

“Focuses on Heavy Goods Vehicle Accidents in Germany”
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Introduction

Accidents involving heavy goods vehicles (goods vehicles over 12 tonnes maximum permissible gross weight) usually have a significantly higher accident severity than other accidents. Furthermore, isolated cases are given special attention in the media, for instance if it comes to pileups with closures of motorways or accidents with hazardous materials.

The Federal Highway Research Institute (BASt), commissioned by the Federal Ministry of Transport, Building and Housing, therefore evaluated the general development and structure of heavy goods vehicle accidents and analysed special aspects. In addition to accidents on motorways and accidents involving foreign goods vehicles, problems such as driver fatigue, contour marking of trucks and trailers and problems because of overtaking heavy goods vehicles were investigated in the study.

Method

The study is based on the official German statistics on road traffic accidents, which are given yearly to the BASt for accident research purposes and which contain the data recorded by the police. All personal injury accidents from 1995 up to 2001 form the basis of the investigation.

The fact that vehicle-related data, such as the maximum permissible gross weight, is not recorded by the police but added in the accident data files by the Federal Motor Transport Authority (Kraftfahrt-Bundesamt) leads to the problem that only German vehicles can be distinguished by their weight. Because of that, the following analyses focus on the heavy goods vehicles registered in Germany. In the origin study it was attempted to give an overall estimation of the number of accidents with heavy goods vehicles including foreign vehicles and those vehicles with unknown vehicle-related data.

Discussion

In 2001, there were 12,548 accidents with personal injuries involving heavy goods vehicles. These accidents resulted in 17,696 casualties including 733 fatalities. Compared to the year 1995 the number of accidents with personal injuries is 6% and the number of persons killed is 15% below the initial value. As shown in picture 1 there was not a continuous process of decrease. Especially the number of fatalities shows significant changes in between successive years (e.g. 1998 (742) to 1999 (825): +11% and 2000 (872) to 2001 (733): -16%; Table 1).

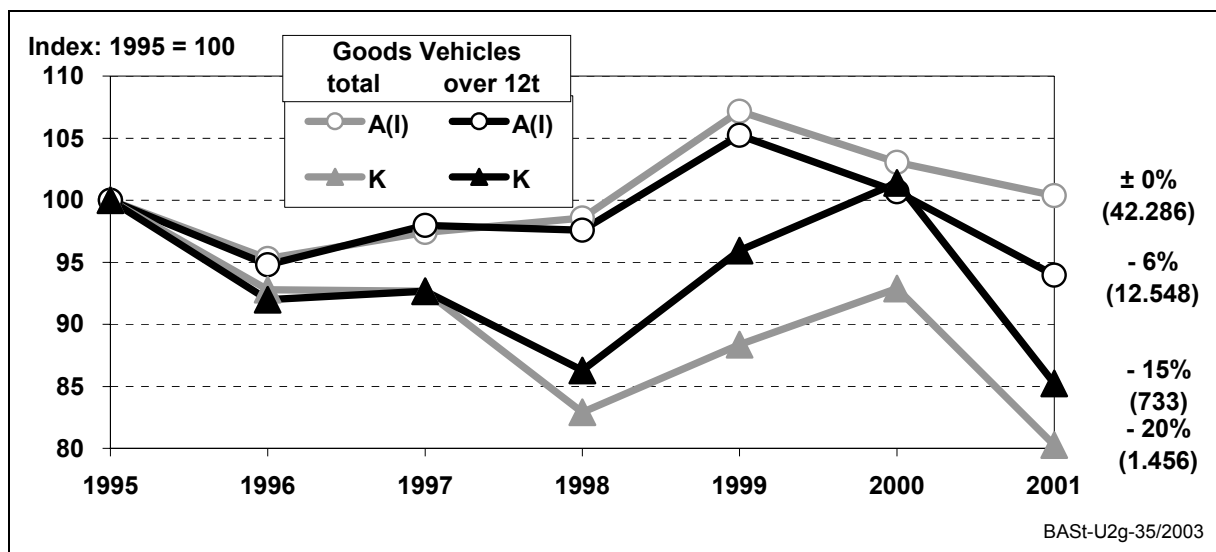
The number of injury accidents with (German) heavy goods vehicles over 12t maximum permissible gross weight has a share of 30% in all accidents involving all kinds of goods vehicles (42.286) and of 3,3% in all injury accidents in 2001. Picture 1 shows a comparison of the accident development of all goods vehicles and those over 12 tons registered in Germany. The development of the accident numbers is nearly the same, but regarding the development

