

Tank Car Safety Initiatives Federal Railroad Administration

LOOKING FORWARD

Incorporation of M-1002 into the HMR

The December 2000 edition of the AAR's *Manual of Standards and Recommended Practices, Section C-Part III, Specification for Tank Cars, M-1002* (see § 171.7(k)(1)) is incorporated into the hazardous materials regulations (HMR) in § 171.7 even though there are more recent versions including the current 2007 version and its amendments. Incorporated by reference, as defined in § 171.8, means a publication or a portion of a publication that is made a part of the HMR. In accordance with § 171.7(a)(1), material not specifically set forth but incorporated by reference is considered to be part of the HMR. A document is incorporated only as it is in effect on the date of issuance of the regulation(s) referring to that material. In other words, material incorporated by reference is the version of the material at the time a regulation is published in a final rulemaking. A notice of a change in the material incorporated by reference into the HMR would require regulatory action and publication in the *Federal Register*. The FRA has the authority to enforce the Federal hazardous material law, 49 CFR Subchapter A - Hazardous Materials and Oil Transportation, and the HMR (see § 107.301). Thus, only the provisions of a publication or the portions thereof that are made part of the HMR are enforceable. Material from the 2000 edition not incorporated by reference as part of § 171.1(k)(1) are not enforceable.

Moving forward, FRA will evaluate of all proposed amendments to the M-1002. On regular intervals FRA will make recommendations to PHMSA to incorporate into the Hazardous Materials Recommendations (HMR) those revisions FRA believes promote the safety of transportation of hazardous materials by rail. Moreover, FRA has requested that AAR align its Casualty Prevention Circular (CPC) incorporation schedule with the HMR incorporation by reference (IBR) schedule.

Ownership of equipment

180.513(b) requires tank car facilities to obtain permission of the equipment owner prior to performing work on the owner's equipment. Permission will take the form of using the owner's supplied qualification or maintenance procedures or written permission from the owner allowing the facility to use procedures provided by others. Please note, tank car facilities must have a written record of this agreement with the tank car owner. This is a straightforward arrangement when an owner sends a tank car to a repair facility. However, when a leased tank car is serviced by a mini-shop or mobile unit at the facility of a customer or supplier of the lessee, the communication between facility and owner becomes difficult. Regardless, the requirements for obtaining the permission of the equipment owner apply. It is incumbent upon the facilities, owners, lessees, and other parties involved to establish the lines of communication and agreements to ensure work performed on the equipment is done in a manner approved by the tank car owner. FRA considers this fundamental to a successful qualification program as well as the facility's quality assurance program and, accordingly, will evaluate the robustness of these arrangements during our audits.

The definition of service equipment owner in 180.303 is the party responsible for bearing the cost of maintenance of the service equipment. It has been reported that tank car facilities consider the entity (other than the party responsible for the qualification program

affecting the service equipment) that contracts with them for repair to service equipment on a tank car as the tank car owner. This contravenes the regulations amended in HM-216B, which are intended to ensure that the tank car owner, based on knowledge of the performance of their fleet, develop a qualification program that identifies the areas to be inspected, the inspection methods and intervals, and acceptance criteria. Additionally, per §180.513, work may be performed only with the permission of the equipment owner and following work instructions approved by the owner. As such, it is necessary for compliance and maintenance of the design level of reliability and safety of tank cars and their appurtenances that the equipment owner be identified and contacted prior to any work being performed.

“S” Delimiter on DOT 111 Specification Tank Cars

The following is a brief summary of the history of DOT regulations related to head shields on DOT specification tank cars.

