Organisation intergouvernementale pour les transports internationaux ferroviaires
Zwischenstaatliche Organisation für den internationalen Eisenbahnverkehr
Intergovernmental Organisation for International Carriage by Rail

OTIF/RID/CE/GTT/2020-A

5 November 2020

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TO THE MEMBER STATES AND ASSOCIATE MEMBERS OF OTIF AND TO REGIONAL ORGANISATIONS WHICH HAVE ACCEDED TO COTIF

Final report of the 18th session of the RID Committee of Experts' working group on tank and vehicle technology

(Video-conference, 6 and 7 October 2020)

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1. The 18th session of the RID Committee of Experts' working group on tank and vehicle technology was held as a video-conference on 6 and 7 October 2020.

2. The following RID Contracting States took part in the work of the 18th session of the working group on tank and vehicle technology (see also Annex II):

   Austria, Belgium, Bosnia and Herzegovina, Finland, France, Germany, Iran, Netherlands and United Kingdom.

   The European Commission and the European Union Agency for Railways (ERA) were also represented.

   The following non-governmental international organisations were represented: the European Chemical Industry Council (CEFIC), the International Union of Railways (UIC), the Association of the European Rail Industry (UNIFE) and the International Union of Wagon Keepers (UIP).

3. As decided at the 44th session of the RID Committee of Experts (see report OTIF/RID/CE/2007-A, paragraph 108), Mr Rainer Kogelheide (UIP) chaired the meeting.

ITEM 1: Approval of the agenda

Documents: RID-20017-CE (Secretariat)

4. The provisional agenda contained in circular letter RID-20017-CE dated 25 August 2020 was adopted.

ITEM 2: Safety assessment of the risk analysis submitted by BASF on extra-large tank-containers

Informal documents: OTIF/RID/CE/GTT/2020/INF.1 (Germany)
OTIF/RID/CE/GTT/2020/INF.3 (CEFIC)

5. The representative of Germany presented the preliminary results set out in document OTIF/RID/CE/GTT/2020/INF.1 of the German competent authorities' examination of the risk assessment carried out on behalf of BASF. She pointed out that the examination would be continued and that the expertise of the German Centre for Rail Transport Research (DZSF) would also be called upon.

6. The representative of CEFIC presented his comments in document OTIF/RID/CE/GTT/2020/INF.3 on Germany's document OTIF/RID/CE/GTT/2020/INF.1. He expressed surprise at the questions Germany had raised in its document, as Germany had taken part in all the meetings of a "sounding board" set up by BASF before the tests were carried out. In particular, this "sounding board" had discussed carrying out tests on 45' and 52' extra-large tank-containers. He recalled that in the study, only a comparison between extra-large tank-containers, tank-containers and tank-wagons was to be carried out.

7. The representative of Germany argued that no documents at all had been made available to prepare for the two meetings of the "sounding board". As it had not been possible to analyse BASF's plan beforehand, the German delegation had only been able to note the presentations that were given. In addition, the participants' comments had not been reflected in the report prepared by BASF.

Need for a definition of extra-large tank-containers

8. The chairman pointed out that during the discussions on the issue of the pressure resistance of manhole closures for the internal inspection of tanks (see also paragraphs 25 to 30) at the RID/ADR/ADN Joint Meeting's working group on tanks (video-conference, 10 - 16 September 2020), the representatives of the tank-container industry had said that their operational experience in intermodal transport was only limited to tank-containers with a capacity of up to 40,000 litres. It might certainly be useful to draw a line at a capacity of 40,000 litres in order to differentiate between conventional intermodal and other tank-containers.

9. The representative of UIP supported Germany's call in document OTIF/RID/CE/GTT/2020/INF.1 to check whether a new definition should be introduced for extra-large tank-containers. He was also of the view that the intermodality of tank-containers was limited by the weight. An extra-large tank-container was not an intermodal tank-container in the usual sense, because owing to its greater weight when loaded, it could not be used like a conventional tank-container.