of the number of fatalities the decrease of the heavy goods vehicles (-15%) is less than it is in the group of all goods vehicles (-20%).

	1995	1996	1997	1998	1999	2000	2001	Changes 2001-1995
Accidents involving (german) heavy goods vehicles over 12t max. permissible gross weight								
Injury Accidents among them:	13.356	12.662	13.084	13.032	14.054	13.447	12.548	-6,0%
Fatality Accidents	764	713	731	684	722	762	662	-13,4%
Casualties among them:	18.816	17.762	18.519	18.275	19.938	19.152	17.696	-6,0%
Fatalities	860	791	797	742	825	872	733	-14,8%
Seriously Injured	5.156	4.637	4.810	4.596	4.845	4.517	3.932	-23,7%
Slightly Injured	12.800	12.334	12.912	12.937	14.268	13.763	13.031	+1,8%

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Table 1: Accidents involving goods vehicles and casualties (1995 - 2001)



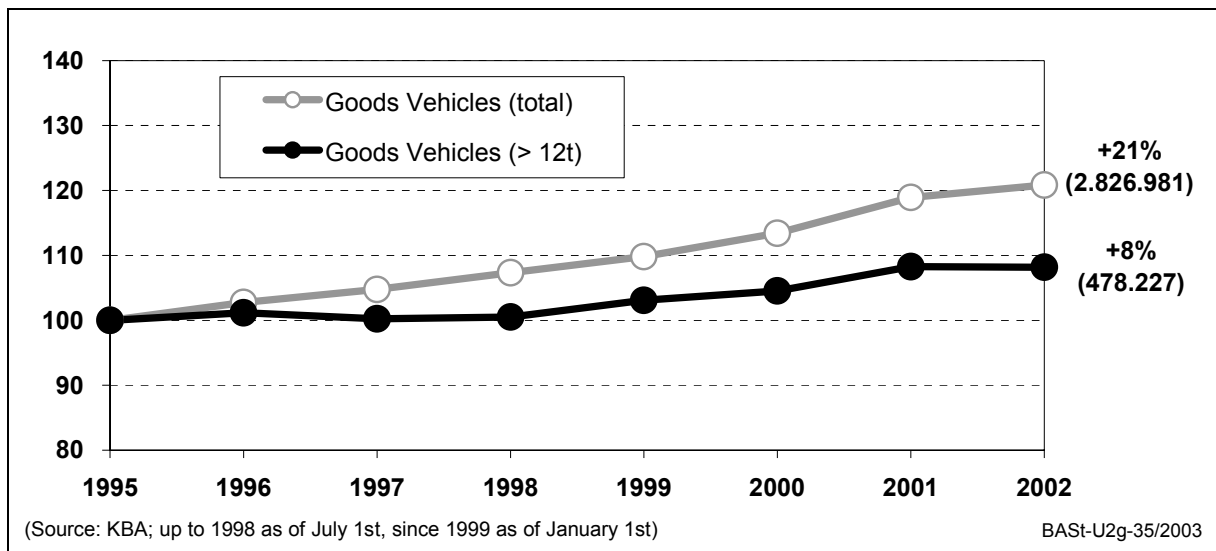
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Picture 1: Accidents involving goods vehicles and fatalities - total and over 12t (1995 - 2001)

