

## **“Improving Safety on German Motorways”**

Resolutions of the German Road Safety Council (DVR) for increasing safety on German motorways

(Status May 2020: This paper will be continuously updated)

### **Preamble**

German motorways usually consist of two carriageways, each with at least two lanes and an additional hard shoulder. The carriageways are separated by a central reservation which is equipped with passive safety guards or concrete safety barriers. In relation to the amount of traffic, German motorways are the safest type of roads, however the severity of accidents is greater than average due to the high speeds involved. On sections where there is no speed limit the speed difference between fast driving cars and trucks or buses is especially high.

In 2018 424 people were killed on German motorways, which represents 12.9% of all road accident fatalities. In 2018 5,910 people were seriously injured on German motorways, which represents 8.7 % of all serious injuries.

### **Areas for action**

In the sense of the Vision Zero strategy, all options must be exploited to make the road traffic system safer and therefore reduce the number and severity of road accidents and their consequences. Implementation of the measures listed below for improving the infrastructure, vehicle technology and traffic surveillance, legal regulations and education is urgently recommended by the DVR in order to prevent fatalities and serious injuries on German motorways.

### **Traffic technology**

German motorways are usually built to high standards. Due to the separate carriageways, overtaking is relatively safe. The side areas are usually free of obstacles. In spite of this, there are high-risk sites. According to the general administrative regulations of the Road Traffic Regulations (VwV-StVO Art. 44) the tasks of the motorway accident

commissions is to decide on and implement measures with the objective of eliminating identified hazardous sites (high-risk sites, sections with frequent accidents).

The “Catalogue of Measures Against Accident High-Risk Sites - MaKaU” of the Federal Highway Research Institute (BASt)<sup>1</sup> contains eleven individual measures which explicitly refer to accident high-risk sites which have been identified by the Motorway Accident Commission. These relate to: Permissible maximum speeds, hard shoulders, acceleration lanes, speed monitoring and road surface renewal.

Since 2008, the DVR has issued safety recommendations for German motorways in four Board resolutions:

The Board resolution<sup>2</sup> “Status of Accident Commissions as an Instrument for Road Safety” (2008) recommends the description of the institutional tasks of the “Accident Commission” as an instrument for road safety work, continuous education and further education of accident commission members, creation of central controlling instruments in the federal states for coordination of the accident commissions and the additional provision of suitable funds for the purpose of elimination of high-risk sites at the level of the government, the federal states and municipalities.

The Board resolution<sup>2</sup> “Increased Safety in Roadworks on German Motorways” (2012) lists a wide range of individual measures. For example, according to the guidelines for securing roadworks (Richtlinien für die Sicherung von Arbeitsstellen - RSA), roadworks must be arranged so that they can be travelled through with a speed limit of 80 km/h.

The majority of new cars are now wider than 2.0 metres including the wing mirrors. To ensure safe operation of roadworks at 80 km/h the minimum width of the left-hand lane should be 2.70 m, and 2.60 m in exceptional cases. The right-hand lane should have a width of at least 3.25.

If these minimum widths are not possible, a lower maximum permissible speed of 60 km/h must be set. A recommendation for staggered driving can make an additional contribution to improving safety.

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<sup>1</sup> [www.makau.bast.de](http://www.makau.bast.de)

<sup>2</sup> All DVR board resolutions can be found under [www.dvr.de/beschluesse](http://www.dvr.de/beschluesse).

Monitoring measures for enforcement of the speed limit should be increasingly implemented at the start of the construction site. The enforcement sites should be easy to identify and should be signed in advance.

The Board resolution<sup>2</sup> “Traffic Control Systems Improve the Safety and Quality of Traffic on Motorways” (2013) recommends the extension and quality assurance of traffic control systems, the qualification of traffic control centre staff and the improvement of user acceptance.

The Board resolution<sup>2</sup> “Greater Safety for Short-Term Construction Sites on Motorways” (2016) recommends, among other things, general improvement of the framework conditions for short-term construction sites, e.g. by improvement of the recognisability of these sites, improvement of the passive safety of safety vehicles, improvement of compliance with speed limits, e.g. through speed enforcement, as well as standardisation of the regulations from guidelines for securing roadworks (RSA) and the technical regulations for workplaces (ASR).

In addition to the four board resolutions already described, the DVR publication “Vision Zero - Fundamentals and Strategies”<sup>3</sup> states the following measures for improvements to German motorways:

Hard shoulders should be provided for the entire motorway network, so that it is possible to stop outside of the flow of traffic in case of an emergency.

An adequate number of suitable rest areas for trucks must be provided at service stations, so that commercial drivers can rest from driving.

On ascending gradients, more additional lanes should be created to prevent hazardous tailgating.

If necessary, slip lanes should be extended to ensure safe access to the motorway.

In tunnels, complete speed monitoring is especially important, as here, compliance with the speed limit is essential due to the special hazard situation. Ideally, the monitoring systems should be permanently installed.

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<sup>3</sup> Deutscher Verkehrssicherheitsrat: Vision Zero - Grundlagen & Strategien, publication series Road Safety No. 16, Bonn 2012.

On routes where there are frequent accidents, rumble strips should be installed to prevent lane departures due to distractions or driver fatigue.

## **Vehicle technology**

In addition to infrastructure measures, vehicle technology makes a significant contribution to motorway safety. Vehicle technology can prevent or at least mitigate hazardous situations and therefore reduces the probability of serious accidents. On the other hand, vehicle technology can contribute to the improved protection of vehicle occupants from the consequences of accidents.

For this reason, the DVR demands that if possible, all vehicles must be equipped with active safety systems in order to prevent accidents. In contrast with rural or urban roads, at the high speeds, or the typical types of misconduct involved in motorway driving, these active safety systems have a different effect.