10. The representative of CEFIC pointed out that the extra-large tank-containers were already approved as intermodal tank-containers. They were already carried by road when empty and some had also been approved for maritime transport. However, the extra-large tank-containers approved in accordance with the IMDG Code had to meet stricter requirements in terms of the wall thickness (4.5 mm + corrosion allowance).

11. The chairman pointed out that owing to their multimodal use, the need for a new definition of extra-large tank-containers and the related issues would have to be discussed in the RID/ADR/ADN Joint Meeting's working group on tanks. The RID/ADR/ADN Joint Meeting's working group on tanks should examine the following points in particular:

    – On the basis of their intermodal approval, can extra-large tank-containers be treated in the same way as conventional intermodal tank-containers or are additional provisions necessary, bearing in mind the fact that the current provisions for tank-containers were developed on the basis of a tank-container with a maximum capacity of around 36,000 litres and extra-large tank-containers are more than twice as large as conventional tank-containers and are hence on a par with tank-wagons in terms of volume?

    – Should the capacity of tank-containers in the existing definition be limited (e.g. to 40,000 litres or perhaps 36/40 tonnes)?

    – Should a new definition be included for extra-large tank-containers so that they can be taken into account accordingly in the provisions for construction, approval, use and loading?

Reducing the shell wall thickness

12. It was recalled that RID 6.8.2.1.18 prescribes a minimum shell wall thickness of 4.5 mm for tank-wagons and 3 mm for tank-containers. The extra-large tank-containers with tank code L4BH manufactured by Van Hool have a wall thickness of 3.4 mm and those made by Magyar have a wall thickness of 4.5 mm.

13. The chairman pointed out that at the time the provisions on reducing the wall thickness of the shell were developed, it had been assumed that greater dynamic forces would inevitably require greater wall thicknesses. However, there were now new materials with enhanced characteristics, thanks to which a shell with a reduced wall thickness would perhaps achieve the same level of safety as a shell made of conventional materials with a greater wall thickness. The wall thickness should also be considered in conjunction with the construction of the subframe (two external solebars rather than one central solebar). So the question was not just whether the provisions on reducing the shell wall thickness should be adapted, but also what direction any amendments should take. Should the minimum wall thickness of extra-large tank-

containers be increased to 4.5 mm because of their volume, which is comparable to that of tank-wagons, or should the minimum wall thickness of tank-wagon tanks be reduced to 3 mm because of the technical advances referred to above?

14. The representative of Germany was of the view that the possibility of reducing the shell wall thickness of extra-large tank-containers to 3 mm in accordance with RID 6.8.2.1.18, without taking account of the increased capacity, was questionable at the least. In addition, the way extra-large tank-containers behaved in serious railway accidents and the greater consequences of an accident compared with conventional tank-containers in the event of a catastrophic failure, with possible leakage of the product, would have to be analysed. He also drew attention to the fact that increasing the minimum wall thickness was a way of compensating for more serious consequences of an accident for the same risk.

15. The representative of UIP shared Germany's concerns with regard to the uncertain behaviour of extra-large tank-containers in serious accident situations. Investigations would have to be undertaken to ascertain whether extra-large tank-containers are sufficiently dimensioned for cases where they become detached from the carrying wagon.

16. In connection with this, the representative of Austria said it was important to consider extra-large tank-containers as part of an overall system, together with the innovative container carrying wagons. However, he considered it necessary to cover this new transport system by means of new provisions in order to ensure that it is used correctly. He also welcomed Germany's initiative to call upon DZSF's expertise for the further examination of this issue (see also paragraph 5).

17. The representative of CEFIC replied that the extra-large tank-containers and the innovative carrying wagons had undergone all the necessary tests. In addition, other tests had been carried out as part of the risk assessment in accordance with scientific principles.

