

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods

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Item 5 (a) of the provisional agenda

**Proposals for amendments to annexes A and B of ADR:
construction and approval of vehicles**

Report of the Informal Working Group on Electrified Vehicles

Transmitted by the Government of the Netherlands on behalf of the informal working group

Summary

1. In the sub-groups work is in progress. However, progress is slower than wished for because the new technology is still developing. Separate to this report a proposal is forwarded for the existing battery master switch function in document UNECE/TRANS/WP.15/2023/4. The choice for an official document is that it will be available in all official languages for discussion. However, this part is felt to be ready for adoption for FL vehicles.
2. Unfortunately, the secretariat function was lost due to a change in position and the position could so far not be filled in (See also UNECE/TRANS/WP.15/253 paragraph 33). WP.15 is requested to allow for continuation of the work of the IWG-EV.

Report

3. The Informal Working Group on Electrified Vehicles has 5 sub-groups. Each sub-group represents a particular interest group. Below a short status is given of the work in each group.

Users Group

4. The users group has in total met 14 times to develop a risk assessment based on a bow tie analysis. The bow ties represent particular scenarios and have been discussed with the truck manufacturers group to validate and adjust their outcome.
5. The following scenarios were earmarked as insufficiently managed:
 - Release of a spark in an ATEX zone, leading to an ignition of a vapour cloud;
 - Mechanical abuse of the battery leading to a thermal runaway of the battery;
 - External fire leading to a battery runaway;
 - Thermal runaway of the battery leading to exposure to driver of toxic fumes;
 - Thermal runaway of the battery leading to a possible BLEVE of a tank containing a liquefied flammable gas;
 - Collision and damage to shut-off valves of the H2 containers leading to hydrogen leaks.
6. In addition to this the following topics were identified for possible amendment in the ADR:

- Amended training and responsible roles for parties involved in the transport (1.4 of ADR);
- Labelling the kind of drive system/fuel on the ADR Certificate (9.1.3 of ADR); and
- Prevention of flammable gases entering the battery.

7. The issues for future discussion are hydrogen for use in internal combustion engines and the use of refrigerated liquefied hydrogen as a fuel.

Manufacturers group

8. Consensus was reached on the Battery Master Switch Function. To become design neutral, it was felt essential to use the more generic term “Feature” than Switch. (See document ECE/TRANS/WP.15/2023/4).

9. Discussion continues on battery safety and in particular on thermal runaway. Development of technology and insight in the effects are still progressing. The measures to prevent a thermal runaway of the battery are still considered as they are mitigating options. Based on this outcome a new look may be needed on permanently energized circuits, what needs to remain energized when the de-energizing feature is employed (former Battery Master Switch).

10. The use of hydrogen fuel cells and their fuelling system is under discussion. A particular point of discussion is the direction of discharge of the Temperature (triggered) Pressure Release Device (TPRD).

11. The 5 minute external warning signal in case a thermal runaway event on the outside of the vehicle may need further review in relation to UNECE Regl. No. 48 on “installation of lighting and light signalling devices”. Request should be made to the WP.29 secretariat for guidance on the possible signals (audible/visual) for such warnings when the vehicle is stationary.

12. The application of camera monitoring system in UN Regl. No. 46 on “devices for indirect vision and of motor vehicles with regard to the installation of these devices”, instead of mirrors, in relation to the use of the de-energization feature is currently being discussed, although not in particular limited to electrified vehicles.

Hydrogen Group

13. The group studied the interaction between a release of hydrogen (fuel) with the load carried. Based on the design and place of release of fuel and release of load interaction was felt to be unlikely. No further comments were received.

Trailer and Body Builders Group

14. Awaiting the outcome on battery safety by the truck manufacturers no meetings have taken place. Work on trailer electrification in various GR’s of WP.29 is ongoing.

EX Group

15. Awaiting outcome on battery safety by the truck manufacturers no meetings have taken place. For July a discussion is foreseen to discuss the latest status on battery safety and de-energization feature for EX/II and EX/III vehicles.

16. In the 12th session of the Informal Working Group the thermal runaway of a battery was discussed. Several standards were recalled that would allow testing of cells and batteries and for design and production control. Depending on the cell chemistry, cell structure and assembly of the battery it may be possible to have a thermal runaway of a cell not leading to

a propagation to other cells and a prevention of a full battery fire. Developments at UN (ECOSOC TDG) level were mentioned.

17. The behaviour in zones where an explosive atmosphere may occur (during handling of the load) and other conditions of carriage of dangerous goods were also discussed. It was understood that development on battery safety is still ongoing.
