

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods

Ninety-sixth session

Geneva, 6–9 May 2014

Item 8 of the provisional agenda

Any other business

26 March 2014

Report of the informal working group on electrical vehicle systems

Transmitted by the Government of the Netherlands

The informal working group met in Delft, the Netherlands on the 11th and 12th of February. The meeting was attended by delegations from France, Sweden, United Kingdom, Germany and the Netherlands, and experts from NGO's presenting CLCCR, CLEPA and OICA. The working group was chaired by Mr. de Putter of the Netherlands.

The working group based its work on the mandate given by the WP.15 during its 95th session of November 2013.

The mandate was worded as follows:

- the existing requirements of part 9 concerning the electrical vehicle systems.
- the interaction between chapters 9.2, 9.3, 9.7 and 9.8. In particular the “ relevant” requirements of subsection 9.7.8.1 as amended by the 95th session of WP.15.
- If new requirements are needed to take the progress of (vehicle) technology into account.

Attached to this report is an annex containing details of proposed amendments and questions from the working group that need confirmation or further discussion in WP.15.

Summary:

An important issue in the discussion was the identification of the purpose of the various provisions. It was asked whether these provisions still had an added value and whether the applicability to the categories of vehicle to which the provisions were assigned was still appropriate.

No subsections were found to be obsolete but several areas were identified as being in need of improvement. Also new developments and risks have been identified.

In order to have free discussion no text proposals were prepared beforehand. For a number of provisions new wording has been suggested during the working group, for others issues new wording needs to be drafted or additional information is needed. In particular for some EX vehicle issues the validation by explosive experts was deemed to be necessary (see annex 1)

The provisions concerning the electrical connections[connectors] in 9.2.2.6.3, for which a reference to an additional standard was approved for ADR 2015, were considered by some delegates to be in need of urgent redrafting, reference to individual standards was

considered to be unnecessary restrictive and developments will require constant inclusion of additional referenced standards. Also developments in the field of automatic trailer coupling systems were mentioned.

Some delegates regretted the limitation of the scope to electrical systems because there were more issues concerning the approval of vehicles that needed attention. These issues were addressed shortly and reproduced under Any Other Business.

The WP.15 is kindly requested to discuss the open issues stated in Annex 1 and to agree to the continuation of the working group to work on revised wording and the additional issues identified under Any Other Business.

Report:

Three different circumstances that a vehicle carrying dangerous goods can be in were defined in a presentation. This were

- normal use conditions, a vehicle carrying goods on the road;
- an accident situation, like a collision or overturning of the vehicle
- handling of goods in a place where an explosive situation could occur.

All relevant subsections dealing with the electrical system were discussed with these three situations in mind to determine the purpose of the requirement. Also for each subsection it was asked whether it was still relevant and subsequently if it could be withdrawn or not, in the last case it was queried whether the vehicle categories as given in chapter 9.1 are justifiable. It appeared that the subsections dealing with wiring, wiring behind the cab, batteries, lighting and electrical connectors all dealt with the vehicle in the normal driving condition. The Battery Master Switch and permanently energized circuits were specific for handling of goods in places of handling of the goods carried, where an explosive atmosphere could occur. Finally the additional requirements for EX vehicles can be seen as a separate group where expertise from explosive experts is required.

Concerning wiring it was decided to keep the provision in 9.2.2.1 and 9.2.2.2. Although so basic that every manufacturer would comply regardless of this provision it was found to have additional value.

As it was so basic it was discussed why it should not apply to EX/II vehicles also. It was decided to ask OICA if this would pose problems in particular concerning panel vans. Several suggestions were made to improve the wording. It was also noted that 9.2.2.2.1 was not in the table of 9.2.1.1.

It was stated that additional electrical equipment was used in the driver's cab which was powered by the cigarette lighter plug. For example road taxation boxes which also contained Lithium-ion batteries which are plugged into the cigarette lighter were identified as a potential risk. Because of developments in the electrical system of vehicles connecting electrically in the vehicle wiring needs special manufacturer approved connectors, ensuring that there is control over adding comfort accessories for the driver.

There was also support for maintaining the provisions in 9.2.2.6.1 for the additional protection of wiring behind the cab. There was discussion on the correctness of the four examples but in the end it was agreed to keep them as they stand. It was also asked whether the requirement should be made applicable to all categories of vehicles because in principle the danger arising from a defective vehicle is no different for class 3 substances than for class 6.1 substances. It was decided to bring this topic to the attention of the WP.15 for a decision.