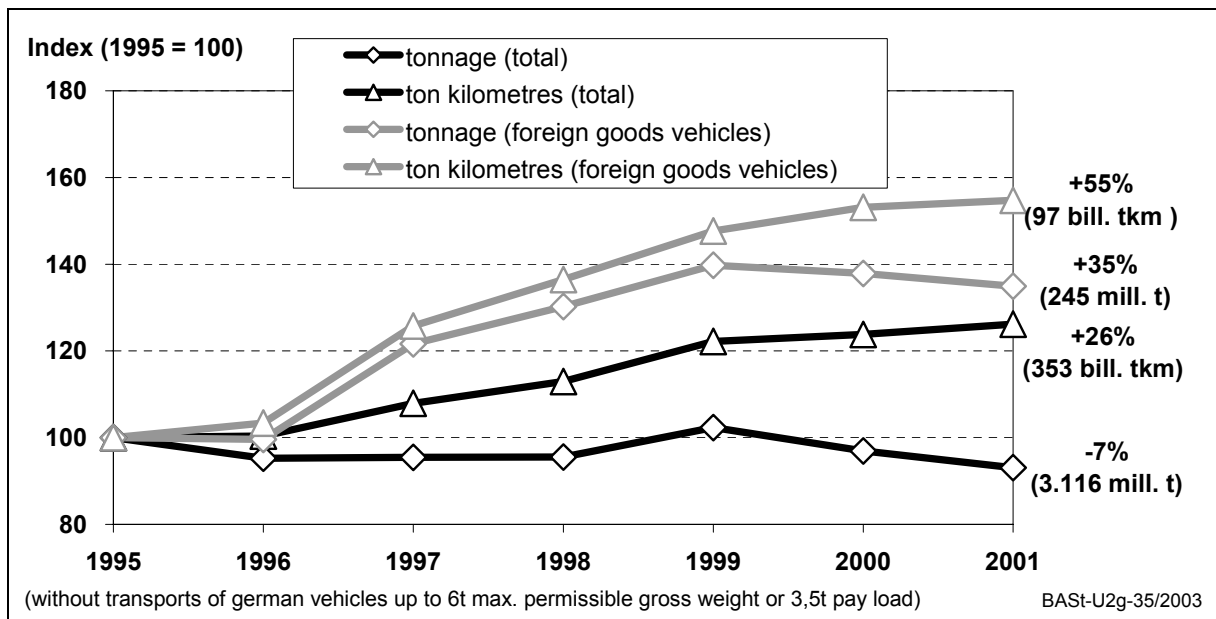
One available reference standard and indicator for goods transportation on streets which can be divided into vehicle weight groups is the vehicle stock. Whereas the number of accidents with heavy goods vehicles decreased from 1995 to 2001, their stock increased by 8% (Picture 2). In 2002, there were 478.227 goods vehicles over 12t registered. Therefore the vehicle stock-related-risk of having an injury accident and being killed fell during the examined time period.

Other indicators of transported goods in Germany are the tonnage and the ton kilometres (Picture 2). Those can be grouped into transports with domestic and foreign vehicles. Whereas the total tonnage of transported goods shows a slight decrease (-7%), the total amount of ton kilometres increased by 26% in the viewed period. This means that the average distance covered has increased. A noticeable stronger increase is shown by the development of the tonnage (+35%) and the ton kilometres (+55%) of foreign vehicles.

