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Zwischenstaatliche Organisation für den internationalen Eisenbahnverkehr
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OTIF/RID/CE/GTT/2019-A

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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 17th session of the RID Committee of Experts' working group on
tank and vehicle technology**

(Ludwigshafen, 14 and 15 October 2019)

1. The 17th session of the RID Committee of Experts' working group on tank and vehicle technology was held on 14 and 15 October 2019 in Ludwigshafen.
2. The following RID Contracting States took part in the work of the 17th session of the working group on tank and vehicle technology (see also Annex II):

Austria, Belgium, Finland, France, Germany, Netherlands and Switzerland.

The following non-governmental international organisations were represented: The European Chemical Industry Council (CEFIC) 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 (Germany) chaired the meeting.

ITEM 1: Approval of the agenda

Documents: [RID-19012-CE](#) (Secretariat)

4. The provisional agenda contained in circular letter RID-19012-CE dated 14 August 2019 was adopted.

ITEM 2: Presentation and discussion of BASF's risk assessment of extra-large tank-containers in comparison with conventional tank-wagons and conventional tank-containers carried on conventional carrying wagons

- 4a. Before this agenda item was discussed, there was a tour of the BASF site in Ludwigshafen. During the tour, participants had the opportunity of seeing extra-large tank-containers loaded onto different carrying wagons, the driverless vehicles on which the extra-large tank-containers are moved around the site, and the tank-container terminal with around 600 stored extra-large tank-containers.

Informal document: INF.4 (BASF)¹
Presentation by the Technical University of Berlin²

- 4b. As an introduction, the representative of CEFIC pointed out that the system of carrying extra-large tank-containers on innovative container carrying wagons had been approved and had been in use in external customer traffic since 2015. The risk assessment carried out in accordance with the common safety method (CSM) for risk evaluation and assessment had been verified and certified by the notified body Bureau Veritas.

Presentation of the risk assessment

5. In a presentation, Professor Hecht (Technical University of Berlin) explained the risk assessment carried out on behalf of BASF, in which extra-large tank-containers loaded onto innovative container carrying wagons were compared with 20' tank-containers loaded onto conventional container carrying wagons, and with tank-wagons.

¹ The author of this informal document has not released it for publication on OTIF's website. It was only sent to registered participants before the meeting. The document can be requested from BASF using the procedure described in informal document [INF.3](#) of the standing working group.

² This presentation has not been released for publication on OTIF's website. It can be requested from BASF using the procedure described in informal document [INF.3](#) of the standing working group.

6. The risk assessment led to the following conclusions:
- The driving stability, **having regard to standard EN 14363** (straight track, curves and hump shunting) of innovative container carrying wagons loaded with extra-large tank-containers was comparable to the driving stability of tank-wagons and conventional loaded container carrying wagons;
 - No dangerous surge movements were noted in the tests that were carried out, so the provision in 4.3.2.2.4 (filling the tank-container to not less than 80% or not more than 20% of its capacity) was not relevant to tank-containers **when carried by rail**;
 - No damage to the strengthened spigots was noted **either during the long-term tests (operating between Ludwigshafen and Schwarzheide or Antwerp, hump shunting) or after the crash tests**, so **the strengthened spigots** were suitable for all carrying wagons;
 - After the hump shunting tests, no damage to other construction elements was noted, so the loaded innovative container carrying wagons were suitable for hump shunting;
 - Extra-large tank-containers loaded **onto container carrying wagons with external solebars** offered greater safety in the event of a side impact, **in which such a wagon is hit by a tank-wagon sideways on**, because the energy was transferred through the external solebars in the lower third, **thus also reducing the forces exerted on the shell. The lower leverage forces that resulted also reduced the risk of overturning.** The level of safety of carriage in tank-wagons **without external solebars** was **thus even** exceeded;
 - In frontal collisions, the minimum wall thickness **investigated here would not have had any effect on safety**, so it was not necessary to amend the provisions for the minimum wall thickness;
 - The minimum distance between the headstock plane and the most protruding point at the shell extremity on tank-wagons, as required in RID 6.8.2.1.29, was of no benefit in terms of safety compared with the extra-large tank-containers, so this provision was not necessary either for conventional tank-containers or for extra-large tank-containers;
 - The protective aim of special provisions TE 22 and TE 25 for equipment could be achieved by significantly increasing the distance between the buffers and the end of the tank.

