

DRAFT REPORT

5th meeting of GRRF/IG on Modular Vehicle Combinations MVC

Venue: CLEPA offices
Chairman: Anders Gunneriusson (SE)
Secretariat: Pierre Teyssier/Olivier Fontaine (OICA)
Dates: 26-27 October 2015

1. Welcome and Introduction

2. Approval of the agenda

The agenda was adopted with the addition of the input from Mr. Adam: MVC-05-02
The chair raised the problem of the mandate extension, as it is foreseen that the group should table a draft by December 2015.

3. Approval of the minutes of last meeting

Document: MVC-04-04 (Chair)

The Secretary committed to post the report ASAP on the website (done as MVC-04-04).

4. Outcomes of GRRF-79 (September 2015)

Document: GRRF-80-28 (S on behalf of MVC informal group)

There was no added comments during the plenary session of GRRF-80.
The group agreed not to spend too much time on steering and coupling, since the primary mandate of the group is to focus on braking.

5. Review of situation in different countries

The experts had few information to exchange.
There was a general statement from OICA: in Germany, the Industry (VDA) is in favour of the introduction MVCs, in a perspective of increased safety and decreased CO₂ emissions, following a positive report from BAST.

6. Items for discussion (Review of document MVC-02-03-Rev2):

6.1. Braking

6.1.1. Communication between vehicles:

Technical principle: Point to point ISO 11992 connection between two successive vehicles in the combination

M. Adam (CLEPA – WABCO) presented the 1st part of his document MVC-05-02. ISO 7638 connector, with 7 pins, 2 of them belong to the CAN communication network, according to ISO11992. Point-to-point communication between 2 nodes. If man adds an additional vehicle, then there is an additional node. Mr. Adam was of the opinion that ISO contains all the necessary information for the interest of the MVC group. No need for additional requirement into UN R13.

Mr. Manz (CLEPA/BPW) pointed out:

- Naming: the towing trailer is not understood as a node according to UN R13
- The router should be identified as the node in the chain.

These two comments may lead a TAA to refuse an approval due to a strict reading of the regulation.

The experts found opportune to change along the text of the regulation, the word “motor vehicle” or “tractor” into “towing vehicle”.

It was clarified that the router permits to extend the number of vehicles (additional nodes) while the amplifier permits to extend the size of the vehicles (long wires). The router function is necessary for any trailer capable of towing a vehicle. There is the necessity of a router on each towing vehicles.

The question was raised about a combination with several trailers, each with a router, and where the 1st router would fail. Would the 2nd trailer receive the number 1?

N Norway, 18 to 80 meters are acceptable.

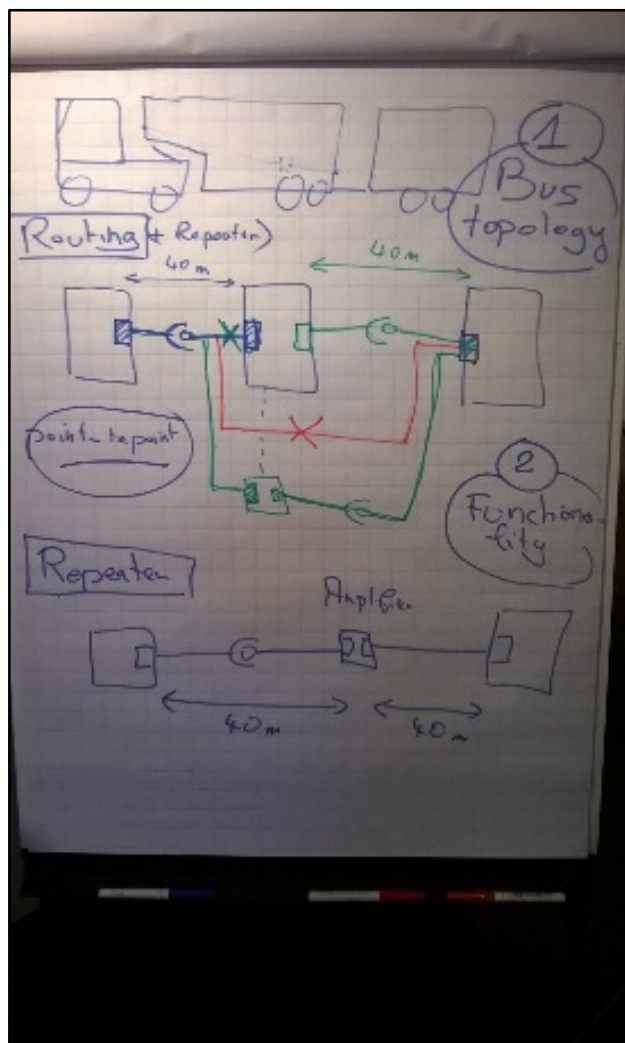
The question was whether there is a possibility that the text is interpreted such that a repeater is allowed, with the current texts of the regulation.