- In 1974 (HM-109) requirements for head shields were introduced into the HMR (§179.100-23). The requirements were for half height head shields (on non-jacketed pressure cars) with specific minimum dimensions and performance requirements limited to the AAR impact test. The requirements were based on three studies that indicate half height head shields were between 50% and 77% effective.
- In 1976, minor amendments were made to the head shield requirements.
- In 1977, HM-144 introduced §179.105-5 Tank Head Puncture requirements which included performance standards and test requirements. As a note coupler restraint and thermal protection systems were also included. Half height head shields were not precluded from use as long as they met the requirements in §179.100-23.
- In 1995, HM-175A introduced the current §179.16 and removed §179.100-23 and §179.105-5. The new requirements were for tank cars transporting all Class 2 materials. In the preamble of the rule PHMSA states “research demonstrates that puncture resistance is an inter-related function of head thickness, insulation thickness, and jacket thickness, and the concept of “head protection” must include more than just traditional head shields.” *The findings of a 2007 study of accident data by RSI which shows that a half height head shield would prevent between 60-70% of the head punctures supports this position.* The rule did not require retrofit of tank cars equipped with half height head shields but did require all new tank cars to be so equipped and a retrofit of tank cars without any type of head protection. In the same rule the regulators contemplated separately tank cars with tanks constructed of aluminum¹ or nickel plate suggesting it was understood the performance standard could not be achieved with these cars but the head shield provided needed improvement in safety.
- On January 25, 2011 FRA published a notice in the Federal Register regarding approval requirements for operation of tank cars at gross rail loads exceeding 263,000 pounds and up to 286,000 pounds. In the notice FRA acknowledges half height head shields in that if a tank car is so equipped, the added puncture resistance provided a level of safety at least equivalent to the required additional shell/head thickness. Stated another way, a tank car equipped with a half height head shield

¹ Based on data in UMLER, there are 895 aluminum cars marked with the “S” delimiter. All of the cars were constructed before July 1, 1996 the effective date of HM-175. The regulations allow the cars to be marked with an “S” delimiter if they meet the requirement at the time of construction.

operating at 286,000 pounds has at least equivalent overall level of safety to a tank car without a half head shield operating at 263,000 pounds. As such there has not necessarily been an improvement, but rather maintenance of the current level of safety.

Half-height head shields were common but the only performance standard was the impact test after which the head shield and support structure must not show signs of permanent damage or deformation, not a puncture test as currently required. If half height head shield designs have been applied to tank cars requiring head protection ("S" delimiter in the specification), they have been shown to meet the puncture resistance requirements. The "S" delimiter is intended for tank cars equipped with a tank head puncture resistance system that meets the performance standard in §179.16. It was understood that tank cars requiring head protection, in Class 2 materials service, would, with the combination of tank head thickness and the head shield, meet the performance standard.

Hydrostatic Test

FRA's position is that the hydrostatic test is a form of leak test and therefore must have a written procedure prepared or approved by an NDT Level III and performed by certified personnel. In §179.12, §179.100-18, §179.200-22 a hydrostatic test (pressure change and visible leak) is required. This test is a form of non-destructive testing comprised of pressure change (M-1002, Dec 2000, Appendix T, 7.3.3) and visible leak detection (M-1002, Dec 2000, Appendix T, 7.3.4).

Approval for Modified Valves

In a recent investigation FRA discovered the following chain of custody for the supply of steam jacketed valves:

- An on-site registered maintenance company ordered steam jacketed vent valves as needed for a certain service cars from supplier (A).
- Supplier A orders a valve from supplier B.
- Supplier B orders a valve from supplier C.
- After receiving a valve from C, Supplier B sends the valve to a 3rd party contractor D to apply a steam jacket.
- The modified valve is received from D and forwarded to Supplier B
- Supplier B forwarded the valve to Supplier A.
- Supplier A then forwarded the valve to the on-site maintenance company for application of the valve to a tank car.

Upon further investigation FRA found that the approval of the valve did not include a steam jacketed version. The operating environments are different for a steam-jacketed and non-steam jacketed valve. Accordingly, FRA believes a separate approval is needed for each version of the valve and urges the AAR Tank Car Committee to develop a process to approve all models of valves and potential modification of valves.

LOOKING BACK

One Time Movement Approvals

The tables below provide a summary of OTMAs since the original issuance of HMG127 in January 2012. Since then HMG-127 has been revised three times to ensure the intent of the document which was to facilitate the process while not compromising safety.