Discussion

7. Some participants regretted the fact that informal document INF.4 had only been available one week before the meeting, so it had not been possible to examine this complex subject intensively. In addition, the informal document only set out the conclusions. The experts had to be in a position to carry out a detailed investigation of the test results. For this reason, the discussions that took place at this meeting could only be considered as provisional.
8. The representative of CEFIC explained that before informal document INF.4 had been distributed, the results of further simulations of a side impact had been awaited, in which a tank-wagon collides sideways with an innovative container carrying wagon on which an extra-large tank-container is loaded. He asked participants to understand that both informal document INF.4 and the **extensive** report behind it **from the Technical University of Berlin** contained confidential commercial information that had to be protected.
9. The representative of CEFIC offered to make the **research report from the Technical University of Berlin**, informal document INF.4 and the presentation by the Technical University of Berlin available to representatives of the authorities in the working group on tank and vehicle technology and in the RID Committee of Experts' standing working group, with a confidentiality notice and with certain parts blacked out.

10. Informal document [INF.3](#) for the next session of the standing working group explains how these documents can be requested.
11. The representative of CEFIC also pointed out that his association did not consider itself to be under an obligation to provide information, as both the tank-containers and the container carrying wagons complied with the provisions in force. His association nevertheless had an interest in having certain conclusions reflected in the provisions.
12. The representative of Germany replied that the provisions for tank-containers had been developed in the 1970s, when tank-containers had a considerably lower capacity (see also paragraph 19).
13. The working group also regretted that ERA, which had requested an investigation in accordance with the Common Safety Method on Risk Evaluation and Assessment (CSM), was not represented at this meeting.
14. The representative of Switzerland reminded the meeting that he had submitted informal document [INF.18](#) to the 8th session of the standing working group (Utrecht, 20 to 24 November 2017), which contained some preliminary questions in relation to extra-large tank-containers.
15. One of these questions was whether the risk resulting from this new system was acceptable. **The representatives of Switzerland and Belgium were of the view that this question could now be answered in the affirmative. The representatives of Switzerland and Belgium considered that it was necessary to hold further discussions on any amendments to the provisions of RID that might be necessary. This might also concern the RID/ADR/ADN Joint Meeting if the provisions on the degree of filling had to be amended.**
16. The representative of Germany was of the view that it was not apparent from the information made available whether the existing regulations, particularly with regard to the minimum wall thickness, were sufficient for the extra-large tank-containers.
17. The representative of UIP pointed out that the test setup chosen for the overriding of buffers assumed that a wagon could only move up against the wagon in front until the bogie of the overriding wagon came into contact with the buffers on the wagon in front. However, there were accident scenarios in which the bogie was wrenched off, in which case there was nothing to stand in the way of the buffers being overridden.
- 17a. The representative of CEFIC replied that, irrespective of how the bogie behaved, it was clear from the film that with a distance of more than 90 cm, the tank would no longer be touched at all. Irrespective of how the bogie behaved, because of friction the impact on the tank end would at least be very considerably reduced as a result of the very large distance. Also bearing in mind the fact that the impact without the large distance (90 cm) only resulted in a 90 litre deformation of the tank-container, it had been clearly proved that a larger distance (90 cm) would provide a comparable level of safety to TE 25.**

ITEM 3: Reducing the shell thickness

18. The Chairman recalled that RID 6.8.2.1.18 prescribed 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 had a wall thickness of 3.4 mm **in the cylindrical area of the tank** and those made by Magyar had a wall thickness of 4.5 mm. He asked how this issue should be taken forward, given that the RID/ADR/ADN Joint Meeting's tank working group had referred it back to the working group on tank and vehicle technology (see [OTIF/RID/RC/2018-A](#), paragraphs 27 to 35).