An explanatory drawing was edited on the white board

- Bus topology
 - o Router
 - o Amplifier
- Functionality

According to M. Adam, there must be an electronic control line in every towing vehicle in a MVC.

A debate took place on the point-to-point communication.



Industry committed to prepare a presentation on the state of the art of the point2point communication.

Conclusion:

- There must be an electronic control line in every towing vehicle/trailer (tbd) in a MVC.
- Industry to prepare a presentation on p2p communication, routing, repeating, etc. and special requirements for towing trailers (PT and CA as pilots).
- Draft text amending UN R13,
 - o from 11992, for a routing function for towing trailer (requirement to transmit forward and backward) (SM and CA as pilots)
 - o in which conditions a repeater is requested. (SM and CA as pilots)

6.1.2. Power supply dimensioning

Does any potential / practical issue exist with ISO 7638 dimensioning (UN R13 paragraph 5.2.2.17.2. also to be reviewed)?

Mr. Adam presented the Part 2 of his contribution per document MVC-05-02.

The experts had a debate on the trends of power consumptions: EBS decreased the levels of current, while the forthcoming electric steering function may increase the necessary power. Need to note that the draft amendments to take into account ACS connectors (7638).

There was a debate on whether to limit the current generated to the other vehicles. It was suggested to inspire from what was adopted by the task-force on trailer electric steering system.

Other approach: any trailer intended for MVC should benefit of a certain amount of current, hence in-use requirements that depending the level of current available at tractor, a certain number of trailers is permitted.

What consumes the most current: self-check, braking on slippery surface, number of valves? Proposal to put labels on the vehicles about compatibility of different vehicles. Yet it was recalled that this solution should be avoided due to the poor durability of the labels.

Conclusion:

- CLEPA to collect real-world data on the levels of electricity consumers (how many amps necessary for one average trailer).
- Volvo to investigate internally (seems to be 25 Amps available to the trailer)

6.1.3. Parking brake

Principle: 12% requirement for all combinations; solution not design-restrictive (i.e. Nordic park brakes are allowed)

The chair informed having red through UN R13, and was of the opinion that wording “power-driven vehicle” cannot be blindly replaced by “towing vehicle”: the dolly cannot hold the combination.

Conclusion: The group confirmed the approach.

6.1.4. Braking performance of Dolly

Type 0 requirements (value of deceleration)

Proposed approach: Dolly is a “tractor-like” towing trailer, thus 50% for type 0

MP (CLEPA/BPW) was of the opinion that the dolly should be considered as a truck for semi-trailer because that permits the combination “dolly + semitrailer” to have a braking capability average of 50% (i.e. 45 + 55%). Should the dolly take only 50%, then the combination would take less than 50%.

BS (CLEPA/VBG) presented some slides (MVC-05-03 and MVC-05-04 - summary of the Eindhoven study) showing dolly braking performances in case of high braking conditions. There was a debate on the load transfer in case of a combination of tractor/dolly/semitrailer (Case D). In case of braking, one part of the load of the semi-trailer is transferred to the tractor (via the dolly). The experts wondered whether the dolly could take 50% of the braking. The chair feared that a too low value for the dolly could generate a jack-knife situation.

The transfer of load depends on the wheel length of the vehicles.