18. The working group did not reach a clear result with regard to reducing the shell wall thickness of extra-large tank-containers and tank-wagons. While some delegations were of the view that the same wall thicknesses are required for cargo transport units with the same capacity, the representatives of CEFIC, Belgium and France argued that the tests and simulations carried out had clearly shown that because of their adapted construction, extra-large tank-containers achieved an equivalent or even better safety level compared with tank-wagons, even with a reduced wall thickness. The representative of France added that the differences between the construction of tank-wagons and extra-large tank-containers led to completely different stresses in operation and so for this reason, it was not meaningful to harmonise the construction requirements for tank-wagons and extra-large tank-containers.

19. The question of reducing the shell wall thickness remains on the agenda and will be dealt with further at the next session of the working group in light of the outcome of the discussions at the RID/ADR/ADN Joint Meeting's working group on tanks (see also paragraph 11).

<u>Energy absorption elements and protection against overriding</u>

20. The chairman pointed out that at the time special provisions TE 22 and TE 25 were included in RID for tank-wagons, equivalent provisions for tank-containers had been dispensed with owing to their smaller size and particular type of construction. However, as a result of the extra-large tank-containers, there was a new situation which might make it necessary to amend the provisions.

21. The representative of CEFIC confirmed that product-specific special provisions for very dangerous substances might be useful, but in this case, they should apply to all tank-containers and not just to extra-large tank-containers. In this case, the intermodal nature of tank-container transport should be taken into account. For example, devices to protect against the overriding of buffers and protective shields were not practicable in container transport, because container carrying wagons are not used exclusively for the carriage of dangerous goods.

22. The working group agreed that for the carriage of very dangerous substances, protective aims in the form of special provisions should be formulated. For tank-wagons, the protective aims could be achieved by the measures specified in special provisions TE 22 and TE 25 and for extra-large tank-containers by compensatory alternative measures (e.g. increasing the distance between the headstock plane and the most protruding point at the shell extremity), which would provide protection equivalent to that offered by TE 22 and TE 25.

23. As it was not possible to discuss this point to a conclusion, it remains on the agenda for the next session of the working group. Attention was drawn to the fact that when dealing with this issue, the discussions on special provisions TE 22 and TE 25 at the Joint Coordinating Group of Experts (JCGE) should also be taken into account.

Minimum distance between the headstock plane and the tank end

24. CEFIC's request to delete the provision in 6.8.2.1.29, according to which the minimum distance between the headstock plane and the most protruding point at the shell extremity must be at least 300 mm, would be discussed at a later date on the basis of a document. CEFIC had argued that in tests carried out as part of the risk assessment, it had been established that this distance did not play a role.

Fixing of welded elements and pressure resistance of closures on the shell

Informal documents: OTIF/RID/CE/GTT/2020/INF.2 (Secretariat)
OTIF/RID/CE/GTT/2020/INF.4 (Chairman of the RID/ADR/ADN Joint Meeting's working group on tanks)

25. The Secretariat introduced its document OTIF/RID/CE/GTT/2020/INF.2, which reproduced the decisions of the RID/ADR/ADN Joint Meeting (video-conference, 10 to 18 September 2020) with regard to welded elements and the pressure resistance of closures on the shell. With regard to adopting the requirement to fit 4 bar man lids on tank-containers, no consensus was reached. The working group on tank and vehicle technology had therefore been asked to reconsider the original proposal, together with a new transitional measure.

26. The chairman of the RID/ADR/ADN Joint Meeting's working group on tanks introduced his document OTIF/RID/CE/GTT/2020/INF.4 with a new text proposal for the right-hand column of 6.8.2.2.4, which would require 4 bar man lids to be fitted only to tank-containers with a capacity of more than 40,000 litres. He explained that the proposal for a threshold of 40,000 litres originated from the tank-container industry (see also paragraph 8).

27. The chairman explained that the requirement for 4 bar man lids for tank-wagons had been introduced in order to prevent spray escaping from the dome covers as a result of liquid surge. The representative of the United Kingdom confirmed that this was the case. He added that no similar defects in liquid tightness had been noticed on conventional tank-containers, owing to the shorter length and the lower capacity.

