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Working Party on the Transport of Dangerous Goods

Joint Meeting of the RID Committee of Experts and the
Working Party on the Transport of Dangerous Goods

Geneva, 15-19 September 2008
Item 2 of the provisional agenda

TANKS* **

**Amendment of the limit values for calculating equivalent wall thicknesses
under 6.8.2.1.18**

Transmitted by the International Union of Private Wagons (UIP)

Proposal

1. It is proposed to remove from paragraph 6.8.2.1.18 of RID/ADR the reference to the definition of mild steel according to section 1.2.1, and to replace it with defined tensile strengths.

* In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.7 (c)).

** Circulated by the Intergovernmental Organization for International Carriage by Rail (OTIF) under the symbol OTIF/RID/RC/2008/15.

Justification

2. For material other than mild steel, equivalent tank-wall thickness has to be determined in accordance with RID/ADR paragraph 6.8.2.1.18.
3. In informal document INF.22 of the September 2007 session of the Joint Meeting, UIP drew attention to the fact that the calculated equivalent wall thickness for tanks had gradually increased from 6.0 to 6.25, as some years ago, the cube root formula in Chapter 6.8 was changed from the one in Chapter 6.7, and the minimum tensile strength of S355J2+N steel cited in the EN 10025 standard (mild steels) had now been reduced from 490 N/mm² (old) to 470 N/mm² (new).
4. At the September 2007 session of the Joint Meeting, the UIP proposal to align the definition of mild steel in RID/ADR section 1.2.1 with the current standard value for S355J2+N was discussed by the working group on tanks. It was recognized that the intention was certainly not to bring about tiny increases in wall thickness for this material, commonly used in the sector, but rather to evaluate grades of aluminium against (fine-grained) stainless steel. The proposal was, however, ultimately rejected, the justification being that, as with portable tanks under Chapter 6.7, reference is made to the definition of mild steel, and an amendment should be drawn up by the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods.
5. The current proposal by UIP would, if accepted, solve the problem above without requiring any amendment of Chapter 6.7.
6. In this context, it should also be recalled that the cube formula for calculating equivalent wall thicknesses mentioned in Chapter 6.7 already differs from the one in Chapter 6.8, and that Chapter 6.7 gives a separate definition of mild steel (which makes no reference to section 1.2.1). Because of these differences, the walls for tanks made of such materials in accordance with Chapter 6.7 are already less thick than those calculated in accordance with Chapter 6.8.
7. UIP also draws attention to the fact that when use is made of less resistant steels, which under the current regulations are covered by the definition of mild steel, a wall thickness of 6.0 mm is considered sufficient, notwithstanding the fact that their elongation at fracture, which is smaller than that of the reference steel in the calculation under paragraph 6.8.2.1.18, would make for a slightly greater wall thickness. The more resistant S355J2+N material, with greater energy absorption, is at a disadvantage, not being covered by the current definition of mild steel.
8. Changing the definition in Chapter 6.8 as UIP proposes would correct this disadvantage in the evaluation, and would thus further simplify the use of this time-tested steel in the construction of tanks.

Proposal for the text:

6.8.2.1.18 To read as follows:

“**6.8.2.1.18** (RID:) Shells shall be not less than 6 mm thick if of ~~mild steel~~² a steel whose minimum tensile strength is between 360 N/mm² and 470 N/mm², or of equivalent thickness if of another metal. For powdery or granular substances, this thickness may be reduced to 5 mm for ~~mild steel~~³ a steel of the values mentioned or to an equivalent thickness for other metals.

Whichever metal is used, the minimum wall thickness of the shell shall in no case be less than 4.5 mm.

(ADR:) Shells of circular cross-section² not more than 1.80 m in diameter other than those referred to in 6.8.2.1.21, shall not be less than 5 mm thick if of ~~mild steel~~³ a steel whose minimum tensile strength is between 360 N/mm² and 470 N/mm², or of equivalent thickness if of another metal.

Where the diameter is more than 1.80 m, this thickness shall be increased to 6 mm except in the case of shells intended for the carriage of powdery or granular substances, if the shell is of ~~mild steel~~³ a steel whose minimum tensile strength is between 360 N/mm² and 470 N/mm², or to an equivalent thickness if of another metal.

“Equivalent thickness” means the thickness obtained by the following formula⁴:

$$e_1 = \frac{464 e_0}{\sqrt[3]{(Rm_1 A_1)^2}} .”$$

Footnote 3 is deleted.

Shells shall be not less than 5 mm thick if of ~~mild steel~~³ a steel whose minimum tensile strength is between 360 N/mm² and 470 N/mm² (in conformity with the requirements of 6.8.2.1.11 and 6.8.2.1.12) or of equivalent thickness if of another metal.

Where the diameter is more than 1.80 m², this thickness shall be increased to at least 6 mm except in the case of tanks intended for the carriage of powdery or granular substances, if the shell is of ~~mild steel~~³ a steel whose minimum tensile strength is between 360 N/mm² and 470 N/mm², or to an equivalent thickness if of another metal.

Whatever the metal used, the shell thickness shall in no case be less than 3 mm.