Conclusion:

- All to read in details the Eindhoven study.
- Group in favour of 50% braking on the dolly
- Rate to be confirmed at MVC-06

Compatibility bands for dollies

Proposed approach: using the compatibility band of a central axle trailer

The group decided to postpone to the next meeting the decision this item (central axle trailer vs. tractor/semitrailer combination).

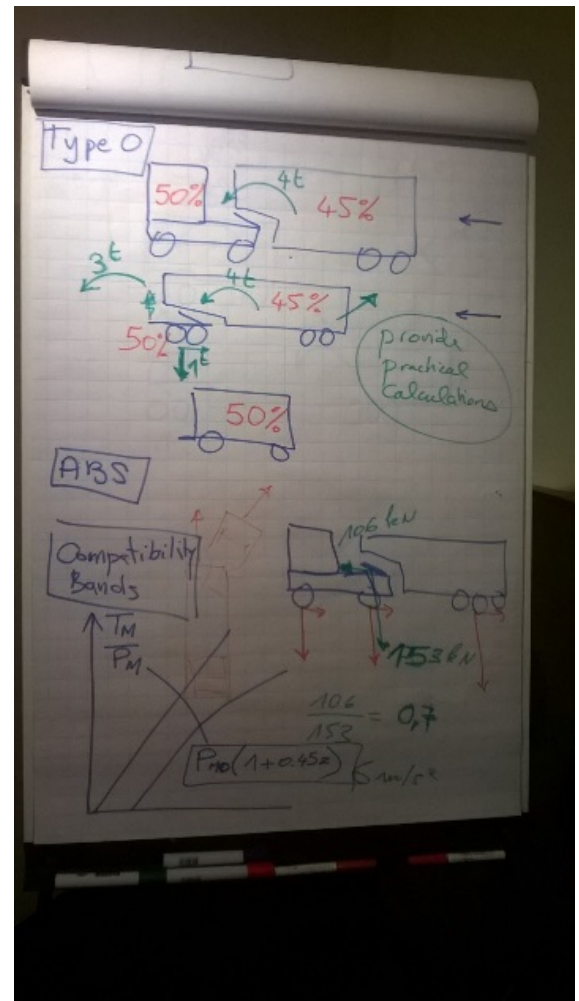
6.2. Stability6.2.1. EVSC Mandatory or optional

Would the pneumatic signal anyway be transmitted to the last trailer?

C. Adam confirmed that the pneumatic signal is always transmitted in parallel to the electric signal.

6.2.2. EVSC for dollies

EVSC is already prescribed, no need for further requirements.



6.3. Coupling issues

6.3.1. Identifying what is missing in UN R55 IG to fully address MVC in R55

Item to be discussed at R55 informal group.

6.3.2. In-use calculation for multiple trailers

ISO 18868 is proposed as a base.

Item to be discussed at R55 informal group.

6.3.3. Remote indication

GRRF accepted chassis side remote indication. Yet the group questioned the need for a specific standard for remote indication connector. ISO 12098 vs. ISO 11992.

Mr. Svensson reported back on the R55 informal group, where an informal document will be prepared for GRRF-81:

- a. Mechanical dimensioning: good progress in defining the dimensions of a coupling capable of handling several vehicles, including a rigid bar dolly. Request to OEMs about the measurements on coupling forces.
- b. Remote indication: new adopted proposal to have the remote indication in the FOV of the operator. The chair questioned the way to transmit the indication from a rear trailer to the preceding one. ISO12098 (lights) could be an option, some pin could be used for coupling status. Mr. Teyssier found the ISO11992 relevant for such message; the experts wondered whether the Part II contains that message. Mr. Svensson proposed to add forward transmission to the existing side indication on the trailer. The group decided to keep this item in mind for further steps.
- c. The chair of the R55 informal group should keep his mandate until end 2016, after which he will be forced to step down from his function as chair.
- d. Next meeting scheduled on 14-15 January 2016 in Paris (prior next GRRF session).

