

**OTIF**



**ORGANISATION INTERGOUVERNEMENTALE POUR  
LES TRANSPORTS INTERNATIONAUX FERROVIAIRES**

**ZWISCHENSTAATLICHE ORGANISATION FÜR DEN  
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**INTERGOVERNMENTAL ORGANISATION FOR INTER-  
NATIONAL CARRIAGE BY RAIL**

**INF.1**

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(Berne, 18 and 19 May 2010)

**Subject: End Protection Measures on Rail Tank Wagons**

**Transmitted by the United Kingdom**

1. The UK's Rail Accident Investigation Branch (RAIB) has recently published a report of its investigation into a rail accident which occurred on 27 January 2009. The train was carrying dangerous goods but their carriage was not the cause of the accident, however some environmental damage occurred as a result of the accident increasing its severity.
2. The RAIB investigation into the accident has resulted in a number of recommendations being made with the aim of preventing a similar accident from occurring in the future. One of these recommendations has been addressed to the UK Department for Transport in our capacity as the competent authority for the transport of dangerous goods.
3. The accident involved a ten wagon dangerous goods train carrying a mixed consignment of gas oil, diesel and kerosene (UN 1202 and UN 1223) to a fuel depot south of Kilmarnock in Scotland. A bridge, which takes the railway over a road, collapsed and led to the derailment of some of the wagons which then overturned, coming to rest at various positions to the south of the bridge. Altogether around 220,000 litres of diesel and kerosene leaked from four of the derailed wagons which then leaked into the local environment and watercourses. The final wagon also caught fire. There were no fatalities or injuries.
4. The full RAIB report into the accident can be located at [http://www.raib.gov.uk/cms\\_resources/100203\\_R022010\\_Stewarton.pdf](http://www.raib.gov.uk/cms_resources/100203_R022010_Stewarton.pdf).

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5. The report concludes that all of the fuel lost from tanks on three of the wagons (170,000 litres) was due to significant override movements which resulted in punctures to the tanks made by the drawhooks of adjacent wagons. Images of these punctures can be seen below:



Wagon 10



Vertical gash on the tank of wagon 6 (left) caused by the adjacent drawhook on wagon 7 (right)

6. The report also comments that the RAIB has identified at least four incidents that have occurred in the UK since 1980 which have involved tanks containing dangerous goods being punctured by drawhooks.
7. It notes that under the 2009 version of RID end protection for new tanks carrying highly hazardous substances is required, calling for at least one of the following: an override prevention system, an increased thickness of tank ends, or 'sandwich covers' or 'protective shields' to protect the tank ends. The RAIB argue that these measures may have prevented the puncturing that occurred if they had been implemented but note that in this case, due to the type of dangerous goods carried, none of these measures are required (paragraphs 242 to 246 of the RAIB report (see para 4), for the full background).
8. The recommendation addressed to the UK Department for Transport is issued with the intention to *"improve the construction of new tank wagons in order to mitigate the risk of leakage resulting from tank damage in accidents"* (page 71 of the RAIB report (see para 4)) and is as follows:

“The UK competent authority for dangerous goods, the Department for Transport, should evaluate the case for extending the requirement for end protection measures on rail tank wagons to cover a wider range of liquid products. The combined benefit to both safety and the environment shall be taken into consideration when assessing the cost implications of this extension. If the case is valid, the Department for Transport should make a proposal for a requirement change to the committee responsible for the RID regulations”.

## Consideration

9. Under UIC leaflet 573 “Technical conditions for the construction of tank wagons”, tank wagons in Europe shall have a gap of 920 mm between the end of the tank and the uncompressed buffer face (300 mm from the end of the tank to the headstock plane plus 620 mm for the length of the uncompressed UIC buffer).
  10. GB tank wagons running internationally have to meet this requirement but for those in domestic traffic only, alternative arrangements have been applied. Because of the more restrictive loading gauge in GB, the diameter of tanks of tank wagons is smaller and so to obtain comparable volumes, tanks are longer meaning that the 920 mm distance requirement cannot be met.
  11. In these cases buffer override protection has to be provided and this has been a requirement for tank wagons since 1980. The specification is given on page 9 in the UK commissioned report referred to below and photographs of examples of this protection are given in figures 1 to 6 of this report.
  12. As mentioned in paragraph 244 of the RAIB report, retrofitting buffer override protection to tank wagons built before 1980 is only required in certain circumstances. In the derailment and fire in the Summit Tunnel in 1984 involving a train of tank wagons carrying petrol, the buffer override protection was effective (see figure 21 in the UK commissioned report) leading the UK Railway Inspectorate to recommend this protection to be fitted on all tank wagons designed to carry “highly flammable products”.
  13. Following this accident, and others where product was lost from punctured tank wagons not fitted with buffer override protection, in 2003 the UK commissioned a study on the provision of buffer override protection on dangerous goods tank wagons. The two main issues under consideration were:
    - the possibility of improvement of the existing design requirements
    - the justification for retrofitting of the existing unfitted vehicles with end protection override beams.
- The full UK commissioned report can be located at <http://www.rssb.co.uk/pdf/reports/research/Review%20of%20tank%20wagon%20end%20protection.pdf>
14. As mentioned in paragraph 244 of the RAIB report, this study concluded that there was no safety justification for retrofitting but the study did not consider the costs for environmental damage or associated clean-up. The UK commissioned report also recommended improvements to the existing buffer override requirements.
  15. It has been decided to include the 300 mm distance requirement between the headstock plane and the end of the tank from UIC leaflet 573 into RID from 2011 for tank wagons intended for the carriage of all dangerous goods. To cater for the circumstances in GB, the alternative of buffer override protection on GB railway infrastructure has also been included in the new 6.8.2.1.29 and the transitional arrangements are given in 1.6.3.36.

16. The type of end protection referred to in paragraph 246 of the RAIB report is that required by RID only for highly hazardous substances, namely toxic gases and high hazard liquids requiring tanks with a calculation pressure of 15 bar or higher (see 6.8.4 (b), TE 25 and the transitional arrangements in 1.6.3.32).
  17. The UK would like to hear the views of the Tank and Vehicle Technology Working Group on whether as a result of the RAIB report this would merit reconsideration of the RID requirements and evaluating the case for extending TE 25 to cover a wider range of dangerous goods.
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