Table 1: OTMA Activity in 2013 and 2014

OTMA	2012	2013	2014 (4/14/14)
1	975	753	246
2	103	90	32
3	1,257	4,703	1,373

Table 2: Sample of OTMA-1 defects

OTMA-1 Defects	2012	2013	2014
Vapor Valve	33	41	3
BOV/Washout	354	114	42
Gauging Device	21	15	7
Gaskets	46	34	7
Liquid Line	127	117	30
Nozzles/Manway	14	31	1
Safety Relief Valve	60	101	18
Sample Valve	20	20	3
Thermometer well	15	8	2
Vacuum Relief Valve	26	13	1
Manway Cover Bolts	9	7	0
Pressure Plates	5	4	0
Tank Shell	45	48	9
Stub Sill	14	23	2
Derailment Damage	9	8	0
Jacket Damage	64	42	8

Table 3: Sample of OTMA-3 defects

OTMA-3 Defects	2012	2013	2014
Bottom Outlet Valve	196	788	310
Vapor Valve	62	161	32
Jacket Damage	116	480	138
Safety Valve	10	64	25
Gauging Device	83	216	56
Liquid Valve	25	112	33
Stub sill	52	31	2

Web-based OTMA application

FRA is currently working on a web-based application process. Some features of the web-based process are as follows.

- Standardization of descriptions of defects.
- Logic to prevent misapplication of the OTMA-3 standing approval
- Facilitate revision of applications

§174.50 (HMG-127) compliance

Industry is having a very difficult time complying with HMG127 (Rev3). To date FRA has extended the courtesy of reviewing daily the OTMA-3 notification to ensure proper use and working with the company submitting the notification to make the necessary corrections. Based on our efforts we have learned that of the OTMA-3 notifications received, the information provided in 90-95% is either incorrect or incomplete. FRA has developed specific defects or types of defects for which an OTMA-3 is applicable. Additionally, we have specifically laid out the information that must be submitted as part of

the notification. Moving forward FRA will approach incomplete and incorrect OTMA-3 notifications in the following manner.

- Incomplete/vague information – Notifying FRA Regional Specialist of potential violations (improper application of OTMA-3 provisions).
- Incorrect information (i.e. use of an OTMA-3 to move a tank car with a crack in the tank shell) – An FRA Headquarters Specialist will issue a violation recommending civil penalties.

Moreover, personnel completing the OTMA application or OTMA-3 notification are Hazmat employees and are required to be trained per the requirements of Part 172 subpart H.

Tank Car Quality Assurance Team

QA Team activities since April 2013 Tank Car Committee meeting

- Inspected 87 facilities
 - 13 of those facilities voluntarily withdrew registration/certification
 - 15 facilities remain to be looked at by HQ QA Team
 - We have already started second round of inspections utilizing initial inspection data.

Top findings

1. Facility not following/getting car owner approval
2. Identification and traceability of materials
3. Measuring and testing equipment
4. Document control
5. Training on QAP and function specific topics

Path Forward

- Move to full risk base facility inspection 3Q 2014
- Increase focus on car owners. HM-216B audits to increase.
 - Focus on new car facilities in U.S., Canada, and Mexico, with further focus on crude oil cars
- Review of M-1002 for IBR
- Re-write of Parts 179 and 180

DOT and EPA regulations: Inspection of manway gaskets

FRA Hazmat Inspectors have reported that both Petroleum Crude Oil shippers and consignees are not inspecting manway cover gaskets on tank cars. The industry is not using the manway to load or unload product. Facility standard operating procedures require product to be loaded/unloaded from either the Liquid Lines or the Bottom Outlet with a Vacuum Recovery Unit (VRU) attached to the Vapor Line. Both shippers and consignees have stated that the U.S. EPA and State EPA regulations prohibit them from inspecting the manway cover gasket due to opening a closure to atmosphere allowing for fugitive emissions. As a result the manway cover gaskets are not being inspected per §173.31(d)(1)(ii)² and Pamphlet 34³.