At the beginning of the text it was stated that the number of fatalities and persons seriously injured at heavy vehicle accidents decreased more than the number of accidents. As a result,



Picture 2: Vehicle Stock of goods vehicles and fatalities - total and over 12t (1995 - 2002)

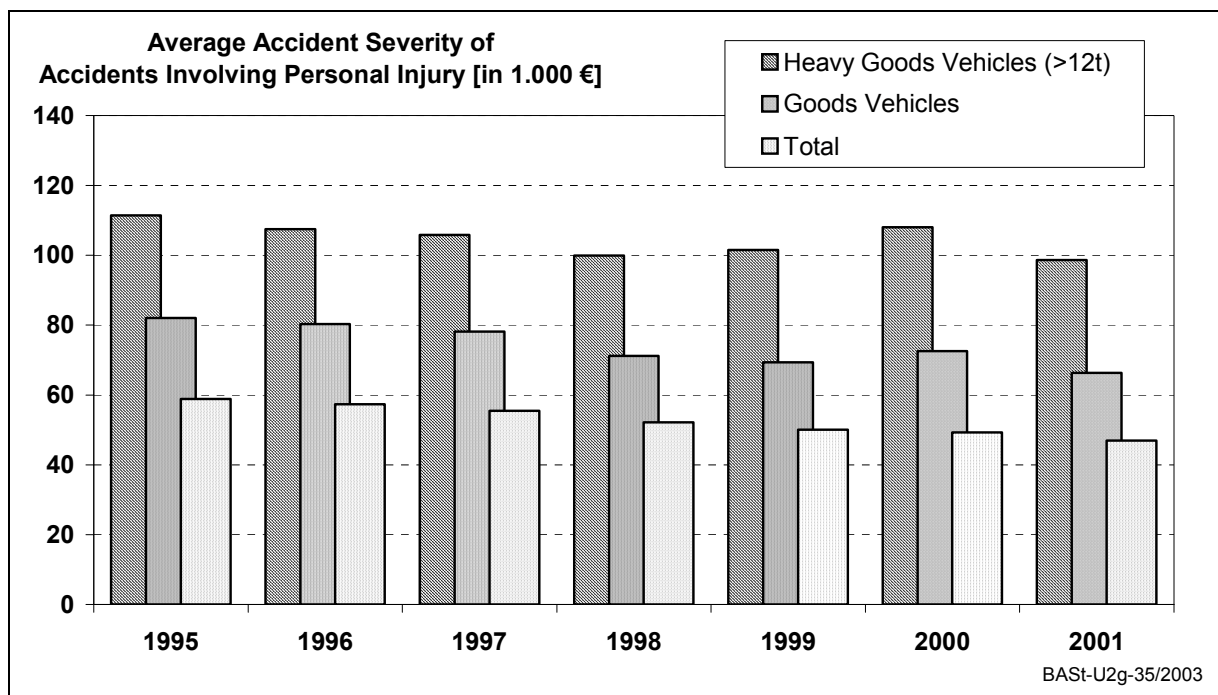


Picture 3: Tonnage and ton kilometres of transported goods in Germany (1995 - 2001)

the accident severity has also decreased.

To get an index for the accident severity, the fatalities, severe and light injuries were weighted with the cost of personal injury (which are calculated yearly by the BAST) and the total costs were related to the number of accidents. The so obtained average accident severity is expressed in Euro per accident.

The average accident severity of heavy goods vehicle accidents in 2001 was about 99T €. Since 1995 (111T €) a decrease of 12% can be detected. The level of accident severity for this group of vehicles is noticeably higher than that for all goods vehicle accidents (66T €) and even higher than the level for all injury accidents on German streets in total (47T €). Furthermore, the decrease of this index for the heavy goods vehicles is not as strong as it is for the two other groups. Their accident severity has fallen by 20%.

