



FIA Mobility

Position on Improved Heavy Goods Vehicle Rear Under-Run Protection

1) Status Quo

A rear under-run protection device (RUPD) is the rear “bumper” of a Heavy Goods Vehicle (HGV). It is specifically designed to prevent the impacting vehicle, in particular passenger cars, from becoming wedged under the HGV.

The technical safety standards for the approval of RUPDs are provided in UNECE Regulation 58¹. It includes a definition of the mounting height for rear under-run protective devices (RUPDs) and the test loads an RUPD must withstand.

The current UNECE Standards however, do not provide effective protection. With alarming regularity, the RUPDs break off after being impacted by a passenger car², allowing the passenger car to be wedged under the rear of the HGV. The consequence is that every year, some 260 car occupants suffer fatal injuries in rear-end collisions with HGV in European roads alone, while approximately 1900 are severely injured³.

The cause for RUPD break-off is usually that the device is not connected stably enough with the HGV frame⁴. Therefore, the unstable RUPD is not offering a colliding passenger car enough support and the vehicle’s crumple zone is unable to absorb the impact. The vehicle slides at high residual speed under the HGV’s rear structures and the cabin is destroyed.

2) Amendment of the UNECE Regulation

Since the current technical safety standards for RUPDs are insufficient to provide optimum protection to motorists in passenger cars, UNECE Regulation 58 is scheduled to be amended in April 2013. A draft Regulation was submitted to the body in charge, the UNECE Working Party on General Safety Provisions (GRSG), calling for stricter safety standards. The demands include:

- a) To increase the test loads now being applied consecutively from currently 50kN to 80kN in the P1 points and from currently 100kN to 145kN in the P2 points.

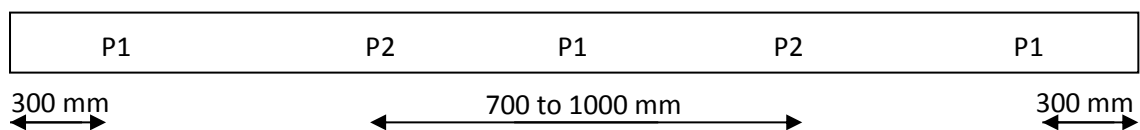


Fig. 1: Head-on representation of an RUPD showing the location of the test points

- b) To reduce the maximum mounting height of currently 550mm for commercial vehicles with hydraulic suspensions to 450mm and to 500mm for steel-sprung vehicles.
- c) To reduce the maximum mounting offset of currently 400mm forward of the HGV rear to 100mm and to 300mm for vehicles with a lift platform, respectively.

¹ <http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/r058r2e.pdf>

² Analysis conducted by ADAC accident researchers shows that there is no RUPD failure in only 8% of collisions.

³ HGV rear under-run is not included in most official statistics. Those figures are a weighted average of the results from the studies LAB, Accidentology Rear Underrun Car vs. Truck and VC COMPAT, deliverable 05, part 1 and 2, adjusted to the year 2011.

⁴ This has been possible because the testing standards in terms of load were too low.



3) FIA Position

The FIA expressly supports the call for improved rear under-run protection (RUP). However, the international federation of automobile clubs believes that the safety standards must exceed the levels called for in the draft UNECE Regulation. A crash test conducted by the ADAC⁵ has shown that RUPDs are effective and life-saving only if they conform to the requirements below:

- a) Specification to test loads of 150kN (in P1 and P3) and 200kN (in P2) respectively applied in three test points simultaneously – instead of consecutively (under the current standard).

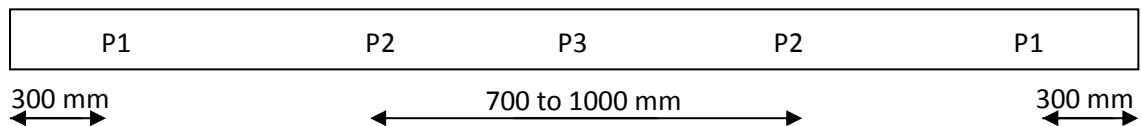


Fig. 2: Head-on representation of an RUPD showing the location of the test points

- b) Reduction of RUPD maximum mounting height to 450mm – both for HGV with hydraulic suspensions and steel-sprung vehicles.
- c) RUPD maximum offset forward of the rear of 100mm – both for HGV with and without a lift platform.

If the RUPDs meet the above requirements, a vehicle rear-ending an HGV at 56 km/h (the speed of the frontal impact crash test for passenger cars under UNECE R94) is able to absorb the impact energy in its crumple zone. The passenger cell remains intact, allowing the seatbelts and airbags to provide optimum protection to the car occupants.

An EU study VC-Compat has shown the improvements to be effective. The study came to the conclusion that RUP improvements would reduce the number of motorists killed by 57% and the number of severe injuries by 67%⁶.

Furthermore, RUPD optimisation would not cost more than €100 per vehicle⁷.

The FIA therefore demands RUPD improvement in line with the criteria set out under 3 a) to c) above.

⁵ <http://youtu.be/svyDtDRxdHQ>

⁶ Data from the VC Compat project funded by the EU Commission; <http://vc-compat.rtdproject.net>.

⁷ Amount indicated by the EU VC Compat project.