2 (d) Examination before shipping. (1) No person may offer for transportation a tank car containing a hazardous material or a residue of a hazardous material unless that person determines that the tank car is in proper condition and safe for transportation. As a minimum, each person offering a tank car for transportation must perform an external visual inspection that includes:

(ii) The piping, valves, fittings, and gaskets for corrosion, damage, or any other condition that makes the tank car unsafe for transportation

3 AAR Pamphlet 34

2.1.16 - If equipped with a hinged and bolted manway thoroughly inspect the manway nozzle and cover assembly assuring that:

2.1.16.1 The manway cover is functional, properly aligned and centered on the manway nozzle, hinge pin operates freely, is in place and not bent, cut or damaged and the eyebolt slots and ears are not bent, worn,

Investigation

On March 6, 2014 FRA met with U.S. EPA Region 3 officials in Philadelphia, PA, to review EPA's regulations concerning the loading/unloading of Petroleum Crude Oil and the affects on DOT's regulations. The EPA's position is that as long as the tank car is not in the loading/unloading process and no lines connected to the tank car facilities are not prohibit by EPA's regulations from the manway cover gasket inspection required by DOT. EPA's Philadelphia office indicated they would prefer that no loading/unloading lines or VRU be attached to a tank car when the manway cover is opened for inspection of the gasket. We also discussed state air quality agencies authority and they said that these agencies may have additional requirements.

FRA also was informed by a shipper in Delaware that Delaware's Division of Air Quality would not allow PBF to remove and replace, or plug a defective Vacuum Relief Valve (VRV) to send a tank car to a repair facility. This prohibition was intended to prevent fugitive emissions. Because there is an active leak from a tank car containing hazardous material, this condition precludes an OTMA for movement of the car to a repair facility.

On April 7, 2014 FRA contacted Delaware's Department of Natural Resources and Environmental Control – Division of Air Quality to discuss Delaware's regulations and how they may affect DOT's regulations. After explaining the FRA's position, the DNREC that replacing or plugging the valve is appropriate for the purpose of move a tank car with a defective condition to a repair facility. Additionally, with respect to opening the manway cover to inspect the gaskets, DNREC indicates an air permit application must account for possible fugitive emissions. The loading/unloading facilities have mistakenly or intentionally omitted the calculations for emissions to inspect the manway cover gaskets when filling their applications to the various states. Both the U.S. EPA and the State of Delaware said that these facilities could file for a waiver to have only the VRU attached while inspecting the manway cover gasket to reduce emissions.

Railroad Safety Advisory Committee (RSAC)

The Rail Safety Advisory Committee (RSAC) was established in 1996 by the FRA as a mechanism to develop new regulatory standards, through a collaborative process, with all segments of the rail community working together to fashion mutually satisfactory solutions on regulatory safety issues. The RSAC membership is comprised of 38 organizations representing, labor, railroads, suppliers, states, chemical suppliers, passenger advocates, plus advisors from the Federal transit Administrations, NTSB, TSA, Canada, and Mexico. The RSAC seeks agreement on the facts and data underlying any real or perceived safety problem, identify cost-effective solutions based on the agreed upon facts, and identify regulatory options.

damaged or deformed. The cover must be free of commodity or other build up that would prevent proper operation of the eyebolts. The area adjacent to the gasket sealing surface must be free of commodity or other build up that would interfere with adjacent surfaces and adjacent areas must be free of corrosion or damage that would allow passage of commodity with the cover in the closed and bolted position.

2.1.16.2 The manway nozzle sealing surface is free of gouges, nicks, corrosion, displaced metal, residual commodity and remnants of old gaskets.

2.1.16.3 The manway gasket is in place, intact, has not taken a permanent compression set that interferes with sealing, is the style and design compatible with the manway nozzle assembly and is of a material compatible with the commodity.

