

Tank Car Safety Initiatives Federal Railroad Administration

Noteworthiness

An important feature of Federal regulations and industry standards is that the car owner is responsible for providing special materials, procedures, or dimensional requirements (data and drawings) to the facility performing repair, alteration, or conversion.¹ As stated in the preamble to the Final Rule under Docket HM-201, "RSPA and FRA have developed a course of action that outlines where and what to inspect, but not how to inspect. This approach allows each tank car owner the flexibility to develop inspection and test procedures appropriate for each unique tank car, or series of tank cars, based on operating and maintenance experience" and that the "owner of the tank car will generally provide the written procedures for inspecting the tank to the tank car facility."² The use of the word "*generally*" was added to accommodate contractual obligations when tank car facilities or third-party vendors develop the inspection and test procedures for the car owner. Another important feature in the regulatory scheme is that the owner's written procedures become part of the tank car facility's quality assurance program to ensure that the facility can identify the characteristics of and elements on each tank car design to be inspected and tested.³

In October, I discussed that one of the elements to ensure the safety and reliability of our Nation's tank car fleet is the establishment of confidence in the nondestructive evaluation methods used to inspect tanks and their associated structures. To establish confidence, owners and tank car facilities must validate the nondestructive evaluation method chosen for the required inspections by quantifying that method's ability to find a flaw for each area under observation. There are several process variables that can alter the outcome of a successful nondestructive evaluation, including variables in the equipment, procedure, calibration, materials, and the technicians themselves. Quantifying the expected outcome of any nondestructive evaluation method is commonly expressed as a function of flaw size. Whereas, the probability of detecting any given flaw is expressed in a curve that characterizes the capabilities of the process to find variable sized flaws.

FRA's investigative experience has shown that there is a wide variation in the capabilities of any given tank car facility and their processes to find flaws. More importantly, there is definite gap in what technicians believe they can detect, given the process, and what they can actually detect. Clear evidence exists of this premise based on investigations of shell failures resulting shortly after an inspection and test event. Our investigations of these incidents focus on process capabilities and the car owner's chosen method to identify a flaw that is located, for example, in a fatigue critical location. An important note in my discussion is that after an inspection and test event, the car owner must make a determination that the area under observation will not fail within the car owner's established inspection interval.⁴ Failure of a component within an owner's

¹ See first 49 CFR 180.513(a), then the Association of American Railroads, Specifications for Tank Cars, Appendix R, R1.3, and then 49 CFR 179.7(d).

² 60 FR 49048, 49063 (September 21, 1995), and 61 FR 33250, 33252 (June 26, 1996).

³ 49 CFR 179.7(b)(5). Also see 61 FR 33250, 33252 (June 26, 1996).

⁴ See, for example, 49 CFR 180.511(a) and (b).

established inspection interval is clear evidence, assuming no abnormal treatment of the area, that (1) the owner's program is essentially flawed with respect to the nondestructive evaluation method chosen, the owner's acceptance criteria, or the inspection interval, or (2) that the tank car facility's program is essentially flawed with respect to the capabilities of the process to find the flaw the owner so wants found.

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Validation of nondestructive evaluation methods generally requires a set of know flaws that are representative of the application and test object. The distribution of flaws in the test object should be within a set detection range (majority of flaws a technician is expected to find) so that there is complete control with respect to reproducibility and repeatability of the results. Validation also requires a precise means of collecting and analyzing the data and a means to clearly communicate the results through written reports, charts, and graphs. The characterization of nondestructive evaluation capabilities provides a means for selection of an appropriate procedure for the type of flaw an owner wants found. The metrics involved also provide quantitative support for damage-tolerance, reliability-centered maintenance, and other alternative inspection protocols.

Railworthiness Directives

After my discussion under Noteworthiness, you have more than likely asked yourself, "so, what happens if I do not provide special materials, procedures, or dimensional requirements (data and drawings) to the facility performing repair, alteration, or conversion; or I do not develop inspection and test procedures appropriate for each unique tank car, or series of tank cars, based on operating and maintenance experience; or if I am a facility, what happens if I do not follow the owner's written procedures and make such procedures a part of the facility's quality assurance program--so that the facility can identify the characteristics of and elements on each tank car design to be inspected and tested"?

Federal regulations, at 49 CFR § 180.509(c), require tank cars to be inspected periodically during their service life and, at .509(b), require inspections upon the happening of certain events. One of those defining events is the discovery, by the FRA Associate Administrator of Safety, that a car or class of cars may be in an unsafe operating condition.