19. The representative of Germany said that this was a fundamental question. The construction provisions for the tanks of tank-containers had been developed in the 1970s on the basis of the tank-containers that existed at that time. For extra-large tank-containers with two and a half times the capacity, these provisions would have to be reassessed.
20. The representative of CEFIC was of the view that the minimum wall thickness of 4.5 mm prescribed in RID for the tanks of tank-wagons had been laid down without any scientific basis. However, experience at that time had shown that this minimum wall thickness is necessary, because some of the longitudinal forces are also absorbed by the tank, particularly in design types where the tank-wagon only has one central solebar. **He was of the view that a wall thickness of 3.0 mm for conventional tank-containers and extra-large tank-containers should be maintained, provided they were loaded onto carrying wagons with external solebars, which was usually the case at present. If carrying wagons with only one central solebar were to be approved in future, these carrying wagons should only be allowed for the carriage of tank-containers with a wall thickness of at least 4.5 mm.**
21. The representative of Belgium explained that the high-grade steel used for the extra-large tank-containers made by Van Hool, with a wall thickness of 3.4 mm, was more stable against penetration than mild steel with a wall thickness of 6 mm.
22. The working group noted that no provisions concerning the use of carrying wagons could be included in RID. The standing working group was asked to develop a proposal for a protective aim and to refer this issue to the Joint Coordinating Group of Experts (JCGE) with the request to deal with it as a priority.

ITEM 4: Fixing of welded elements

23. The Chairman recalled that according to RID 6.8.2.2.1, on tank-wagons, the attachments of equipment which is welded on must be made in such a way that the shell is prevented from being ruptured as a result of stresses caused by an accident.
24. The working group recommended proposing to the RID/ADR/ADN Joint Meeting's tank working group that this requirement also be included for tank-containers.

ITEM 5: Pressure resistance of closures on the shell

25. The Chairman reminded the meeting that for tank-wagons, RID 6.8.2.2.4 prescribes a certain pressure resistance for the closures of openings. He also recalled that the RID/ADR/ADN Joint Meeting's tank working group had already pointed out that owing to their being longer, higher pressures could occur in extra-large tank-containers than in conventional tank-containers as a result of surge movements (see [OTIF/RID/RC/2018-A](#), paragraph 32).
26. The representative of Belgium again confirmed that the extra-large tank-containers that already existed met this requirement and that conventional tank-containers were also currently built with a calculation pressure of not less than 4 bar, so the working group recommended to the RID/ADR/ADN Joint Meeting's tank working group that this requirement also be included for tank-containers.

ITEM 6: Vehicle technology issues

a) Design of spigots and marking of carrying wagons fitted with reinforced spigots

27. With regard to the issue of marking carrying wagons fitted with reinforced spigots, the representative of CEFIC informed the meeting that this was still being discussed within UIC.
28. UIC's decision would have to be awaited, including with respect to the marking of carrying wagons with two external solebars (see paragraph 45).

b) Minimum distance between the headstock plane and the shell

29. The Chairman recalled one of the conclusions of the risk assessment, according to which the minimum distance between the headstock plane and the most protruding point at the shell extremity, as required by RID 6.8.2.1.29, had no positive effect (see paragraph 6).
30. None of the delegations expressed an opinion on this point. It therefore remains on the agenda, as it will also have to be checked whether this requirement can be dispensed with for tank-wagons.

c) Energy absorption elements and protection against overriding

31. The Chairman pointed out that the innovative container carrying wagons were fitted with long stroke buffers. These were necessary, because the reinforced spigots were only designed for accelerations of up to 3 g. However, they could not be considered as a replacement measure for special provision TE 22.
32. With regard to protection against overriding, reference was made to the discussion on informal document INF.3 (see paragraph 44).
33. The representative of Belgium pointed out that various measures of special provision TE 25 could also be implemented for tank-containers. Thus it would be possible to prescribe tank ends with a higher wall thickness or sandwich covers on the tank ends for tank-containers as well.

ITEM 7: Presentation and discussion of a proposal by Germany to resolve the future arrangements for the approval procedure of RID tank-wagons

Informal document: [INF.1](#) (Germany)

34. The representative of Germany introduced informal document INF.1, which contained the results of the national ad hoc working group on the future form of the approval procedure for RID tank-wagons and a proposal to amend the text of footnote 1 to 6.8.2.1.2. The ad hoc working group had established that the calculation provisions and the load cases to be considered in each case in standards EN 12663-2:2010 and EN 14025 are based on very different design concepts and should not be mixed up. It had endorsed the decision of the 10th session of the standing working group no longer to take account of the decision of its 2nd session with regard to the permissible stresses when assessing the ability of tank-wagons to withstand stresses.
35. The ad hoc working group had pointed out that as a rule, the competent bodies for the tests according to the TSI or UTP are not accredited to check that the provisions of RID have been complied with. The ad hoc working group had agreed that when assessing the ability of tank-wagons to withstand stresses, the following points would also have to be taken into account in addition to the requirements of the TSI and UTP referred to in footnote 1 to 6.8.2.1.2:
 - Maximum working pressure of the tank to be superimposed on the load cases,
 - Operating temperature range of the tank,
 - Minimum wall thickness of the tank,
 - Special provisions TE 22 and TE 25 and
 - Tank liner.

