain types of hazmat, including crude oil. Older tank cars that do not meet new standards are being phased out. Railroads also proactively equip many trains carrying hazmat with equipment designed to enhance rail braking and minimize damage to rail cars in the event of an accident.

U.S. Class I railroads use the Rail Corridor Risk Management System (RCRMS), a joint initiative between railroads and the government, to analyze and identify the safest and most secure routes for transporting highly hazardous materials. The model uses 27 risk factors — including hazmat volume, trip length and population density along the route — to assess rail routes’ overall safety and security.

Response Teams & First Responder Training

Railroads have 24/7 emergency response teams to assist local officials. Railroads also maintain networks of on-call hazmat response contractors and environmental consultants to provide additional assistance. Freight railroads have a fundamental commitment to the safety of the communities they serve all across the country. Working with government and industry partners like MxV Rail, railroads help train tens of thousands of emergency responders each year and actively collaborate with local officials on emergency response plans in the event of an incident. Emergency response agencies can, upon request, receive confidential information on the hazmat moving through their communities.

Transparent Communications

Railroads actively collaborate with local officials on emergency response plans. Upon request, railroads also share information with state and local officials on the types of cargo moving through their communities to inform emergency response planning. In partnership with the International Association of Fire Chiefs, the industry developed the AskRail app, which provides first responders across the rail network immediate access to accurate, timely data about what type of hazmat a rail car is carrying and how to respond to an incident safely.

Tech-enabled Inspections

There is a direct correlation between increased investment in the rail network and enhanced safety performance. Record spending — approximately $760 billion between 1980 and 2022 — helps freight railroads make a safe network safer. Using advanced technology, railroads routinely inspect track components, bridges and equipment to identify safety issues and proactively schedule maintenance before incidents occur.
These technologies include using drones to inspect inaccessible areas, ultrasound technology to identify flaws within track and specialized monitors mounted along track that identify faulty or worn railcar components as a train pass by. Because the nation’s rail network is highly integrated with equipment often operating across the networks of multiple rail companies, railroads participate in industry-wide initiatives to gather and share data so potential problems with equipment can be identified quickly.

**Timeline: Hazmat Safety Actions**

- **AUG. 2009**: AAR begins to upgrade industry tank car standards that exceed the safety standards of U.S. Department of Transportation (DOT)-111 tank cars.

- **MAR. 2011**: AAR formally petitions the Pipeline and Hazardous Materials Safety Administration (PHMSA) and Transport Canada to implement tougher tank car specifications for DOT-111 tank cars used for crude oil and other hazmat.

- **AUG. 2011**: In the absence of any progress by the DOT and Transport Canada, the AAR Tank Car Committee adopts industry construction specifications for new tank cars, and the stronger CPC-1232 design becomes the standard for all tank cars built after October 2011.

- **AUG. 2013**: The freight rail industry responds to DOT Emergency Order No. 28 and Safety Advisory to further strengthen train operations on mainline tracks or sidings. AAR modifies industry best practices, making trains carrying 20 or more carloads of any hazmat subject to a speed restriction and other enhanced operating practices.

- **NOV. 2013**: AAR again urges DOT to improve federal tank car regulations and require all tank cars transporting flammable liquids, such as crude oil, to be retrofitted or phased out of crude service.

- **FEB. 2014**: The nation’s major freight railroads issue voluntary safety initiatives for the transportation of CBR, including new operating practices, including (1) Speed reductions for trains transporting crude oil, (2) Increased inspections of tracks on crude oil routes, (3) Route risk analysis for trains carrying more than 20 carloads of crude oil (a Key Crude Oil Train), (4) Two-way end of train devices or distributed power for Key Crude Oil Trains to provide faster braking, (5) Additional bearing defect detectors along routes carrying Key Crude Oil Trains, (6) Development of an emergency response inventory along routes carrying Key Crude Oil Trains, and (7) Stepped-up crude oil incident training for first responders. DOT issues an Emergency Order on the classification and packaging of crude oil.