The Hazardous Materials Working Group was created August 29, 2013 during an emergency meeting of the RSAC. The Working Group was charged with ensuring that appropriate processes and procedures are in place for transportation of hazmat by rail by taking into consideration the differing hazards presented by different types and amounts of the materials and recommend, as appropriate, special handling and/or operational controls of trains and vehicles transporting such materials. Special handling and operational controls may include, but are not limited to, the classification, identification, route planning, movement, attendance, or any other recommended handling measure or operational control of trains and vehicles transporting hazardous materials. Recommendations, listed below were submitted to the FRA Administrator prior to the imposed deadline of April 1, 2014.

Recommendation 1 - Propose to amend the definition of "residue" as follows.

§171.8 Definitions and abbreviations.

Residue means the hazardous material remaining in a packaging, including a tank car, after its contents have been unloaded to the maximum extent practicable and before the packaging is either refilled or cleaned of hazardous material and purged to remove any hazardous vapors. The extent practicable means an unloading facility has unloaded a bulk package using properly functioning service equipment and plant process equipment.

Recommendation 2 - Proposed wording for a recommended practice document.

Securement and security of loaded hazardous materials cars on private track

It has come to FRA's attention that cuts of loaded hazardous materials cars are being stored on track that is exclusively leased, and meets the definition of private track, but that may not be adjacent to a shipper or consignee facility. These stored cars are of great concern to the general public living in nearby communities. The cars are being stored in other locations simply for available space reasons – there isn't available storage space closer to a consignee facility. If the cars are stored on track that meets the definition of "private track" they are considered to be no longer in transportation, and the hazardous materials regulations do not apply. Nonetheless, FRA strongly recommends the following as best practices that may enhance the safety and security of stored hazardous materials cars.

FRA recommends that companies (party in control of private track as defined in §171.8) review the private track locations where cuts of hazardous materials cars (20 or more cars) are regularly stored to determine the following:

1. Whether additional attendance, monitoring, or other security measures may be appropriate;
2. Whether an adequate and appropriate number of handbrakes are set on the cuts of cars that will ensure that there is no unintended movement of the cars;
3. Whether all of the hazard communication information (placards, emergency response information) be maintained as they would if the cars were in transportation, and that this information may be available to emergency responders if requested.

We believe these recommended best practices will further the safety and security of hazardous materials shipments stored on private track.

Recommendation 3 – PHMSA reengage on loading/unloading and storage of tank cars

In 2003, the Research and Special Programs Administration (RSPA), the predecessor agency to PHMSA, clarified its regulatory jurisdiction over the loading, unloading, and storage of hazardous materials. 68 Fed. Reg. 61906 (October 30, 2003). The intent was to clarify where transportation began and ended, and thus, where PHMSA jurisdiction began and ended. In the rail mode, certain aspects of the storage, loading, and unloading of hazardous materials to and from rail tank cars were no longer regulated, and those requirements were removed from the CFR. The thought was that the loading, unloading, and storage were more appropriately workplace issues better addressed by an agency such as OSHA. PHMSA continued to regulate certain "pre-transportation functions" that it believed were clearly tied to transportation safety, such as the securement of closures on rail tank cars after loading but before offering the package to a carrier. This proposal is not intended to change the current regulation of OSHA over workplace safety issues related to loading, unloading, and storage of railroad tank cars.

As certain industries that ship hazardous materials by rail have evolved, and as some loading, unloading, storage, and transportation practices have changed, FRA believes it may be appropriate for PHMSA to re-engage on these subjects. FRA believes that there may be aspects of these procedures that directly affect transportation safety, and that it would be appropriate for PHMSA to regulate them.

Recommendation 4 - Align definition of Appendix A train with "Key Train" from OT-55-N.

Appendix A to Emergency Order 28

Any train transporting:

- (1) one or more tank car loads of materials poisonous by inhalation as defined in 49 CFR 171.8, and including anhydrous ammonia (UN 1005) and ammonia solutions (UN 3318); or
- (2) 20 or more rail car loads or intermodal portable tank loads of any material listed in (1) above, or bulk car loads Division 2.1 flammable gases, Class 3 flammable liquids, or hazardous substances listed in 49 CFR 173.31(f)(2); or rail car loads of packages of Division 1.1 or 1.2 explosives.