



Submitted by the experts
from OICA and CLEPA

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CLEPA/OICA position on the introduction of Virtual Testing in UN R152

Refers to document ECE-TRANS-WP.29-
GRVA-2023-22 (France)

General Industry Position (GRVA#16 presentation **update for GRVA#17**)

- Support in principle to introduce the opportunity to use simulation as a replacement of physical testing for homologation in UN R152.
- **Don't support the amendment as described in document ECE/TRANS/WP.29/GRVA/2023/22 without improvements (see next slides)**
- Keen to harmonizing the process of validation of simulation; possibly based on VMAD outcomes (i.e. without specifying number of repetitions ...) adapted to AEBS.
- New proposal should be developed (preferably jointly) based on VMAD results (cfr. document GRVA-14-16).



- Industry considers the French proposal ECE/TRANS/WP.29/GRVA/2023/22 not the common practice concerning the use of virtual tool for system development.
- Industry proposal (inspired by VMAD discussion and UN-R140) is intended to be discussed at a common workshop to define an Annex for virtual testing which does not inhibit innovation with regard to the use of virtual testing.



Industry amendment proposal for introducing simulation results for homologation

Document ECE/TRANS/WP.29/GRVA/2023/22

Industry Proposal

“6.7. Computer simulation of dynamic tests

6.7.1. A computer simulation model may be used for the tests described in paragraphs 6.4. to 6.6., provided the simulation model and simulation toolchain have been validated according to and are used in accordance with annex 4.

6.7.2. Simulation tools and mathematical models for evaluation of the warning and activation tests may be used in accordance with Schedule 8 of Revision 3 of the 1958 Agreement. Manufacturers shall demonstrate the scope of the simulation tool, its validity for the scenario and concrete vehicle concerned as well as the validation performed for the simulation tool chain (correlation of the outcome with physical tests) in accordance with annex 4.

6.7.3. The technical service shall be able to validate the simulation model using physical validation tests.

6.7.4. In case the computer simulation of dynamic tests is chosen by the manufacturer, a separated report including at least the additional data information specified in annex 4 paragraph 1.4. shall be annexed to the test report.”

6.7.

6.7.1. Virtual testing may be used by request of the vehicle manufacturer as an alternative for the tests described in paragraphs 6.4 to 6.6. The provided virtual model and virtual toolchain have been validated according to and are used in accordance with annex 4.

6.7.2. The technical service shall be able to validate the virtual model by using physical validation tests [according to 6.4 to 6.6].



Industry proposal for an amendment to Annex 4: (modifications are highlight in yellow)

Annex 4

This annex describes the **method process** that can be used to consider **simulation results** virtual testing ~~instead~~ as an **alternative** to physical **testing results**, demonstrating compliance with regulatory requirements.

Compliance of the Advanced Emergency Braking System with the performance requirements as defined in Paragraphs 5.2.1 to 5.2.3 of this regulation may be demonstrated by the vehicle manufacturer to the Type Approval Authority or Technical Service by making use of virtual testing of the dynamic maneuvers of the paragraph(s) 6.5 to 6.7 of this Regulation.

The manufacturer shall provide documentation to prove the credibility of the virtual testing results.

Credibility of the virtual toolchain that is used for virtual testing shall be demonstrated to the Type Approval Authority or Technical Service. For this, the following four criteria shall be considered:

- (a) Capability – what virtual toolchain can do, and what are the associated risks;**
- (b) Accuracy – how well virtual toolchain does reproduce the target data;**
- (c) Correctness – how sound & robust is the used data and the algorithm in the tools;**
- (d) Fit for Purpose – how suitable is the virtual toolchain for the assessment**

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