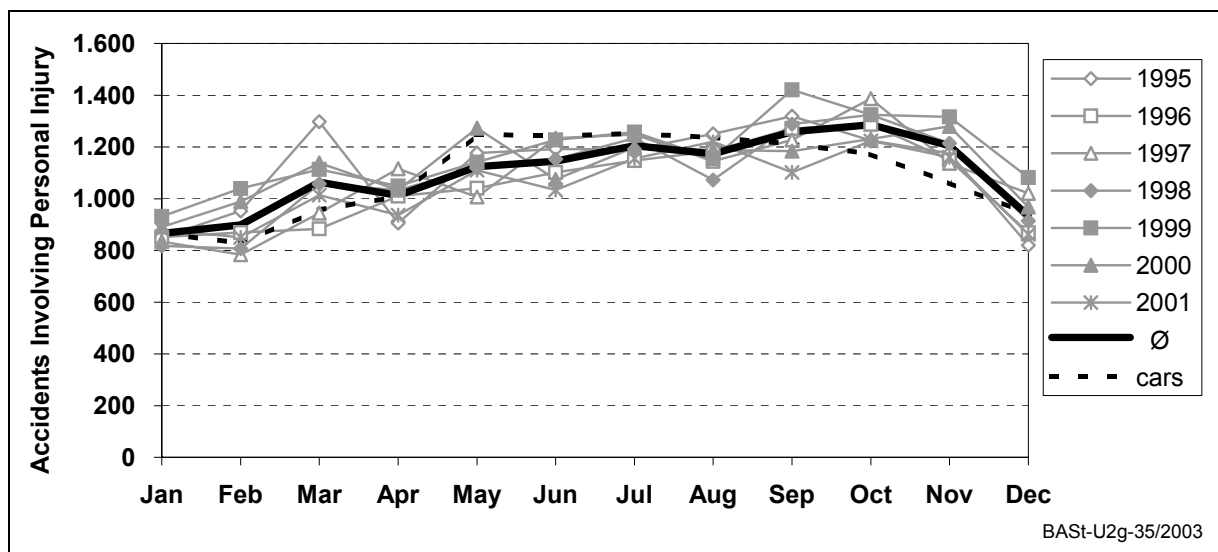


Picture 4: Accident severity of injury accidents by different vehicle groups (1995 - 2001)

The monthly distribution of accidents with heavy goods vehicles shows a nearly continuous rise from January to October. December is marked by a lower number of accidents. This fact can be put down to the Christmas holidays and to the turn of the year. The number of accidents with heavy goods vehicles is about 800 to 1.000 in the winter months December and January, while it is about 1.200 to 1.400 accidents in the months September and October.

Variations in the accident numbers of particular months can occasionally be explained by the different spread of holidays or weekend days over the months for the different years. This is especially the case in March and April.

The question of the basic increase of the accidents involving heavy goods vehicles in the first ten months can not be answered finally. Assumptions about a possible connection with production indices or foreign trade development could not be proved.

