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

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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 19th session of the RID Committee of Experts' working group on tank and vehicle technology (Berne/hybrid, 22 November 2022)

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1. The 19th session of the RID Committee of Experts' working group on tank and vehicle technology was held as a hybrid meeting in Berne on 22 November 2022. Delegates were able to attend in person or take part remotely.

2. The following RID Contracting States took part in the work of the 19th session of the working group on tank and vehicle technology (see also Annex I):

   Austria, Belgium, Finland, France, Georgia, Germany, Italy, Latvia, Luxembourg, Netherlands, Spain, Switzerland, Türkiye 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 International Union of Wagon Keepers (UIP) and the International Union of Combined Road-Rail Transport Companies (UNIFE).

   Mr Stefan Hagenlocher (*hwh Gesellschaft für Transport- und Unternehmensberatung mbH*) and Mr Christian Radewagen (Voith Group) were invited as guests.

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) is the Chairman of this working group until further notice.

ITEM 1: Approval of the agenda

Document: RID-22009-CE (Secretariat)

4. The provisional agenda contained in circular letter RID-22009-CE dated 19 September 2022 was adopted.

5. The Secretary General of OTIF, Mr Wolfgang Küpper, opened this session of the working group. He recalled the long history of the working group, whose work had led to enormous safety gains in the carriage of dangerous goods by rail. He welcomed the intended introduction of digital automatic coupling, which represented an important technological advance for rail transport and would significantly increase the competitiveness of rail as a mode of transport. Even if the new technology could not be compared with the existing technology in terms of safety and parts of the technical vehicle regulations contained in RID are adapted to the current state of the art, falling below the existing safety level should be avoided. Although the overriding of buffers could no longer occur, other risks could arise as a result of the new technology, and these risks would certainly have to be eliminated in advance.

ITEM 2: Extra-large tank-containers

Informal document: OTIF/RID/CE/GTT/2022/INF.2 (Germany)

6. In his informal document INF.2, the representative of Germany informed the meeting that the research project on the effects of surge movements in rail traffic would be awarded in 2023.

7. The representative of Germany explained that the research project was intended to provide a fundamental understanding of surge behaviour. In particular, various conditions, such as the geometry of the route, the speed, the tank design type, viscosity of the substance and the interaction of transverse to longitudinal surge would be considered. The work was expected to take two years, so the result could be presented at the beginning of 2025.

8. Delegations were again asked to indicate quickly which further investigations they wished to be included in this research work. The representative of Cefic said that he would contact the German delegation in this regard.

Informal document: OTIF/RID/CE/GTT/2022/INF.4 (Cefic)

9. The representative of Cefic introduced his informal document INF.4, which reported on experience with using extra-large tank-containers. He explained that the tank-containers used for the transport of dangerous goods were designed for 3g.

10. The Chairman was of the view that for hump shunting, it had to be ensured that the container carrying wagons were equipped with L buffers and with spigots that were also designed for 3g. It would also have to be ensured that no acceleration values above 3g could occur.

11. The working group agreed that this value should be prescribed in RID 6.8.2.1.2. The representatives of Cefic and UIP said they were prepared to submit a proposal to this effect to the next session of the RID/ADR/ADN Joint Meeting.

ITEM 3: Definition of protective aims in RID replacing the provisions of 6.8.2.1.29 (minimum distance between the headstock plane and the shell) and special provisions TE 22 (energy absorption elements) and TE 25 (protection against overriding)

12. The working group decided not to formulate definitions of protective aims in RID to replace the provisions of 6.8.2.1.29 and special provisions TE 22 and TE 25 until it was known which regulations would contain the corresponding technical provisions.

ITEM 4: Requirements for wagons equipped with digital automatic coupling or requirements for these couplings (see report OTIF/RID/CE/GTP/2022-A, paragraphs 23 to 27).

13. Mr Radewagen from Voith introduced the new digital automatic coupling (DAC) technology. He pointed out that in contrast to wagons with buffers, where the energy is absorbed on both sides, the energy dissipation of wagons with DAC took place in the middle, in the so-called UIC pocket. He explained that when the DAC is coupled, the claw of one wagon goes under the front plate of the next wagon and can also compensate for a difference in height between the two adjacent wagons.

14. In order to be able to meet the requirements of special provision TE 22 applicable to gas tank-wagons for wagons equipped with DAC, he proposed to use DAC AX, i.e. standard DAC with an elastic (reversible) energy absorption capacity of 75 kJ and an energy absorption element with a plastic (irreversible) energy absorption capacity of 600 kJ.