About the rigid vs. hinged drawbar dolly, the experts agreed that the calculation of the R55 “d” value remains unchanged. This was not considered critical, yet Mr. Svensson committed to elaborate on this issue.

6.4. Steering

6.4.1. Steered axle on a dolly

The experts wondered whether such dollies are approved to UNR79: there are mainly approved to national regulations, yet there are different types of dolly steering systems. The experts acknowledged that rigidity is usually beneficial to stability. Krone did marketed some steered dollies. The experts were informed that S does not allow the Krone solution (drawbar + front axle). The chair informed about his hope that the group find acceptable solution toward harmonization.

The problem of in-use requirements (roundabout radius are different in the different countries) was raised. S stated to be ready to amend their national legislation for the sake of harmonization.

Mr. Adam committed to contact M. Hüdepohl (Krone) to check his experience on such dollies.

Mr. Adam subsequently transmitted the answer of Mr. Hüdepohl:

“All approvals are single approvals in Germany, production is about 25 units/year. Nearly all of them are used under the umbrella of the BASt running test. These dollies were introduced for fulfilling the manoeuvrability requirements. Experience is very good. The ball bearing turntable improves the stability on normal roads rather than on icy conditions. The front axle of the dolly is locked above 60 km/h (steering is mechanically controlled by the angle of the drawbar).”

6.4.2. Steering table

In Finland dollies 5th wheel steering angle is limited to 30°.

Ball bearing in Nordic countries: mandatory on dollies, not always on trucks, with limitation to +/-20 or 30° according to the country. This is for combination stability on slippery surface. (5th wheel is still free, only the bearing is blocked.

The chair questioned whether these steering tables' provisions should be limited to Nordic countries or extended to others. The chair and the Nordic countries representatives committed to investigate the pros and cons of lockable ball bearing systems in their territories.

Conclusion:

- Need for more information
- Informal group to clarify the kind of requirement relevant for this item:
 - should such dollies be covered by UN R79?
 - if yes: how? Locked/unlocked, with which load, which vehicles behind?

6.5. Miscellaneous

6.5.1. Trailer identification

7. **Review of document MVC-01-06e (GRRF-66-08 – Amended)**

The group agreed to review the document paragraph by paragraph.

There was a debate on the necessity to add a definition of a “towing trailer”: there are 2 types of towing trailer i.e. semi-trailer with 5th wheel, and extended chassis with 5th wheel. Agreed to delete the reference to “this regulation”.

Definition of dolly: Debate on the possible restriction of such definition: it could prevent adding some future new technologies. Agreed to change the definition: “dolly” means a towing trailer designed for the sole purpose to tow a semi-trailer.” Agreed to make the definition of a dolly as a sub-definition of towing trailer.

Paragraph 5.1.3.: adopted

Paragraph 5.1.3.1. to 5.1.3.4.1.: adopted. Mr. Heim pointed out that there use of “coupling head” is unclear, since it is usually understood as a pneumatic connector, while it is here used as both pneumatic and electric. The group agreed to keep this issue in head.

Paragraph 5.1.3.5.: adopted

Paragraph 5.1.3.6.3.: adopted

Paragraph 5.1.3.6.4.: question of the meaning of “highest”. There was a debate on the interpretation of the last sentence of the paragraph. The group agreed to flag this sentence and inquire on the origin of the change. The 1st sentence may be interpreted such that if there is in the chain a vehicle with only pneumatic brake/only electric brake, then the combination may have the wrong design and the relevant action must be taken. MMrr Heim and Adam volunteered to dig in the working documents and the history of the document for finding the meaning and purpose of the paragraph.

Conclusion: M. Heim and M. Adam to provide explanation on the necessity of the proposed paragraph.

Paragraph 5.1.3.9.: the group tried to secure that the hoses and cables are always provided. PT proposed a simplified wording (MVC-05-05):

“Paragraph 5.2.1.3.9. The flexible hoses and cables used for the connection between a towing vehicle for semi-trailer and its following semi-trailer shall be part of the towing vehicle.

The flexible hoses and cables used for the connection between a towing vehicle for trailer other than a semi-trailer and its following trailer shall be part of the following trailer.

