Recommendations on UNECE Regulation No. 158 for devices for reversing motion for N2/N3 and M2/M3 vehicles

Decision of 25/10/2021 based on a recommendation of the Executive Committee for Automotive Engineering

Guiding principle

The requirements of the current UNECE Regulation No. 158[1] for reversing-assistance devices are not sufficient to ensure the safety of vulnerable road users when reversing or manoeuvring N2/N3 and M2/M3 vehicles (not transporter-based) and trailer vehicles.

Decision (N2/N3 and M2/M3 vehicles)

If the reversing area cannot be viewed sufficiently, a camera monitor system (CMS) should always be used in conjunction with sensor monitoring.

- The detection ranges provided for in the UNECE Regulation are too tightly limited for both CMS and monitoring using sensors.
- The following minimum detection ranges should be covered:
    - Field-of-vision CMS, width: extending at least 1.5 m beyond the width of the vehicle, depth: 9 m
    - Sensor-system monitoring area, width: 0.75 m beyond the width of the vehicle, depth: 5 m
- In particular for commercial vehicles, the regulations shall also apply to the vehicle category of the trailer vehicles.
- In future, normative regulations for interfaces between towing and trailer vehicles will be indispensable. Appropriate standardisation projects should therefore be initiated in the near future.

[1] Tracking of amendments to UN Regulation No. 158 (Reversing motion); Submitted by the Informal Working Group on Awareness, Informal document GRSG-121-09 of Vulnerable Road Users Proximity (121st GRSG, 12-16 April 2021)

- Until such regulations take effect, monitoring of the reversing area by means of sensors is to be implemented with an optical warning on the trailer vehicle that is easily recognisable to the driver, such as via the flashing of the side marker lights on the trailer.
- In a further step in the future, brakes will automatically be applied when obstacles are identified.

Explanation

The DVR welcomes the mandatory introduction of reversing-assistance devices on motor vehicles as part of the General Safety Regulation 2019[2].

However, from the point of view of the DVR, the requirements for N2/N3 and M2/M3 vehicles laid down in the current UNECE Regulation No. 158 are not yet sufficient to ensure the safety of vulnerable road users when reversing or manoeuvring. It is imperative that a future Regulation No. 158 also takes into account vehicle category O.

The objective should be to design devices for reversing motion in such a way as to avoid endangering other road users, in particular unprotected persons, and thus, as a rule, to avoid the need for a guide.

If the reversing area cannot be viewed sufficiently, a camera monitor system (CMS) should always be used in conjunction with sensor monitoring. This seems sensible for the following reasons:

[2] Regulation (EU) 2019/2144 of the European Parliament and of the Council of 27 November 2019 on type approval requirements for motor vehicles and their trailers

- For safe driving, people primarily trust their visual perception. The display on the monitor enables them to assess and evaluate obstacles for themselves.
- Keeping several mirrors in view at the same time appears to be problematic for ergonomic reasons.
- Suitable sensor monitoring systems achieve high detection reliability. They are constantly active and ensure a high reaction speed.

However, all previously known sensor technologies also have advantages and disadvantages with regard to their system limits and the detection of critical objects. It has not yet been possible to ensure absolutely error-free detection.

Against this background, the DVR considers it necessary to have a combination of CMS for vision and sensor technology as a warning system. Through this combination, people and technology complement each other sensibly and a higher safety level for the assistance system is achieved overall.

The detection ranges provided for in the UNECE Regulation are too tightly limited for both CMS and monitoring using sensors. The obstacles to be expected are, as a rule, dynamic objects. For this reason, the monitoring area should be dimensioned such that – even when pedestrians and cyclists are approaching – the driver can react in good time and, if possible, the vehicle can be stopped. The field of vision of the CMS must also extend beyond the lateral contour of the vehicle. Systems with a corresponding detection angle are already state of the art today.

The following minimum detection ranges should be covered:

- Field-of-vision CMS, width: extending at least 1.5 m beyond the width of the vehicle, depth: 9 m
- Sensor-system monitoring area, width: 0.75 m beyond the width of the vehicle, depth: 5 m

Extended detection ranges are intended to take account of the dynamics of the obstacles to be expected.

The draft of the regulation only provides for tests with static test specimens to verify the visual or sensor detection range. In the future, these should be supplemented with dynamic test scenarios based on test methods for pedestrian automatic emergency braking systems, for example.

With regard to the test specimens used in the testing of the systems, the DVR is of the view that there is a further need for research. Which critical objects are to be considered in detail depends to a large extent on the technology used. In addition to the geometry, the surface and material properties must also be taken into account.

Particularly for commercial vehicles, it does not seem sensible to generally exclude the vehicle category of trailer vehicles from the regulation. The majority of these vehicles use trailers for transport. Equipping semi-trailer tractors, for example, makes little sense, since they practically always travel with a trailer. The increased hazard potential exists especially when reversing with trailer vehicles.

For systems in trailers, the compatibility of the interface with interchangeably coupled tractor units presents a particular challenge. In the future, normative regulations for such interfaces will be indispensable. Appropriate standardisation projects should therefore be initiated in the near future. Until such regulations take effect, as a solution for the current situation we propose as a minimum monitoring of the reversing area by means of sensors, with an optical warning on the trailer vehicle that is easily recognisable to the driver, such as via the flashing of the side marker lights.

A further revision of the regulation should take into account the aspect of automatic braking by the assistance system when obstacles are detected. As study results[3] show, the automatic response can relieve the burden on the drivers and increase safety.

[3] Research report FS 03: Driver assistance systems – Determination of safety potential on the basis of the claims of German insurers; Gesamtverband der Deutschen Versicherungswirtschaft e.V.; 09/2011