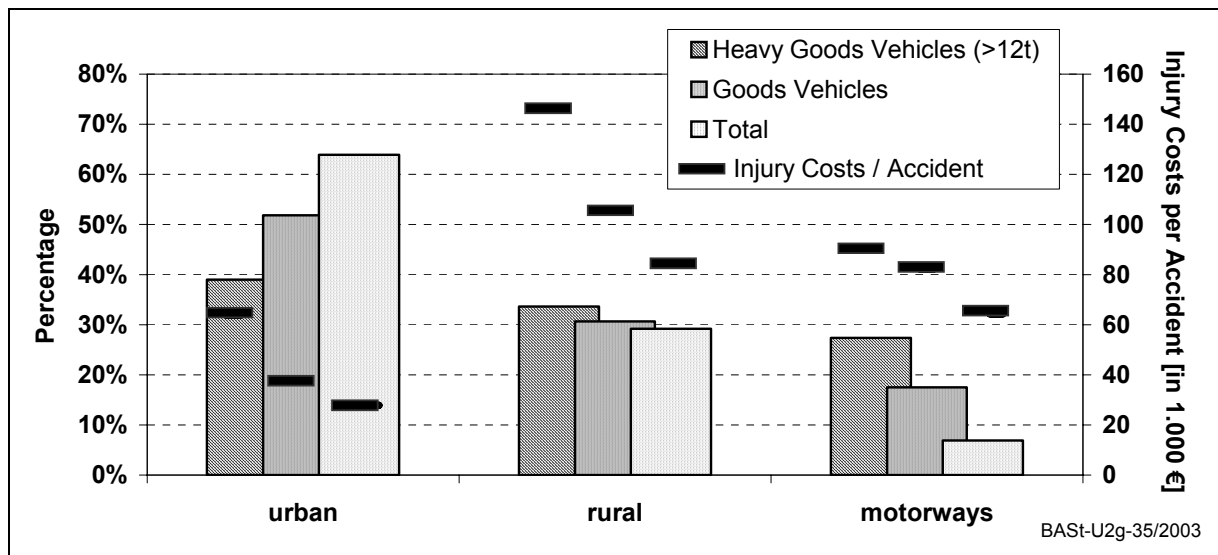


Picture 5: Injury accidents with heavy goods vehicles (>12t) by months (1995 - 2001)

Accidents with heavy goods vehicles happen mainly on urban roads (2001: 4.893 = 39%). The Share on rural roads is 34% (4.219) and on motorways 27% (3.436). In comparison with all accidents involving goods vehicles and all injury accidents in total (picture 6) the share on rural roads is almost equal. In urban areas the share is clearly higher for goods vehicle accidents and even higher for all injury accidents than for accidents with heavy goods vehicles. The share of accidents with heavy goods vehicles on motorways is with 27% higher than in the two other groups (18% / 7%).

The severity of accidents with heavy goods vehicles is highest on rural roads with 164T € per accident. This can be explained by a great number of accidents with oncoming vehicles. On motorways the accident severity is about 90T € per accident. Although the severity on rural roads is much higher than it is on motorways, the accidents on motorways are in the centre of interest for two reasons in this report. One is the fact that motorway-accidents are mentioned explicitly as a focus in the German traffic safety program. The other reason is the position of heavy goods vehicle accidents in the media, especially when it comes to pileups with closures of motorways or accidents with hazardous materials.

In 2001, 3.436 (27%) of the accidents involving (German) heavy goods vehicles over 12t maximum permissible gross weight occurred on motorways and 5.369 casualties were counted (Table 2). 160 of them were fatalities, 1.266 persons were seriously and 3.943 slightly injured. Compared to the year 1995 there is a noticeable decrease of 17% in the number of fatalities and seriously injured persons. In 2001, the number of slightly injured persons was



Picture 6: Injury accidents with heavy goods vehicles (>12t) by months (1995 - 2001)

	1995	1996	1997	1998	1999	2000	2001	Changes 2001-1995
Accidents involving (german) heavy goods vehicles over 12t max. permissible gross weight								
Injury Accidents among them:	3.193	3.163	3.265	3.279	3.692	3.662	3.436	+7,6%
Fatality Accidents	163	197	170	164	200	196	143	-12,3%
Casualties among them:	5.121	5.080	5.187	5.136	5.933	5.734	5.369	+4,8%
Fatalities	192	232	197	192	240	248	160	-16,7%
Seriously Injured	1.518	1.396	1.383	1.442	1.532	1.485	1.266	-16,6%
Slightly Injured	3.411	3.452	3.607	3.502	4.161	4.001	3.943	+15,6%