15. In response to a question, Mr Radewagen explained that the previous requirements for the energy absorption capacity of A buffers, C buffers and long-stroke buffers had been carried over to the requirements for DAC A, DAC C and DAC L.

16. The Chairman explained that the so-called UIC pocket had already been taken into account on most freight wagons, so that the wagons could be fitted with central buffer couplings at a later date. For newer wagons already built in accordance with the requirements of the TSI WAG, this free space was not available, which made retrofitting with DAC somewhat more complex.

Informal documents: OTIF/RID/CE/GTT/2022/INF.1 (ERA)
OTIF/RID/CE/GTT/2022/INF.3 (Germany)

17. The working group discussed ERA's informal document INF.1, which reflected the discussions at ERA's workshop on 12 October 2022. In so doing, it took into account the protective aims set out in Germany's informal document INF.3, which had been established at previous meetings of the working group.

RID 6.8.2.1.29 – Minimum distance between the buffer beam and the tank

18. 6.8.2.1.29 requires a minimum distance of 300 mm between the headstock plane and the most protruding point at the shell extremity on tank-wagons.

19. The representative of ERA explained that this provision was intended to prevent the buffer from penetrating the tank in the event of the buffers overriding. As the overriding of buffers could be ruled out with DAC, this gap was no longer necessary. In addition, the buffer beam that used to be on wagons would no longer appear on new-build wagons because the transfer of energy would take place in the middle.

20. Those participants who took the floor saw no need to maintain this requirement for wagons equipped with DAC because the overriding of buffers would not occur.

RID 6.8.3.1.6 – C buffers on gas tank-wagons

21. Tank-wagons and battery-wagons for the carriage of gases must be fitted with buffers with a minimum energy absorption capacity of 70 kJ (C buffers). In the past, this requirement was carried over into RID from a UIC leaflet. C buffers could be dispensed with if the wagon is already equipped with an energy absorption element in accordance with special provision TE 22.

22. The representative of UIP pointed out that the energy absorption capacity of a DAC C (140 kJ), which was the equivalent of C buffers, was achieved by a hydraulic element, but it was very expensive to maintain. In addition, the effectiveness of the hydraulic element depended very much on the impact speed.

23. The working group was of the view that it would make sense also to stipulate DAC AX for the few tank-wagons and battery-wagons for the carriage of gases for which energy absorption elements are not prescribed at present, as this solution was more cost-effective and in the past, the industry had already chosen energy absorption elements instead of C buffers.

24. The participants who took the floor also agreed with this proposal from a cost point of view.

Special provision TE 22 – Energy absorption capacity of 800 kJ at each end of the wagon

25. The Chairman explained that the UIC pocket allowed for DAC AX with a total energy absorption capacity of 675 kJ (see paragraph 14). Owing to the limited space, it was not possible to have a greater energy absorption capacity without having to impinge on the construction of the chassis.

26. The representative of UIP was of the view that the energy absorption capacity of 800 kJ for conventional wagons would only be achieved in ideal cases. On curves, only a considerably lower value could be achieved because the main load is absorbed by a single buffer.

27. The representative of Germany reminded the meeting that in the past, when specifying requirements, the meeting had always been guided by the components available on the market.

28. Those participants who spoke were of the view that a DAC AX should be required for the carriage of those substances to which special provision TE 22 currently applies. The energy absorption capacity of 125 kJ less was justifiable from a safety point of view.

Special provision TE 25 – devices to protect against the overriding of buffers

29. Special provision TE 25, which applies to tank-wagons for toxic gases and for liquids requiring a calculation pressure of 15 or 21 bar, allows several measures to be taken to prevent overriding of buffers or to limit the damage caused by overriding of buffers. One of the measures described in paragraphs (a) to (e) has to be selected. The measure in special provision TE 25 (a) requires, among other things, that overriding buffer protection devices withstand a vertical force of 150 kN.

30. The Chairman recalled that according to Voith, DAC would achieve the required 150 kN. Furthermore, safe locking of DAC up to a speed of 36 km/h is ensured. The requirement of special provision TE 25 (a) was therefore met and all wagons equipped with DAC could be marked "TE 25".

31. The representative of Belgium criticised the fact that this would mean that the measures in paragraphs (b), (c) and (d) of special provision TE 25, i.e. increasing the wall thickness of tank ends, sandwich covers on tank ends and protective shields, would no longer be implemented in future. She was concerned that this would reduce safety.