The ad hoc working group had been of the view that standard EN 12663-2:2010 would have to be supplemented with the first four points so that all the tests to be carried out were covered by the scope of accreditation of the respective competent bodies. In parallel, standard

EN 14025 should be supplemented with suitable verification processes for the strength of liners.

36. The Chairman said that these two standards could be supplemented during the revision that was already planned for next year.
37. As an interim solution, Germany proposed an amendment to footnote 1 to 6.8.2.1.2 to make the applicable requirements more specific (see annex I).
38. The representative of UIP pointed out that the text proposed by Germany did not contain any threshold values to be complied with and that this could lead to different interpretations by the competent authorities. He added that there was not yet any procedure for checking the strength of the liner and was of the view that before RID was amended, the principles should first be dealt with in the relevant standards.
39. The representative of Germany confirmed that the standardisation work was essential. However, he was still of the view that making the text more specific, as proposed, would assist the competent authorities in the approval procedure and that this could be done already, irrespective of the standardisation work.
40. The working group thought the points proposed by Germany were correct. The Chairman asked the representative of UIP to submit an alternative text proposal to the next session of the standing working group, if necessary.
41. The Chairman of the working group and the representative of Germany said they were prepared to draft a proposal to amend or supplement standards EN 12663-2:2010 and EN 14025 and submit it to the standardisation bodies.

ITEM 8: Any other business

UIP position paper

Informal document: [INF.3](#) (UIP)

42. In his informal document, the representative of UIP recalled that in the past, experience in the carriage of dangerous goods, particularly in tank-wagons, had contributed to the further development of RID in this area. In particular, this had led to the inclusion of special provisions TE 22 and TE 25 for the equipment on tank-wagons. Consequently, when introducing new transport technologies, such as the deployment of extra-large tank-containers, care should be taken to ensure that the provisions of RID do not discriminate against certain means of transport. So if a minimum wall thickness of 3 mm were considered sufficient for extra-large tank-containers, this lower minimum wall thickness would also have to be allowed for tank-wagons.
43. The representative of CEFIC replied that for extra-large tank-containers, 3 mm would be considered sufficient if the carrying wagon has external solebars. In contrast, there had to be higher wall thicknesses for tank-wagons if they do not have external solebars (see also paragraph 20).
44. In reply to another point mentioned by the representative of UIP during the presentation on his document, the representative of CEFIC said that special provision TE 25 did not currently apply to intermodal transport. If this special provision were to be introduced for intermodal transport, it would have to be done in a workable manner. For example, a minimum distance between the headstock and the tank end of the tank-container or tank-wagon could meet the protective aim of limiting damage resulting from the overriding of buffers. However, this measure would also have to apply to **all tank-containers**, so that for substances for which special provision TE 25 is given, only two tank-containers could be loaded onto a carrying wagon **for example**, instead of three, **because of the larger distance to the buffers**.

45. The representative of UIP asked how it could be ensured during operation that extra-large tank-containers are only loaded onto suitable carrying wagons. The representative of CEFIC said that a clear marking was necessary to ensure this (see also paragraphs 27 and 28).

Equivalence of the USA's construction and testing provisions for tank-wagons

Informal document: [INF.2](#) (Secretariat)