There was also support for maintaining the provisions concerning batteries in 9.2.2.4. It was concluded that where in the past there was only the battery for the vehicle engine, now batteries appeared in other places in the vehicle as well. An example was batteries in the cabinet of fuel tankers to energize the (capacity) measuring system. These batteries require additional protection for that zone in an explosive atmosphere. The wording dealing with the venting capability of the battery box, should be revised depending on the type and position of the battery.

For EX/III and FL vehicles it is stated in 9.2.2.6.2 that no screw cap lamp(bulbs) were allowed. It was questioned if this was still necessary, taking all the vehicle regulations of WP.29 into account. It was felt however that there was an uncertainty as to what would happen in practice and that the wording could be improved to better express the intention.

For electrical connectors it was stated that un-intended disconnection was the major issue. If this is the case it was questioned how this could be justified as only important for EX/III or FL vehicles. A defect leading to a less safe vehicle (ABS, Lighting etc.) is just as dangerous for EX/II, AT or OX. It was also felt that the requirement was too restrictive and that the referenced standards did not cover all the purposes needed. Especially for rear view camera systems this proved to be troublesome. New developments in automatic trailer coupling systems were mentioned which could not be used with the currently referenced standards. New text was proposed and because of the urgency some delegates were of the view that even an amendment for ADR 2015 should be considered.

Battery Master Switch; in the past several working groups discussed the use of the Battery Master Switch (BMS). The outcome of the informal working group meeting in Bonn in 13 and 14 July 1999, that the battery master switch is intended for safety in an explosive atmosphere occurring in a loading depot, was reconfirmed. (WP.15/67 INF 2 & WP.15/159 pars 33-39)

Being also applicable to EX/III it was questioned whether explosive atmospheres were to be considered here. Only compatibility group J could give off flammable gases. The absence of this atmosphere is also expressed in 9.2.2.5.1. for permanently energized circuits. In case of the example in document 2013/3 from Sweden it could be questioned whether a BMS was needed at all and in addition to this, when to use it. If used during loading, how should the interior lighting be wired to work? This should be checked with explosives experts.

Another issue with the BMS is the delay time between using the operating device and the actual breaking of the circuits which can take up to 120 seconds in extreme conditions. The reason is the orderly shutdown of the motor management system and cleaning of the urea injector for Euro V/VI trucks. Although some delay time could be acceptable, 120 second was felt to be too long. A text proposal needs to be drafted.

Permanently energized circuits

These requirements were found to be sufficient. It could be argued that explosive atmosphere during handling of the load is something outside of ADR. However it was concluded that having this requirements in ADR proves to be very valuable because normal road vehicles with a combustion engine can only comply to ATEX with very heavy and expensive additional equipment. By having requirements in ADR the additional requirements could be fine-tuned to what is really needed for ADR vehicles entering for instance a depot.

Additional requirements for EX vehicles

24Volt

Because of the requirement for 24 V system being in chapter 9.3 of ADR it can be questioned if it is applicable to the additional part or to the system of the whole vehicle. Before the restructuring of ADR this requirement was for the system of the whole vehicle. It can be questioned why this should then be in chapter 9.3 and not in chapter 9.2. The Netherlands experiences problems with approval of modern trucks with higher voltage systems like starter systems for Xenon lighting. It was proposed to put this question forward to explosive experts. Some improvements of the wording were proposed by the working group.

The requirements for EX/II and EX/III vehicles concerning the lighting in the load area were found to be overlapping. These provisions could be simplified. A text proposal needs to be drafted.

Any other Business

1) Reducing the number of vehicle categories of chapter 9.1 (Sweden)

The representative of Sweden said that the difference between some categories is very limited. Participant from the industry confirmed that they cluster requirements to make for instance two ADR types to cover all categories. It is proposed to check all requirements of part 9 and if possible to limit the categories. The discussion over the purpose of the electrical provisions and the applicability for the categories also point in this direction.