32. The Chairman reminded the meeting of the additional measures required in Switzerland for the carriage of chlorine, which had resulted from risk analyses. He noted that DAC complied with the current wording of special provision TE 25. Discussions on further measures under paragraphs (b) to (d) of special provision TE 25 would have to take place on the basis of a separate document. He invited those delegations that were interested to prepare such a document.

Electrical energy supply for wagons

33. Mr Hagenlocher from the consulting firm hwh explained that the electrical energy system provided by DAC is operated with 400 V alternating current. On each wagon, this was transformed to 48 V direct current with buffering in a battery. He specified that the European DAC Delivery Programme (EDDP) had already defined use cases in connection with the introduction of DAC, e.g. automatic detection of wagon order, electronic brake test, automated train integrity check. It was clear to the developers that protection from explosions had to be ensured for dangerous goods wagons. New operational instructions would also have to ensure that the electrical power supply was switched off when entering filling facilities.

34. The representative of ERA reiterated that the specific risks resulting from high voltage would be dealt with at the ERA workshop on 1 December 2022.

35. The representative of Cefic explained that his association was also dealing with the issue of explosion protection and would submit a document on this to the next session of the working group.

Domino effect on trains with central buffer coupling

36. The representative of the United Kingdom asked whether the domino effect observed in derailments in North America, in which many wagons in the train set had overturned because of the rigid coupling, had been taken into account in the development of DAC. He explained that these accidents had led to a revision of the design of North American couplings, which now allow the coupler to twist or rotate reducing the transmission of torque.

37. The Chairman explained that the Scharfenberg coupling chosen for DAC was different from the North American coupling. In addition, the centre of gravity of North American wagons is higher, which results in the wagons overturning more easily.

38. Mr Radewagen from Voith explained that calculations in this respect were still being carried out in connection with DAC. If the same risks were to arise as in North America, a torque limit would have to be set.

ITEM 5: Any other business

39. The working group decided not yet to set a date for the next meeting of the working group.

Annex I

Liste des participants
Teilnehmerliste
List of participants

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

Allemagne/Deutschland/Germany

Mr Alfons **Hoffmann**
Ms Linda **Rathje-Unger**
Mr Valeri **Voth**
Mr Luciano **Inama**
Mr Andreas **Würsig**
Mr Thomas **Buder**

Autriche/Österreich/Austria

Mr Othmar **Krammer**

Belgique/Belgien/Belgium

Ms Caroline **Bailleux**
Mr Luc **Opsomer**

Espagne/Spanien/Spain

Ms Monica **Perez**
Mr Ignacio **Álvarez**

Finlande/Finnland/Finland

Mr Jouni **Karhunen**

France/Frankreich/France

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

Géorgie/Georgien/Georgia

Mr Giorgi **Katsitadze**

Italie/Italien/Italy

Ms Mariella **di Febbo**
Mr Benedetto **Legittimo**
Ms Stefania **Fabozzi**
Mr Mattia **Madrigale**
Mr Valentino **Rinaldi**
Mr Andrea Giuseppe **Ercole**

Lettonie/Lettland/Latvia

Mr Dainis **Lācis**
Mr Juris **Pakalns**
Mr Valerijs **Stuppe**

Luxembourg/Luxemburg/Luxembourg

Mr Iliass **Zerktouni**

Pays-Bas/Niederlande/Netherlands

Mr Soedesh **Mahesh**

République tchèque/Tschechische Republik/Czech Republic

Ms Alena **Zátopková**

Royaume-Uni/Vereinigtes Königreich/United Kingdom

Ms Anita **Moinizadeh**
Mr Arne **Bale**

Suisse/Schweiz/Switzerland

Mr Claude **Despont**

Türkiye

Mr Bülent **Eyyüpoğlu**
Mr Saim Kemal **Erol**
Mr Nejmi **Ergücü**

II. 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**

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

Cefic

Mr Marc Frederic **Schroeder** (BASF)

UIC

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

UIP

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

IV. Invités
Gäste
Guests

Mr Stefan **Hagenlocher** (hwh Gesellschaft für Transport- und Unternehmensberatung mbH)
Mr Christian **Radewagen** (Voith Group)

VI. Secrétariat/Sekretariat/Secretariat

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

VII. Interprètes/Dolmetscher/Interpreters

Mr David **Ashman** (OTIF)
Ms Laura **Keller**