

# ADAC position paper

## ADAC promotes improved rear underrun protection

### 1. Background

Severe or even fatal injuries in the case of rear impact collisions with HGV and trailers are no exception despite the fact that law provides for a rear underrun protection (RUP) system. As can be seen in Europe, the amended EU Directive (70/221/EEC) for underrun protection systems which became effective in March 2007 did not make a big difference.

**ADAC therefore recommends to further improve HGV underrun protection.**

### 2. Status quo

The underrun protection system mandatory for HGV and trailers with a gross vehicle weight of over 3.5 t fails to protect car passengers from life-threatening injuries. Every year, some 40 car occupants suffer fatal injuries in rear-end collisions with HGV on German roads, while approximately 400 are severely injured<sup>1</sup>. The EU-funded VC-Compat<sup>2</sup> project showed that improved underrun protection would prevent 57 % of fatal and 67 % of severe injuries. This would be feasible at even less than € 100 per vehicle.

The main reasons for the increased injury risk are the test loads used for type approval which are too low and therefore result in a weak connection between the underrun protection device and the HGV's frame. Upon impact with the passenger vehicle, the underrun protection breaks off immediately, causing the car to be wedged under the HGV. Depending on the impact speed, the cabin gets fully destroyed as far back as the rear doors. Moreover, the rear panel of the HGV pushes the car airbags down, leaving the occupants unprotected. ADAC proved this with its crash test conducted in 2006<sup>3</sup>.



Passenger car after impacting the conventional (left) and the improved (right) underrun protection system.

<sup>1</sup> GIDAS/ BAST Data, presented 23 January 2012 at an expert meeting on revision of UN Regulation 58 in the German Federal Ministry of Transport

<sup>2</sup> VC-COMPAT, Improvement of Vehicle Crash Compatibility through the Development of Crash Test Procedures

<sup>3</sup> The test aimed at verifying if the 2006 amendment to the EU Directive 70/221/EEC actually achieved its purpose of improving the situation of passenger car occupants. The offset crash test involved a small family car colliding with a stationary HGV trailer at 56kph. The cabin was completely destroyed with the back of the trailer penetrating the vehicle as far as to the front seat headrests. During a second test which was conducted under the same conditions but involved an ADAC improved underrun protection, the survival space of the occupants remained completely intact and the seatbelts and airbags were able to prevent severe injuries.

The responsible body of the UNECE Working Party 29<sup>4</sup>, the GRSG (*Working Party on General Safety Provisions*), has recognised the situation and currently revises the HGV underrun protection requirements. For this purpose, UNECE Regulation 58, on which the aforementioned EU Directive is based, is being amended.

### 3. ADAC position

ADAC considers that the stability of the underrun protection system may be optimised at no great cost and therefore recommends:

- **Much more stable underrun protection systems**

The underrun systems must be much more stable to ensure that passengers do not sustain life-threatening injuries. This is why higher static test loads are urgently required for the type approval of underrun protection systems.

- **Lower fitting**

Putting underrun protection systems at a lower height helps mitigate the consequences of an accident, since the impacting passenger car is able to reduce energy much better when hit at its supporting structure. In fact, this will prevent that the car considerably underruns the HGV and that the occupants suffer devastating injuries. ADAC recommends to lower the permissible mounting height of underrun protection systems from 550 to 450 mm.

- **Underrun protection near the rear panel**

According to the EU Directive, underrun protection deflection may not exceed 400mm for type approval. If there is less or hardly any deformation, the distance between the protection device and the rear panel may even be 400 mm. However, this reduces valuable crumple distance for the colliding vehicle and presents a particular drawback for its crumple zone if the vehicle is short. This is why it is important that the underrun protection system is mounted as close to the HGV's rear end as possible.

### 4. Conclusion

Optimising the underrun protection system will cost less than € 100 per vehicle<sup>5</sup>. However, a much more important issue in this debate is the road safety aspect as mentioned above.

Currently, car-to-HGV collisions in Germany cause fatal injuries to 40 car passengers every year, another 400 sustain severe injuries.

Various studies show that an improvement of the underrun protection system on the basis of the above recommendations would reduce the number of deaths by 57 % and the number of the severely injured by 67 %<sup>5</sup>.

**To improve underrun protection systems is extremely effective, life-saving and cost-efficient.**

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<sup>4</sup> WP 29 responsibilities include the passing of vehicle safety standards at UNECE level.

<sup>5</sup> Result of the EU project VC-Compat, <http://vc-compat.rtdproject.net>