46. With informal document INF.2, the Secretariat submitted standing working group document OTIF/RID/CE/GTP/2019/1 to the working group for a preliminary discussion.
47. The representative of Germany pointed out that for the 14th session of the working group on tank and vehicle technology (Hamburg, 12 and 13 April 2016), Germany had already investigated the provisions in Canada and the USA that apply to the construction and retrofitting of tank-wagons for the carriage of flammable liquids and whether they were relevant to RID. The basis for the discussion was document [OTIF/RID/CE/GTT/2016/1](#), which showed the North American and RID provisions in a table side by side. However, as that investigation had only covered tank-wagons for flammable liquids, Germany was of the view that it would be useful to commission a research project for an overall comparison of the construction and testing provisions for tank-wagons in both systems, if sufficient financial resources were available.
48. The Chairman added that a comparison of all the applicable requirements worldwide might be useful as well.
49. The Chairman reminded the meeting that when the North American provisions had been examined in 2016, as mentioned previously, it was already concluded at that time that both systems would ensure sufficient safety, but that they were difficult to compare, not least because of their different infrastructure and operating conditions (e.g. ambient temperature range).
50. If the Cooperation Council for the Arab States of the Gulf (GCC) and its Member States were to accede to COTIF, the working group thought one possibility would be to restrict the use of tank-wagons built according to the USA provisions either regionally or nationally. In principle though, the states concerned should consider whether it might not be more appropriate in future to move towards the rules of RID, particularly with a view to cross-border traffic between the GCC states and the RID Contracting States.
51. In reply to the question as to whether references to regionally applicable CEN standards should increasingly be replaced in future by globally applicable ISO standards, the working group tended not to agree. There was concern that the weak European representation in the worldwide standardisation bodies could lead to loss of control over the regulations.
52. As there is no through rail transport between Europe and North America, the working group was of the view that the provisions do not need to be harmonised. However, if any far-reaching changes were adopted for the North American system in future, it should be checked whether these changes are relevant to RID, as was done in 2016 for tank-wagons for flammable liquids.
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Draft amendments to RID to enter into force on 1 January 2021

6.8.2.1.2 Amend footnote 1 to read as follows:

"1 This requirement is deemed to be met if

(a)

- the notified body in charge of verifying compliance with the technical specification for interoperability (TSI) relating to the subsystem "rolling stock – freight wagons" of the rail system in the European Union (Commission Regulation (EU) No 321/2013 of 13 March 2013) or
- the assessing entity in charge of verifying compliance with the uniform technical prescriptions (UTP) applicable to the Rolling Stock subsystem: FREIGHT WAGONS – (Ref. A 94-02/2.2012 of 1 January 2014)

has successfully evaluated ~~compliance with the provisions of RID~~ the requirements listed below, in addition to the requirements of the TSI or UTP mentioned above, and has confirmed this compliance by a relevant certificate:

(1) That the maximum working pressure of the tank has been superimposed on the load cases applicable to the assessment of the ability to withstand stresses

(2) That the operating temperature range of the tank has been taken into account in the load cases applicable to the assessment of the ability to withstand stresses

(3) That the minimum wall thickness of the tank in accordance with RID 6.8.2.1 and 6.8.2.6 has been taken into account in the load cases applicable to the assessment of the ability to withstand stresses

(4) Special provisions TE 22 and TE 25 in accordance with RID 6.8.4

and for tanks with a liner

(b)

That the competent authority for the design type test in accordance with RID 6.8.2.3.1 or a body designated by that authority has tested and certified the ability of the liner to withstand the stresses in the load cases applicable to the assessment of the tank's ability to withstand stresses. The necessary data on the assessment of the ability to withstand stresses (particularly the maximum elongations in the tank walls for all relevant load cases and, if necessary, their combinations) shall be made available to the competent authority."

Liste des participants
Teilnehmerliste
List of participants

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

Allemagne/Deutschland/Germany

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Mr Benjamin **Körner**
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)

Finlande/Finnland/Finland

Mr Jouni **Karhunen**

France/Frankreich/France

Mr Patrick **Caillet** (Magyar)
Mr Robert **Stawinski** (Magyar)

Pays-Bas/Niederlande/Netherlands

Mr Arjan **Walsweer**

Suisse/Schweiz/Switzerland

Mr Colin **Bonnet**
Mr Claude **Despont**

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

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

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

**IV. Organisations internationales non gouvernementales
Internationale Nichtregierungsorganisationen
International non-governmental organisations**

CEFIC

Mr Thorsten **Bieker** (BASF)
Mr Holger **Schmiers** (BASF)
Mr Harald **Schlegel** (BASF)
Mr Marc Frederic **Schroeder** (BASF)
Mr Markus **Hecht** (TU Berlin)
Ms Irmhild **Saabel** (WASCOSA)

UIP

Mr Rainer **Kogelheide** (Président/Vorsitzender/Chairman) (selbstständiger Berater)
Mr Oliver **Behrens** (GATX)
Mr Philippe **Laluc** (Ermewa)
Mr Ernst **Winkler** (Gefahrtgutberatung Schwerzenbach (CH))

V. Secrétariat/Sekretariat/Secretariat

Mr Jochen **Conrad** (OTIF)
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VI. Interprètes/Dolmetscher/Interpreters

Mr David **Ashman** (OTIF)