- **MAY 2014**: AAR forms a joint task force with the American Petroleum Institute (API) to examine components associated with moving CBR. PHMSA and the Federal Railroad Association (FRA) issue a Safety Advisory discouraging the use of DOT-111 tank cars. DOT issues an Emergency Order requiring railroads to inform first responders about crude oil routes.
**JUL. 2014:** AAR provides DOT with access to an inventory of emergency response resources available to respond to hazmat accidents. DOT issues a Notice of Proposed Rulemaking (NPRM) on tank car standards and an Advanced NPRM on oil spill response planning requirements. A three-day training course for first responders focused exclusively on CBR occurs at the Security and Emergency Response Training Center (SERTC) (an AAR subsidiary) in Pueblo, Colorado. More than 1,500 emergency responders receive classroom and in-field training in 2014 at the world-class facility.

**SEP. 2014:** In comments to DOT’s proposed rules for regulating crude oil trains, AAR again calls for dramatically improved tank cars that carry crude oil and ethanol and proposes a comprehensive safety package, which includes thicker shells, thermal protection and appropriately-sized pressure relief devices. AAR advocates an aggressive retrofit or phase-out program for crude service tank cars.

**OCT. 2014:** Roll-out begins of the rail industry-developed AskRail mobile app, which is an additional tool for emergency responders to access information about hazardous materials contained in rail cars when responding to an incident.

**NOV. 2014:** SERTC launches web-based crude oil training for first responders.

**JAN. 2015:** AAR further modifies industry best practices to increase commodity flow information provided to local emergency response agencies for all hazmat transported through their communities.

**MAR. 2015:** AAR and API announce a new CBR safety course for first responders. The program, offered through the Transportation Community Awareness and Emergency Response (TRANSCAER) program, is in addition to specialized training offered to thousands of first responders by railroads in local communities at SERTC and through web-based training. AAR enhances the AskRail app.

**APR. 2015:** PHMSA issues a Safety Advisory on emergency response information; FRA issues an Emergency Order on maximum speeds for CBR moving through certain highly populated areas; and FRA issues a Safety Advisory on brake and mechanical inspections for trains moving crude.

**MAY 2015:** DOT issues a comprehensive final rule on tank car standards and operations for moving large volumes of flammable liquids by rail. PHMSA issues Transportation Rail Incident Preparedness and Response (TRIPR) training modules on best practices related to rail incidents involving flammable liquids.

**JUL. 2015:** FRA further specifies requirements for railroad notifications to State Emergency Response Commissions concerning crude oil.

**SEP. 2015:** DOT announces $5.9 million in first responder grants specific to crude oil incidents.
• **DEC. 2015:** Congress passes the FAST Act, which includes numerous provisions supported by the freight railroad industry related to rail safety generally, emergency response training and the safe transport of flammable liquids by rail. Among these are requirements for web-based training for emergency responders, emergency preparedness and training grants, specifications for real-time emergency response information, enhanced tank car standards and a mandatory phase-out schedule for older tank cars.

• **FEB. 2016:** The proposed rule on oil spill planning and information sharing for crude oil trains is revised based on FAST Act requirements and sent to the Office of Management and Budget (OMB) for review.

• **MAY 2016:** AAR urges DOT to adopt a thermal protection requirement for flammable liquid cars, which exceeds DOT’s current standard and which all thermal blanket manufacturers currently meet. The new standard would increase the amount of time flammable liquids could survive a pool fire and reduce the chance of thermal tears.

• **JUL. 2016:** DOT rejects AAR’s request to improve the standard for thermal protection based on a technicality.

• **AUG. 2016:** DOT issues a rule requiring thermal protection blankets per the FAST Act, but not requiring that they be as effective as the AAR had requested or manufacturers currently make.

• **SEPT. 2016:** AAR files comments to DOT’s NPRM on oil spill response plans seeking clarification on a variety of issues, including how close to navigable waters does a rail line have to be to require a plan and the definition of environmentally sensitive areas, among others.

• **DEC. 2016:** AskRail upgrades to allow access from any internet-ready device and provides additional information within the app, including DOT car types, the maximum capacity of the locomotive fuel tank and AAR’s Field Guide to Tank Cars.

• **APR. 2017:** AAR files comments to DOT’s advanced NPRM on real-time train consist information asking DOT to accept AskRail as the solution. AskRail provides emergency responders with information about what is in the entire train consist by entering one car or locomotive number.

• **DEC. 2017:** AskRail upgrades to allow a search by container number, GIS/Mapping including points of interest such as schools and hospitals, street-level views and part of the Emergency Response Guidebook.