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Item 6 of the provisional agenda

Tanks

Shells with protective linings

Transmitted by the Government of the Netherlands^{1, 2}

Summary

- Executive summary:** This proposal seeks to limit the use of construction material for shells with protective linings. In the case of damage of the lining the shell shall exhibit a level of chemical resistance to the substance carried.
- Action to be taken:** Amend 6.8.2.1.9
- Related documents:** ECE/TRANS/WP.15/AC.1/2015/10
Informal document INF.50 of the March 2015 session,
paragraphs 12-14
ECE/TRANS/WP.15/AC.1/138, paragraph 9

¹ In accordance with the programme of work of the Inland Transport Committee for 2014–2015 (ECE/TRANS/240, para. 100, ECE/TRANS/2014/23, cluster 9, para.9.2).

² Circulated by the Intergovernmental Organisation for International Carriage by Rail (OTIF) under the symbol OTIF/RID/RC/2015/51.

Introduction

1. Document ECE/TRANS/WP.15/AC.1/2015/10 of the Netherlands concerning the use of shells made of aluminium alloy with protective lining was discussed in the working group on tanks in March 2015. The working group supported the principle of the proposal and invited the Netherlands to make a further proposal. Reference is made to paragraph 12 to 14 of informal document INF.50 of the March 2015 Joint meeting.
2. In the plenary meeting the issue was also discussed and some additional remarks were made (see paragraph 9 of ECE/TRANS/WP.15/AC.1/138). No remarks or additional information on the tanks that might be involved have been submitted to the Netherlands since last session. Based on the discussion in the working group and in plenary the Netherlands has revised its proposal, taking into account similar text in Part 4 of RID/ADR.

Discussion

3. On 3 July 2013, a tanker carrying hydrochloric acid developed a damage in the protective lining, resulting in a hole in the shell. The shell was made of aluminum alloy and the leaking hydrochloric acid spilling out from above the waistline of the tank dissolved approximately one quarter of the diameter of the shell material and part of a stiffener in short period of time. For more details reference is made to ECE/TRANS/WP.15/AC.1/2015/10.
4. The first paragraph of 6.8.2.1.9 reads:

“The materials of shells or their protective linings which are in contact with the contents shall not contain substances liable to react dangerously (see "Dangerous reaction" in 1.2.1) with the contents, to form dangerous compounds, or substantially to weaken the material.”
5. In the above mentioned accident, the tank was made of aluminium and due to the protective liner the material of the shell was **not** in contact with the contents. However the liner was damaged and therefore the contents came in contact with the material and resulted in the hole in the shell.
6. Similar provisions can be found in Part 4, 4.3.2.1.5 of ADR/RID, which reads as follows:

«Tanks, battery-vehicles and MEGCs shall not be loaded with any dangerous substances other than those for the carriage of which they have been approved according to 6.8.2.3.1 and which, in contact with the materials of the shell, gaskets, equipment and protective linings, are not liable to react dangerously with them (see "dangerous reaction" in 1.2.1), to form dangerous products or appreciably to weaken these materials.»
7. Despite the phrase “... *in contact with the materials of the shell* ...», one interpretation of this text is that the materials of the shell, gaskets, equipment and protective linings, shall not be liable to react dangerously (see "dangerous reaction" in 1.2.1), or appreciably to weaken these materials irrespective whether or not the substance carried is in direct contact with the shell. Following this text the aluminium tank with the protective liner is **not** allowed for the carriage of hydrochloric acid.
8. The expert of the Netherlands is of the opinion that aluminium shells with a protective liner should not be allowed for substances such as hydrochloric acid. Furthermore, **irrespective whether the material is aluminium or some other material, a**

situation that could result in a dangerous reaction or appreciably weaken the material of the shell should be avoided in all cases.

Additional Remark

9. It would be our view that the situation described in the second paragraph of 6.8.2.1.9 which reads:

“If contact between the substance carried and the material used for the construction of the shell entails a progressive decrease in the shell thickness, this thickness shall be increased at manufacture by an appropriate amount. This additional thickness to allow for corrosion shall not be taken into consideration in calculating the shell thickness.”

is not affected by this approach because the slow reduction of the thickness of the shell as a result of the reaction between the contents and the shell would not be regarded as a "dangerous reaction" as defined in 1.2.1 or as an appreciable weakening of the material of the shell.

Proposal

10. On this basis we propose the following modification to the first paragraph of 6.8.2.1.9 with additions indicated in **bold** font and deletions in ~~strike through~~. The second paragraph of 6.8.2.1.9 will remain as it is.

«6.8.2.1.9 *The materials of shells ~~or~~ **including** their protective linings, **if applicable**, ~~which are in contact with the contents~~ shall not contain substances liable to react dangerously (see "Dangerous reaction" in 1.2.1) with the contents, to form dangerous compounds, or substantially to weaken the material..”*

11. The text of 4.3.2.1.5 can remain as it is.