

**49 CFR Part 173**

[Docket No. HM-201B; Notice No. 87-11]

**Shippers; Use of Tank Car Tanks With  
Localized Thin Spots**

**AGENCY:** Research and Special Programs  
Administration (RSPA), (DOT)

**ACTION:** Notice of proposed rulemaking  
(NPRM).

**SUMMARY:** The RSPA and the Federal  
Railroad Administration (FRA) are  
proposing the development of safety  
standards that would (1) permit the use  
of railroad tank car tanks with tank  
shell thicknesses in localized areas less  
than the minimum specified in the  
Hazardous Materials Regulations (HMR)  
and (2) require the measurement of tank  
car tank thicknesses under certain  
conditions. This action is necessary to  
verify that tank repairs do not result in  
significant decreases in shell  
thicknesses. The intended effect of this  
action is to assure that tank repairs do  
not result in a reduction in the level of  
safety and to facilitate commerce by  
allowing the use of tank car tanks, with  
localized thin spots, which have been  
determined to be safe for the  
transportation of hazardous materials.

**DATE:** Comments must be received by  
February 11, 1988.

**ADDRESS:** Address comments to the  
Dockets Unit, Research and Special  
Programs Administration, Department of

Transportation, 400 Seventh Street, SW, Washington, DC 20590. Comments should identify the docket and notice number and be submitted in five copies. Persons wishing to receive confirmation of receipt of their comments should include a self-addressed stamped postcard. The Dockets Unit is located in Room 8426 of the Nassif Building, 400 7th Street, SW., Washington, DC 20590. Public dockets may be reviewed between the hours of 8:30 a.m. and 5:00 p.m., Monday through Friday, except holidays.

**FOR FURTHER INFORMATION CONTACT:** Philip Olekszyk, Deputy Associate Administrator for Safety, Federal Railroad Administration, RRS-2, Washington, DC 20590, Telephone 202-366-0897.

**SUPPLEMENTARY INFORMATION:** Part 179 of the HMR specifies the minimum plate thicknesses for heads and shells of DOT specification tank car tanks. Section 173.31 of the HMR requires that tank cars used to transport hazardous materials be maintained to meet the requirements of Part 179. Sections 179.6 and 173.31(f) of the HMR specify that tank car tanks shall be repaired in compliance with Appendix R, Association of American Railroads Specification for Tank Cars. Appendix R specifically states that a tank car tank repair "means reconstruction of a tank to its original design."

Notwithstanding the regulatory standards cited in the preceding paragraph, RSPA and FRA believe that a significant number of tank cars that are stenciled and used as DOT specification tank cars may have localized areas of the shells in which the thicknesses are less than the minimum specified in Part 179 for the particular car type. Tanks with these localized "thin spots" are not in compliance with the current HMR, accordingly, they are not authorized for use in transporting hazardous materials requiring the use of a DOT specification tank car. RSPA and FRA believe that there may be some tank car tanks with localized "thin spots" that do not meet their original tank car tank specification, but may meet some other tank car specification. For example, a tank car tank that had originally been manufactured to the DOT 105A300W specification may qualify for the DOT 105A200W specification. Owners of these tank car tanks have the option of converting their tanks to a lower pressure test rating.

RSPA and FRA first became aware of the magnitude of the problem of tank cars with localized thin spots as a result of actions taken in response to an incident involving a tank car leaking

ethylene oxide on December 31, 1984, at North Little Rock, Arkansas. Investigation of this incident revealed that the subject tank car had been equipped with an anti-shift bracket not in conformance with Federal Regulations for such brackets on tank cars carrying hazardous materials.

The FRA's Office of Safety subsequently reviewed construction records and had identified, by September 1985, approximately 9,000 hazardous materials tank cars with nonconforming brackets. These tank cars were built by one manufacturer, which proposed to bring the affected cars into conformance by means of a campaign to remove the nonconforming brackets, inspect the tank shell for cracks, and remove or repair any detected cracks before returning the tank cars to service.

During the retrofit program, FRA inspectors noted some anomalies in the procedures. In particular, the inspectors observed that some repair facilities were removing cracks by grinding the shell without subsequent restoration of the shell to the minimum prescribed thickness. Independently, FRA received reports from the Louisiana State Police of similar anomalies.

In August 1985, the FRA's Associate Administrator for Safety asked the DOT Transportation System Center to make a preliminary technical assessment of the adequacy of the manufacturer's inspection and repair procedures. The Center formed a Task Force for this purpose, consisting of five senior engineering faculty members from three universities, a National Bureau of Standards expert on tank car steels, and two senior members of the Center's technical staff. The Task Force members are nationally recognized authorities on structures, structural fatigue, and fracture mechanics.