2) Applicability of chapter 9.7 for tractors of semi-trailers (not being a tank-vehicle)(Germany)

The representative of Germany stated that there was ongoing discussion as to whether the requirements of chapter 9.7 would be applicable for tractors for semi-trailers in the case when additional equipment was added after delivery as complete vehicle. Chapter 9.7 being only applicable to tank-vehicles and a tractor for semi-trailers not being a tank-vehicle in the definition of chapter 9.1. A possible solution is to change the heading of chapters 9.3, 9.7 and 9.8.

3) Improving of the definition of “complete”, “incomplete” and “completed” in chapter 9.1 (United Kingdom).

The representative of the UK stated that the national industry experienced interpretation problems concerning the above mentioned definitions. It was stated that the EU frame-work directive 2007/46/EC contained similar definitions which could help the understanding.

It was suggested to investigate the EU definitions and if necessary propose amendments.

4) Opening for interpretation of the application of 9.3 and 9.7 between type-approved (9.1.2.2) and not type-approved (9.1.2.1) vehicles. (Netherlands)

The representative of the Netherlands said that the wording of 9.1.2.2, for complete type-approved vehicles, was such that it was open for interpretation if for instance the 24 volts of 9.3.7.1 was applicable. In 9.1.2.1, for non type-approved vehicles, it is stated that the requirements of 9.3 to 9.8 apply. If the outcome that the 24 Volts is applicable to the whole vehicle system a solution may be found in transposing 9.3.7.1 to chapter 9.2.

5) Applicability of the first inspection of vehicles of 9.1.2.1 (second paragraph) to vehicles of chapters 9.4, 9.5 and 9.6. (Norway)

The question was raised if the first inspection in 9.1.2.1 was also applicable to vehicles carrying packages (9.4), bulk (9.5) and temperature controlled (9.6) because of the wording of 9.1.2.1 second paragraph. It was assumed that the initial inspection was not intended and if so the reference should be changed. WP.15 is asked for the confirmation of this position.

Conclusions

The WP.15 is invited to discuss the items in Annex 1 and to give its consent for the proposed direction of development. WP.15 is also requested to agree to the continuation of the work and widening of the scope to be able to work on the questions stated under Any Other Business. The final result to be presented as an official document in a future session of WP.15.

Annex 1

- 1) Consent is asked from WP.15 to make 9.2.2.2, concerning wiring in general, applicable to all categories of vehicles, including EX/II. OICA will be consulted if this is also possible for panel vans.
- 2) Various improvements will be proposed for the wording of 9.2.2.2 concerning wiring.
- 3) Consent is asked from WP.15 to make 9.2.2.4 concerning batteries, applicable to all categories of vehicles.
- 4) Improvements will be proposed for the wording of 9.2.2.4 to acknowledge that more than one battery may be on the motor vehicle or trailer and the option for venting will be in related to the type of battery and placing.
- 5) Consent of WP.15 is asked to make the additional requirements for wiring behind the drivers cab applicable to all categories of vehicles. OICA shall be consulted if there are exceptions needed for instance in case the wiring is not exposed on the chassis but protected by body work (panel vans).
- 6) Improvement will be proposed for the wording of 9.2.2.6.2 concerning lighting.
- 7) WP.15 is asked to consider the urgent amendment of 9.2.2.6.3 by replacing the whole paragraph by the following wording:

“Electrical connections between motor vehicles and trailers shall have a protection degree IP54 in accordance with IEC 60529 and be designed **specifically** to prevent accidental disconnection. **The design shall include a mechanical locking device or alternatively an electronic interlock. With the mechanical locking device in a locked position it shall not be possible to force the connector to disconnect. The electronic interlock shall be based on a safety concept including at least two actions in sequence. This sequence shall only be possible to implement when the vehicle is stationary.**”
- 8) Improvements will be proposed for the wording of 9.2.2.3 concerning the battery master switch to take into account new developments.
- 9) Delegations are asked to discuss with the national explosives experts the possibility to delete the provision for the Battery Master Switch for EX/III vehicles because of the lack of an explosive atmosphere. An exemption can be made for substances of Compatibility group J.
- 10) Delegations are asked to discuss with the national explosive experts the limitation to a nominal voltage of 24 Volts for EX/II and EX/III vehicles taking into account developments on Xenon lighting and other equipment which work on higher voltage. Is it acceptable to have higher voltage systems outside the load compartment or is screening needed? Are additional requirements needed in this regard for detonators of compatibility group B? Is the lighting in the load compartment to be functioning when the circuits are broken by the battery master switch?