28. The representative of Germany proposed that the requirement for 4 bar man lids on tank-containers fitted with surge plates could be dispensed with.

29. The representative of CEFIC considered a threshold of 40,000 litres to be arbitrary and called for a dome cover test pressure of 4 bar either for all tank-containers, or not to adopt this requirement for tank-containers. On the other hand, he found the compromise proposed by Germany acceptable. The chairman asked the representative of CEFIC to submit a corresponding proposal to the next session of the RID Committee of Experts' standing working group (video-conference, 24 to 26 November 2020).

30. The chairman of the RID/ADR/ADN Joint Meeting's working group on tanks pointed out that if this provision were also to apply to portable tanks, the UN Sub-Committee of Experts on the Transport of Dangerous Goods should first deal with it.

Surge movements

31. The representative of CEFIC called for the provision in 4.3.2.2.4 to be dispensed with in rail transport. This provision stipulates a minimum degree of filling of 80% or a maximum degree of filling of 20% for tank-containers. He explained that in the risk assessment, no critical surge movements had been detected in the S-curve tests either for tank-wagons, conventional tank-containers or extra-large tank-containers.

32. The representative of Germany referred to paragraphs 10 to 12 of his document OTIF/RID/CE/GTT/2020/INF.1, where the question is raised as to whether the findings from the risk assessment can be carried over for all the track geometries in the OTIF Member States, other tank/vehicle combinations, different tank volumes, different load densities and filling degrees other than those that had been tested (100%, 50% and 0%). He emphasised that the 1962 ORE report B57 had identified a filling degree of 75% as the most critical value.

33. The representative of CEFIC said that the study[1] referenced in the risk assessment cited a 50% degree of filling as the most critical value for the occurrence of surge movements. That was why this degree of filling had been chosen for the tests. Carriage in train-load consignments and specification of the route ensured that such tank-containers are only carried in rail transport. He underlined the competitive advantage rail transport would achieve if tank-containers could be carried by rail irrespective of the degree of filling.

34. Several national representatives conceded that the results of the tests called the relevance of the provision in 4.3.2.2.4 into question for rail transport, but pointed out that any proposal from CEFIC would have to answer the question of how tank-containers that do not meet the requirements of 4.3.2.2.4 can be prevented from being loaded onto a road vehicle. The representative of the Netherlands pointed out that a CEFIC proposal would also have to cover portable tanks, which, according to 4.2.1.9.6 (a), are subject to similar provisions in terms of the minimum and maximum filling degree.

35. The representative of Germany expressed a general reservation on the prospective CEFIC proposal, as there was some question whether the tests carried out with the degrees of filling chosen by CEFIC were sufficient to delete the provision in RID 4.3.2.2.4. In addition, such a proposal would have far-reaching consequences for intermodal transport. She also referred to CEFIC's previous argument, which emphasised the importance of intermodality.

36. The representative of CEFIC was asked to submit a proposal, taking into account the concerns expressed, to the next session of the RID Committee of Experts' standing working group (video-conference, 24 to 26 November 2020).

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1 *Jönsson, L.-O.: Method to evaluate safety against derailment due to sloshing in partially filled railway tank vehicles. In: Spiryagin, M., Gordon, T. J., Cole, C. U. McSweeney, T. (publishers): The dynamics of vehicles on roads and tracks. Proceedings of the 25th Symposium of the International Association of Vehicle System Dynamics (IAVSD 2017), Rockhampton, Queensland, Australia, 14-18 August 2017. Boca Raton: CRC Press, Taylor & Francis Group 2018, p. 907–912*.

Marking of carrying wagons fitted with reinforced spigots

37. The aim of marking carrying wagons fitted with reinforced spigots was to prevent extra-large tank-containers from being loaded onto unsuitable carrying wagons. At the last session of the working group, there was also a discussion on the marking of carrying wagons that have two external solebars (see report OTIF/RID/CE/GTT/2019-A, paragraph 45).