The Task Force issued a final report, which is available as part of this docket. This report documents the Task Force assessment of the inspection and repair procedures. The Task Force assessed three risks: (1) The risk that local reductions of shell thickness might lead to burst failures, (2) the risk that the inspection procedure would not detect certain cracks which might continue to grow during subsequent service, and (3) the risk that weld repair might damage the shell if the repair procedure is not adequate. The report concluded that small localized reductions of shell thickness of less than one-sixteenth inch would not significantly reduce the bursting strength of a tank car tank. However, the report further concluded that the inspection procedure might not

detect small cracks that could grow into unacceptably larger cracks and that the repair of detected cracks could cause collateral damage.

Based on the Task Force Report, RSPA and FRA believe that rulemaking is needed to address the issues of localized reduction of shell thicknesses and of crack detection and repair. This NPRM will only address the thin spot issue. For the purposes of this NPRM, the term "thin spot" does not include a deformation of the tank car tank with a small radius of curvature (i.e., a score or a gouge or any other potential stress riser). RSPA and FRA do not contemplate changing the current requirements for the repairs of scores or gouges. A separate ANPRM published elsewhere in today's Federal Register addresses the detection and repair of cracks, pits, corrosion, lining flaws and other defects of tank car tanks. The ANPRM also addresses defects that result from both repair operations and nonrepair related causes.

RSPA recognizes the inconsistency between the actions proposed in this notice for tank car tanks with thin spots and the actions previously taken by RSPA for cargo tanks with thin spots. In a Rule Related Notice published on April 7, 1983 in the Federal Register (48 FR 15217), RSPA noted that "if for any reason, a cargo tank does not meet the applicable specification under which it was constructed, its specification plate must be removed or rendered illegible thereby removing its certification as a specification cargo tank." The notice further stated that " \* \* \* the minimum thickness requirement \* \* \* is an essential function in determining the continuing qualification of a cargo tank as an authorized packaging. For example, if an MC310 cargo tank has a capacity of 2,000 gallons, its minimum thickness may be no less than 3/8 inch. If the tank is less than 3/8 inch thick at any point, e.g. as a result of internal or external corrosion, it may no longer be marked 'MC 310' on its identification plate, nor may it be used as a specification cargo tank under the HMR."

RSPA and FRA believe that there are two factors that justify the above inconsistency. First, the wall thicknesses of cargo tanks are generally thinner than the wall thicknesses of tank car tanks. New DOT specification cargo tanks must be manufactured to withstand a test pressure that can be as low as 3 psig. In contrast, the test pressure of DOT specification tank car tanks is at least 60 psig. In the preamble of a Notice of Proposed Rulemaking published on September 17, 1985 in the Federal

Register (50 FR 37766), it was noted that "research conducted by the states of Michigan and California and DOT has shown that failures of the tank shell \* \* \* occur frequently in cargo tank overturn accidents. In a substantial number of instances, these failures resulted in serious leakage, sometimes resulting in fires. These research studies showed that in many cases leakage resulted from tank shell puncture, tank shell rupture, \* \* \*." RSPA believes that allowing the use of cargo tanks with thin spots could result in a significant increase in the frequency of tank shell failures. However, RSPA and FRA believe that allowing the use of tank car tanks with localized thin spots resulting from repairs will not significantly increase the risk of tank shell failure, because tank car tanks have relatively thick walls.

Furthermore, the requirements for the qualification, maintenance, and use of cargo tanks are different than the corresponding requirements for tank car tanks. In general, the only explicit reinspection requirement for cargo tanks is an external visual inspection at least once in every two years (cargo tanks, having a capacity of 3,000 gallons or less, used exclusively for the transportation of flammable liquids need not be visually inspected and certain other cargo tanks must be pressure tested in addition to the visual inspection). However, tank car tanks must be hydrostatically retested and reinspected at periodic intervals, generally of either 1, 2, 3, 5, 10 or 20 years as prescribed in § 173.31(c).

Section 173.31(a) would be revised to allow the use of a single unit tank car tank that meets the DOT tank car tank specifications, except that it has one or more "thin spots" resulting from a tank repair, where the thickness of the tank is less than that prescribed in Part 179 of the HMR. However, the tank may not have scores, gouges, or other stress concentration areas, no thin spot could be greater than one-sixteenth of an inch less than the prescribed thickness, and no thin spot could be located on the lower half of the tank head. In addition, the total cumulative surface area of the thin spots could not exceed two square feet. The maximum safe total cumulative surface area depends on several factors, such as the size and shape of the thin spots, the location of the thin spots, the tank characteristics, and the lading properties. It is the judgment of RSPA and FRA that adoption of a two square foot restriction would pose no significant safety risk, even in a worst case combination of the above factors. Section 173.31(a) would also specify that

ethylene oxide could not be transported in a tank with thin spots, unless the tank had a theoretical bursting pressure of 750 p s i g or greater. The Task Force Report concluded that ethylene oxide tanks with thin spots were vulnerable to failure because the use of gas padding increases the internal pressure.