In the case of an automated connector, this requirement regarding the allocation of flexible hoses and cables is not applicable.”

The drawings should be added in the regulation. CA proposed an alternative wording, focusing on the owner of the hoses:

“towing vehicles having a 5th wheel, and towed vehicles having a drawbar shall provide the flexible hoses and cables for the connection between towing and towed vehicles.”

Proposed sketches:

Vehicle combination 1

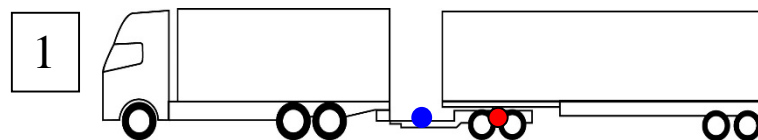


Figure 2 — truck + dolly + A-semi

Vehicle combination 2

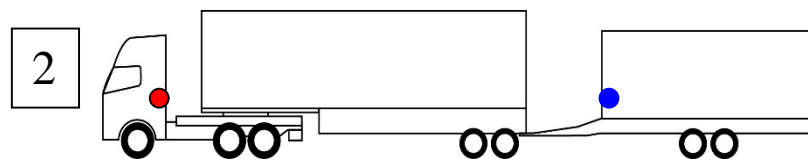


Figure 3 — tractor + A-semi + centre axle trailer

Vehicle combination 3

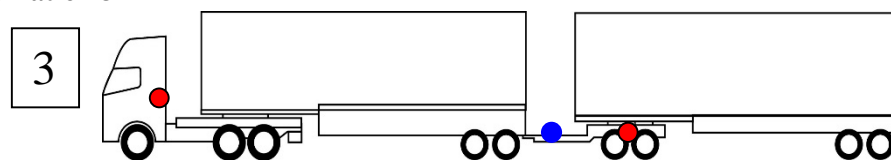


Figure 4 — tractor + A-semi + dolly + A-semi

Vehicle combination 4

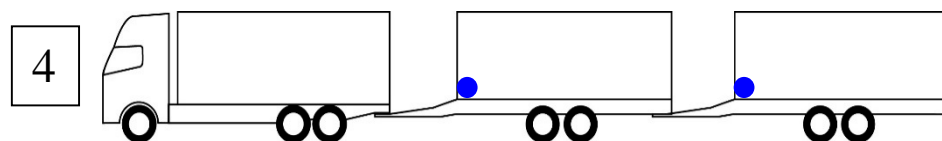


Figure 5 — truck + centre axle trailer+ centre axle trailer

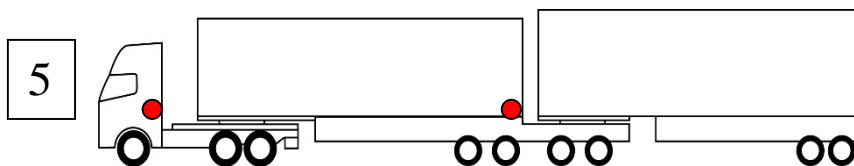
Vehicle combination 5

Figure 6 — tractor + link-trailer + A-semi (B-train)

The group adopted the PT proposal, as amended, together with the sketches. The group acknowledged that there is still room for grammatical improvement, and that the sketches could be placed either as an explanation in the justifications to the working document, or as a new annex of the regulation.

Paragraph 5.2.1.18.: the group acknowledged that the word “towing” was not present in the current text of the regulation, hence should not be deleted.

Conclusion:

- Text adopted.
- Group to keep in mind the necessity to add equivalent provisions for towing trailers.

Paragraph 5.2.1.28.1.: “one cooker is enough in the kitchen”, i.e. two controllers in a control loop could lead to unstable situations. Hence the group agreed to keep the requirement of one unique coupling force control.

Conclusion: proposed change adopted.

The group had no time to continue the revision of the document further than paragraph 5.2.1.28.1.

8. Other business**9. Date and place of next meetings**

MVC-06: 2-3 March 2016 at CLEPA starting at 10:30 am

MVC-07: TBD (conflict with ACSF-06)