38. The representative of UIC said he would be submitting a progress report on the work on a new marking for carrying wagons fitted with reinforced spigots to the 12th session of the RID Committee of Experts' standing working group (video-conference, 24 to 26 November 2020). He would also provide information in the report on when a marking could be expected.

Load cases for carrying wagons

39. The chairman pointed out that standard EN 12663 made provision for load cases F1 and F2. F1 applied to wagons which could be used in free circulation, including in hump shunting, and which would have to be designed for acceleration values of 5g. F2 applied to wagons which are not allowed to be hump shunted and for which a design with an acceleration value of 2g was sufficient. The extra-large tank-containers on innovative carrying wagons were designed for 3g and could be moved over humps with retarders. It would therefore have to be clarified whether an intermediate class between F1 and F2 should be provided for this (see also report OTIF/RID/CE/GTP/2019-A, paragraph 52).

40. The representative of UIP said that a new marking would be available from 1 January 2021 which, according to the General Contract of Use for Wagons (GCU), is to be used for carrying wagons that can only be hump shunted when loaded (see Annex I). He was of the view that the innovative container carrying wagons would have to bear this marking in order to avoid their being hump shunted over installations not fitted with automatic retarders.

41. The representative of CEFIC said that both the extra-large tank-containers and the innovative carrying wagons had approval for all types of transport. Long term tests had not furnished any critical values. He explained that the innovative carrying wagons were fitted with reinforced spigots and long-stroke buffers. Accelerations on hump shunting facilities with automatic retarders were under 2g and on those without automatic retarders, they were under 3g. If innovative carrying wagons were no longer allowed to be hump shunted, this would lead to a modal shift to road transport. Conventional carrying wagons not approved for hump shunting were also hump shunted in practice.

42. The chairman summarised that the question of hump shunting was the responsibility of operators and did not have to be considered by this working group.

Strength of extra-large tank-containers

43. The chairman explained that tank-containers according to 6.8.2.1.2 and portable tanks according to 6.7.2.2.12 must be designed for acceleration values of 2g. These acceleration values are also prescribed by the International Convention for Safe Containers (CSC) and the UIC's International Railway Solutions (IRS). The extra-large tank-containers were designed for acceleration values of 3g so that they can be moved over hump shunting facilities with automatic retarders. If the intention was also for these extra-large tank-containers to be hump shunted at facilities with no automatic retarders, then they would have to be designed for 5g.

44. The representative of CEFIC said that in the long term tests and simulation, no acceleration values of 5g had been detected.

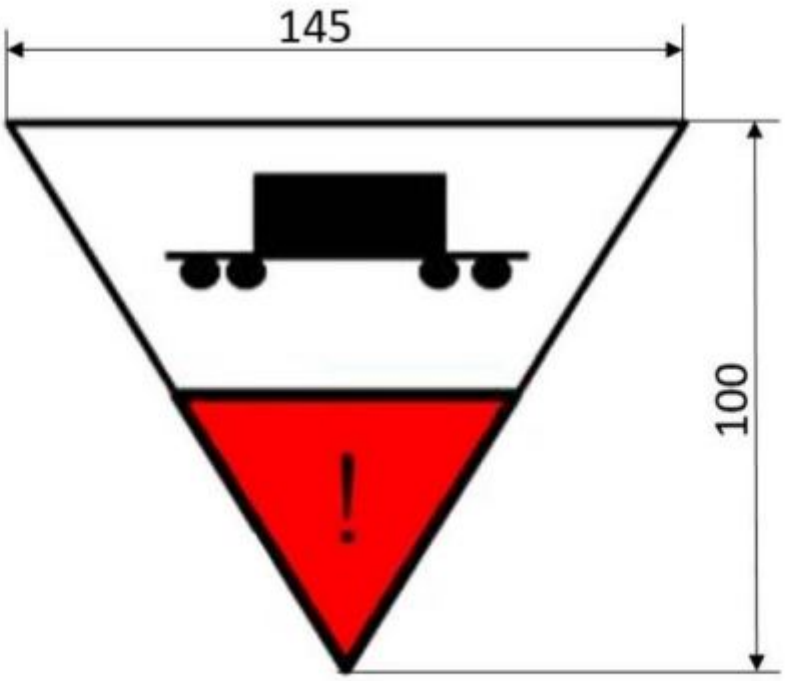
45. The chairman replied that in the tests, no hump shunting without automatic retarders had been carried out.