It should be noted that the proposed revision of § 173.31(a) would not authorize the construction of tank car tanks with thin spots. The thin spot provisions only apply to thin spots that occur as a result of the authorized repair of a tank.

The Association of American Railroads' (AAR) Manual of Standards and Recommended Practices, Section C-Part III is incorporated by reference in § 171.7(d)(2) of the HMR. This manual implicitly requires that tank car owners report tank car tank thickness measurements on the Report of Welded Repair, Alterations or Conversions (Exhibit R-1 report) for areas affected during repairs, alterations or conversions. Section 173.31(f) of the HMR requires repairs, alterations and conversions to be made in accordance with Appendix R of the AAR's Manual of Standards and Recommended Practices, Section C-Part III. In spite of the requirement to take measurements, FRA found that after repairs were made to tank car tanks to correct improperly installed anti-shift brackets, the repair records (Exhibit R-1 reports) did not include the required thickness measurements. In a few cases, FRA determined that the repair facilities had not made the required measurements. Therefore, it is proposed to revise § 173.31(f) to clarify that after repairs, alterations or conversions, tank car tank thickness measurements must be included in the Exhibit R-1 report.

#### Administrative Notices

##### *Paperwork Reduction Act*

The information collection requirements contained in this proposal will be submitted to the Office of Management and Budget (OMB) for approval under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96-511).

##### *Executive Order 12291*

The RSPA has determined that this rulemaking (1) is not "major" under Executive Order 12291, (2) is not "significant" under DOT's regulatory policies and procedures [44 FR 11034]; (3) will not affect not-for-profit enterprises or small governmental jurisdictions; and (4) does not require an environmental impact statement under the National Environmental Policy Act (40 U.S.C. et

seq.) A regulatory evaluation is available for review in the Docket.

##### *Impact on Small Entities*

Based on limited information concerning size and nature of entities likely to be affected by this proposed rule, I certify this proposal will not, if promulgated, have a significant economic impact on a substantial number of small entities. This certification is subject to modification as a result of the review of comments received in response to this proposal.

##### List of Subjects in 49 CFR Part 173

Hazardous materials transportation, packaging and containers.

In consideration of the foregoing, 49 CFR Part 173 would be amended as follows:

#### **PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS**

1. The authority citation for Part 173 is revised to read as follows:

Authority: 49 App. U.S.C. 1803, 1804, 1805, 1806, 1807, and 1808, 49 CFR Part 1, unless otherwise noted.

2. In § 173.31, the beginning of the first sentence in paragraph (a)(1) would be revised; paragraph (a)(11) would be added and paragraph (f)(1) would be revised to read as follows:

##### **§ 173.31 Qualification, maintenance, and use of tank cars.**

(a) \* \* \*

(1) Except as otherwise provided in paragraphs (a)(2) and (a)(11) of this section, \* \* \*.

\* \* \* \* \*

(11) A single unit tank car tank that meets the applicable specifications of Part 179 of this subchapter, except that it has one or more localized areas ("thin spots"), resulting from a tank repair, where the thickness of the tank car tank is less than that prescribed in Part 179 of this subchapter, may continue in use provided that—

(i) The difference between the required minimum thickness of the tank car tank and the actual minimum thickness of the tank car tank does not exceed one-sixteenth of an inch;

(ii) The total cumulative surface area of the thin spots on each tank car tank does not exceed two square feet;

(iii) If the tank car tank is used to transport ethylene oxide, then the bursting pressure (see § 179.100-5 of this subchapter) of the tank must be at least 750 p s i g;

(iv) There are no thin spots on the lower half of any tank car tank head, and

(v) The tank car tank does not have any scores, gouges, or other areas of stress concentration

\* \* \* \* \*

(f) *Repairs or alterations* (1) For procedure to be followed in making repairs or alterations to all tank car tanks and securing approval therefor, see Appendix R, Association of American Railroads Specifications for Tank Cars. After repairs, alterations, or conversions of a tank car tank that result in a possible change in the tank thickness at any point, the thickness of the tank car tank shall be measured in the affected area and shall be included on Exhibit R-1 of Appendix R

\* \* \* \* \*

Issued in Washington, DC on December 2, 1987 under authority delegated in 49 CFR Part 106, Appendix A

Alan I Roberts,

*Director, Office of Hazardous Materials Transportation*

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