As stated earlier, embodied within the Federal regulations is the requirement that tank car owners must develop inspection and test procedures appropriate for each unique tank car, or series of tank cars, based on operating and maintenance experience. Owners are required to furnish these procedures to the tank car facilities that are performing work on their tanks. To ensure that any work on the tank conforms to Federal regulations, industry standards, and the car owner's requirements, the regulations prohibit any person from working on a tank unless that person operates in conformance with an approved AAR quality assurance program, and complies with the owner's written procedures.⁵ In addition to the tank, similar provisions remain in-place under FRA's Emergency Order Number 17, Notice 3; where tank car owners are required to

⁵ See 179.7(f).

distribute procedures for inspecting the stub sill to the parties performing the inspections, and to ensure that the parties fully understand and consistently follow the written procedures.⁶

When FRA learns that an owner or a facility is not complying with the Federal regulations, including any industry standard or owner's requirement incorporated into Federal law, the agency has at its disposal a variety of enforcement tools to improve compliance. Since 1996, the agency can pursue corrective actions through the issuance of a Railworthiness Directive. Railworthiness Directives are less formal than an emergency order, but carry the same weight. Since owners of cars have control of where such cars move, Railworthiness Directives are issued to car owners. As of today, the agency has issued four such orders:

RD HM-01	Foam-in-Place Richmond-built Tank Cars
RD HM-02	Tank Anchor Cracking in Certain Full-Sill Tank Cars
RD HM-03	Non-Authorized Welding on Tanks
RD HM-04	Pre-1974 GATX-Built Tanks with Reinforcement Bars

In each of these orders, FRA found that a car, or series of cars were determined unsafe for transportation. These cars either had excessive corrosion, fatigue cracks, or non-approved welding on the tank that could result in premature failure. The Railworthiness Directive also provides the agency the ability to require modification of an owner's maintenance program based on actuarial data (history of failures). For example, the agency could require an owner to inspect an area on a tank on a more frequent basis, to use a different inspection method to find flaws, to force the recall of tanks based on improper repairs or design, or to force early retirement of any car deemed unsafe for transportation.

Tank Car Facility Compliance Reviews

FRA is currently finalizing all of the audits performed over the last year. This project was on hold due to staff resources. With respect to additional audits, FRA has completed several regionally based audits of tank car facilities, and we continue to audit each facility as part of any incident investigation with respect to any tank failure, with a special emphasis on any failure that occurs shortly after an inspection and test.

Scheduling of Modifications and Progress Reporting

On September 21, 1995, the Department of Transportation issued a final rule that improved the crashworthiness of certain tank cars when involved in accidents (Docket HM-175A). Car owners that have tanks subject to the rule must schedule the cars for modification under a phased program. Car owners must submit a report to FRA by October 1 of each year. Currently, FRA is reviewing the reports submitted and evaluating whether owners are progressing the modification of cars at an acceptable rate.

Exemptions Maximizing Safety and Weight

⁶ See 60 FR 15811, 15813 (March 27, 1995).

E11241 Rohm and Haas Company. This exemption authorizes the use of DOT Specification 111S100W2 tank cars having a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of certain class 3 materials.

E11654 Celanese LTD. This exemption authorizes the use of DOT Specification 105S300W tank cars having a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of certain class 3 materials.

E12126 LaRoche, Industries. This exemption authorizes the use of DOT Specification 120J200W tank cars having a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of certain class 8 materials.

E12368 Occidental Chemical Corporation. This exemption authorizes the manufacture, mark, sale and use of DOT Specification 111A100W1 tank cars that have a maximum gross weight on rail of 272,000 pounds for the transportation a Division 5.1 solid material.

E12423 Reagent Chemical & Research, Incorporated. This exemption authorizes the use of DOT specification 111A100W5 tank cars having a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of hydrochloric acid.

E12561 Rhodia, Incorporated. This exemption authorizes the use of DOT Specification 111S100W2 tank cars having a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of sulfuric acid

E12613 NOVA Chemical Corporation. This exemption authorizes the manufacturing, marking, sale and use of DOT Specification 112J340W tank cars that have a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of certain class 3 materials.

E12768 BOC Gases. This exemption authorizes the use of DOT Specification 105S500W tank cars having a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of carbon dioxide, refrigerated liquid.

E12858 Union Carbide Corporation. This exemption authorizes the use of DOT Specification 105J400W tank cars having a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of ethylene oxide.

E12903 Cargill Incorporated. This exemption authorizes the use of DOT Specification 111A100W1 tank cars having a maximum gross weight on rail of 286,000 pounds for the transportation in commerce of class 3 materials.

Renewals

E12095. The FRA is near completion of its final edits to DOT-E 12095. This exemption makes improvements to the Final Rule issued under Docket HM-201 on September 21, 1995. Our review included a comparison of the second draft of the exemption, completed several years ago by a large industry/government task force, and with the last approved CGSB 43-147 Standard. FRA anticipates forwarding the package to RSPA this week.

Specification Plates

E12905. RPI. This exemption request, on behalf of RPI, seeks to remove tank head stampings and to place that information on identification plates located on the AR and BL corners of the tank. This exemption request is currently at RSPA awaiting final approval.

Stronger Hazardous Materials Legislation

On October 10, U.S. Secretary Norman Mineta sent to Congress proposed legislation that would strengthen the security and safety in the transportation of hazardous materials. The DOT proposed legislation would:

- Strengthen DOT inspector's authority to inspect packages in transportation;
- Provide these inspectors with authority to stop seriously unsafe transportation;
- Increase the maximum civil penalty for hazardous materials violations from \$27,500 to \$100,000;
- Expand the requirements for training persons involved in the transportation of hazardous materials;
- Strengthen the enforcement authority of DOT's State enforcement partners;
- Provide the U.S. Postal Service with civil penalty authority to effectively enforce its regulations on mail shipments of hazardous materials;
- Address the current overlap of hazardous materials transportation regulations between DOT and OSHA, except in certain areas;
- Specifically allow participation by states in a coordinated program of hazardous material carrier registrations and permits.