According to Federal Statistical Office (DESTATIS), the main causes of accidents on motorways are “distance”, “inappropriate speed” and “overtaking”. The DVR assumes that in particular emergency braking assistants, which are usually combined with an adaptive cruise control, have the greatest effect for preventing motorway accidents. Intelligent speed assistants (ISA) can also effectively ensure compliance with speed limits and optimum speeds (DVR Board resolution “Intelligent Speed Assistance - ISA” (2018)). Furthermore, especially lane keeping assistant systems and lane change assistance systems are useful driver assistance systems. Because motorway driving is often monotonous and increases driver fatigue, fatigue detection systems can also be regarded as effective for preventing motorway accidents (DVR Board resolution “Driving Fatigue” (2009)).

Furthermore, the DVR demands that industry and government further develop passive safety systems to reduce the effects of accidents. These passive systems, especially those which protect vehicle occupants, are considered to be highly effective, especially at the high speeds on motorways. However, only relatively slight increases in safety are to be expected from further developments, as the most effective passive systems are both well developed and widespread. In order to ensure that the existing systems are actually used, installation of seat-belt reminder systems should be mandatory to ensure that all vehicle occupants use seat belts. (DVR board resolution “Measures to Increase the Ratio of

Seat Belt Use" (2011)).

Finally, automation and connected mobility must be increasingly promoted, as further progress in safety is to be expected from this (DVR resolutions "Enhanced Road Safety due to Vehicle-2-X Communication" (2017), "Automated Driving Functions" (2017), "Highly Automated Driving" (2015)).

Connected systems could contribute to the improvement of "defensive driving". By communication between vehicles, distances and speed differences can be automatically optimised even if the vehicles are not in direct "visual contact". Likewise, warnings of foreseeable hazards such as the end of a traffic queue or icy roads can be given in good time. In addition, directed information from traffic control centres can be communicated to vehicles.

The various levels of automated driving will first be introduced on motorways, because here the complexity of traffic situations is lower in comparison with other roads. Automated vertical and lateral guidance as well as automated lane changes can be performed with greater safety if there are no large speed differences.

## **Traffic enforcement**

On German motorways traffic enforcement particularly includes compliance with speed limits and driving and rest times for HGV traffic. The two factors frequency and level of sanctions are decisive for successful enforcement.

The DVR considers targeted monitoring of all road users to be an essential element of road safety work, which prevents serious road accidents and therefore protects people against severe suffering. In particular, driving at excessive speeds often causes road accidents which have serious consequences to life and limb.

The DVR resolution "Traffic Enforcement" (2014) <sup>2</sup> demands from the Interior Ministries of the federal states and their police authorities:

In order to have the greatest possible effect, traffic enforcement must be as widespread as possible and not foreseeable for individual drivers.

Special traffic enforcement campaigns such as "Sicher.Mobil.Leben"

(*Safe. Mobile. Life*), which replaced the former “speed check marathon” should be continued and further developed. On the one hand, in order to be preventively and repressively active on a particular day with considerable enforcement density throughout Germany, and on the other hand, to draw greater public attention to traffic enforcement.

Fines for speeding offences on motorways must be increased.

The police must provide more personnel for traffic enforcement so that efficient road safety work can be ensured, especially on motorways.

Excellent training of traffic enforcement staff must be a matter of course. Regular further training of this group of people is essential. The training and further training itself should be continuously evaluated and improved. Traffic enforcement equipment must be continuously adapted to the latest technology in all federal states.

“Section Control” (speed checks on road sections) should be implemented without delay by all federal states as a measure to monitor sections with high accident concentrations which cannot be mitigated by infrastructure measures. The federal government should create a uniform legal basis for this.

The board resolution<sup>2</sup> “Section Control” (2010) recommends performance of a model trial according to the recommendations of the 47th German Traffic Court Conference.

## **Traffic Law**

Traffic law provides further opportunities to increase road safety on German motorways.

In contrast to many other EU states, there is no generally applicable speed limit for all types of vehicle over the entire German motorway network.

The Board of DVR has agreed at its meeting on 11<sup>th</sup> May 2020 on a resolution regarding general speed limits on German motorways. DVR demands general speed limits for all vehicles on German motorways in order to sustainably reduce the number of serious injuries and road accident fatalities:

“In the sense of Vision Zero, measures are to be taken which are

suitable to reduce the number and severity of road accidents. A general speed limit on German motorways is expected to have a significant effect on the prevention of serious accidents. (...)

The German Road Safety Council proposes an additional general speed limit on German motorways also for passenger cars without trailers, motorcycles, trikes and quads as well as other vehicles up to a total permissible weight of 3.5 t.

There are several reasons for a general speed limit of 130 km/h on German motorways: The general public is already aware of this value as it is the current recommended speed on motorways and therefore a high level of acceptance is to be expected. It is also the most widespread speed limit in Europe.

On suitable sections, an increase of the permitted speed limit may be allowed by placement of the speed limit sign 274 with a special justification.

The DVR also demands a considerable increase in the use of intelligent traffic systems on German motorways in order to mitigate situational effects such as weather, road works, accidents, congestion risks and other road safety impairments by adjusting speed limits for individual types of vehicle.”

Road accidents due to the influence of alcohol often have especially serious consequences. Because of this, in the board resolution “Alcohol Ban While Driving” (2011) the DVR demands an absolute ban on alcohol while driving, in order to minimise the risk of causing serious road accidents. It can be assumed that such a ban would also improve road safety on motorways.

Statistics show a decrease in alcohol related road accidents. Such a ban would further promote this general positive development. The social acceptance of a total ban on alcohol while driving is very high and the introduction of this ban for novice drivers has already shown a great effect and saved a large number of lives.