46. The working group agreed that tank-containers designed for acceleration values of 3g would also have to be covered in the container provisions of the CSC and IRS and in chapters 6.7 and 6.8 of RID/ADR. It might also be necessary to give some thought to a separate marking for containers designed for 3g. The RID Committee of Experts' standing working group should assess whether a new class for tank-containers that can be hump shunted should be defined in RID.

47. The representative of UIC was asked to provide clarification for IRS 50592, if possible.

Annex I

Pictogram for carrying wagons that cannot be hump shunted when loaded (according to the General Contract of Use for Wagons (GCU))



NB: Fly or hump shunting and buffing is not permitted when the wagon is loaded. Shunting may be performed without restriction when the wagon is empty.

Annex II

Liste des participants
Teilnehmerliste
List of participants

I. États parties au RID/RID-Vertragsstaaten/RID Contracting States

Allemagne/Deutschland/Germany

Ms Gudula **Schwan**
Mr Alfons **Hoffmann**
Mr Philipp **Unger**
Mr Frank **Jochems**

Autriche/Österreich/Austria

Mr Othmar **Krammer**

Belgique/Belgien/Belgium

Ms Caroline **Bailleux**
Mr Luc **Opsomer**
Mr Luc **Borstlap** (Van Hool)
Mr Kris **Dobbelaere** (Van Hool)

Bosnie-Herzégovine/Bosnien-Herzegowina/Bosnia-Herzegovina

Mr Nermin **Cabric**

Finlande/Finnland/Finland

Mr Jouni **Karhunen**

France/Frankreich/France

Ms Ariane **Roumier**
Mr Patrick **Caillet** (Magyar)
Mr Robert **Stawinski** (Magyar)

Iran

Ms Azadeh **Hajjar**
Mr Ali **Goharpour**
Mr Ali **Abdollahi**
Ms Fatemeh **Ashrafi**

Pays-Bas/Niederlande/Netherlands

Mr Soedesh **Mahesh**

Royaume-Uni/Vereinigtes Königreich/United Kingdom

Mr Arne **Bale**

II. États non parties au RID/Nicht-RID-Vertragsstaaten/Non-RID Contracting States

III. Organisations internationales gouvernementales/ Internationale Regierungsorganisationen/International governmental organisations

Commission européenne/Europäische Kommission/European Commission

Mr Roberto **Ferravante**

Agence de l'Union européenne pour les chemins de fer/Eisenbahnagentur der Europäischen Union/European Union Agency for Railways(ERA)

Mr Oscar **Martos**

IV. Organisations internationales non gouvernementales Internationale Nichtregierungsorganisationen International non-governmentalorganisations

CEFIC

Mr Thorsten **Bieker** (BASF)
Mr Marc Frederic **Schroeder** (BASF)
Mr Matthias **Gülker** (TU Berlin)

UIC

Mr Jean-Georges **Heintz**
Mr Joost **Overdijkink**

UIP

Mr Rainer **Kogelheide** (Président/Vorsitzender/Chairman) (selbstständiger Berater)
Mr Oliver **Behrens** (GATX)

UNIFE

Mr Tomasz **Szmidt**

V. Secrétariat/Sekretariat/Secretariat

Mr Jochen **Conrad** (OTIF)
Ms Katarina **Burkhard** (OTIF)

VI. Interprètes/Dolmetscher/Interpreters

Mr David **Ashman** (OTIF)