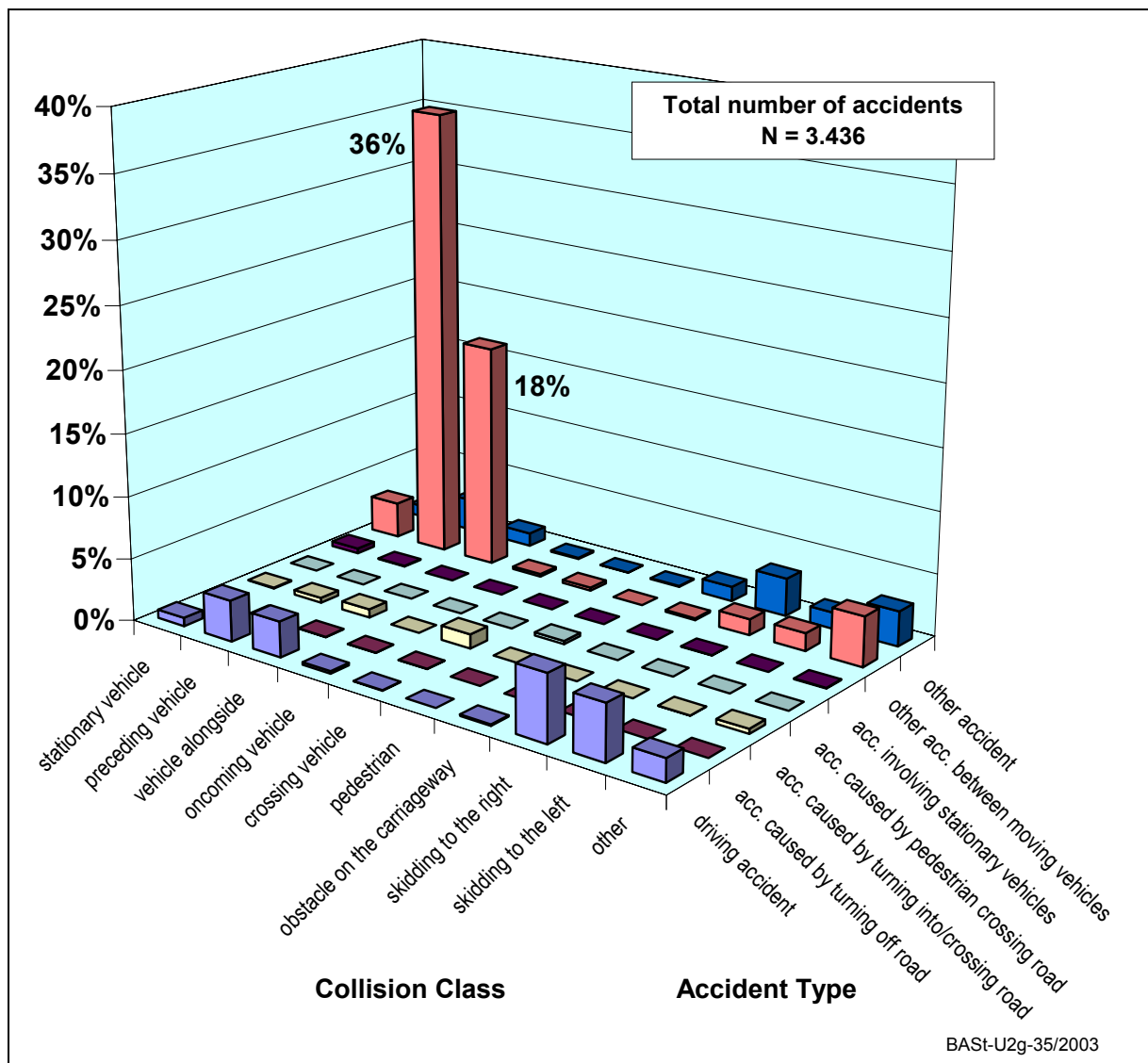
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Table 2: Accidents involving goods vehicles and casualties on motorways (1995 - 2001)

16% higher than in 1995. Especially the number of fatalities on motorways shows significant changes in between successive years. For example, a rise of 25% from 1998 (192) to 1999 (240) and a decrease of 35% from 2000 (248) to 2001 (160). Therefore 2001 was the year with the lowest number of fatalities on motorways.

The most common accident type of heavy goods vehicle accidents on motorways with a share of 64% is the accident between vehicles moving along in carriageway (in picture 7: “other acc. between moving vehicles”). Considering the collision class, this accident type is characterised mainly by collisions with preceding vehicles (36%) and by those with vehicles moving laterally in the same direction (“vehicle alongside”; 18%).

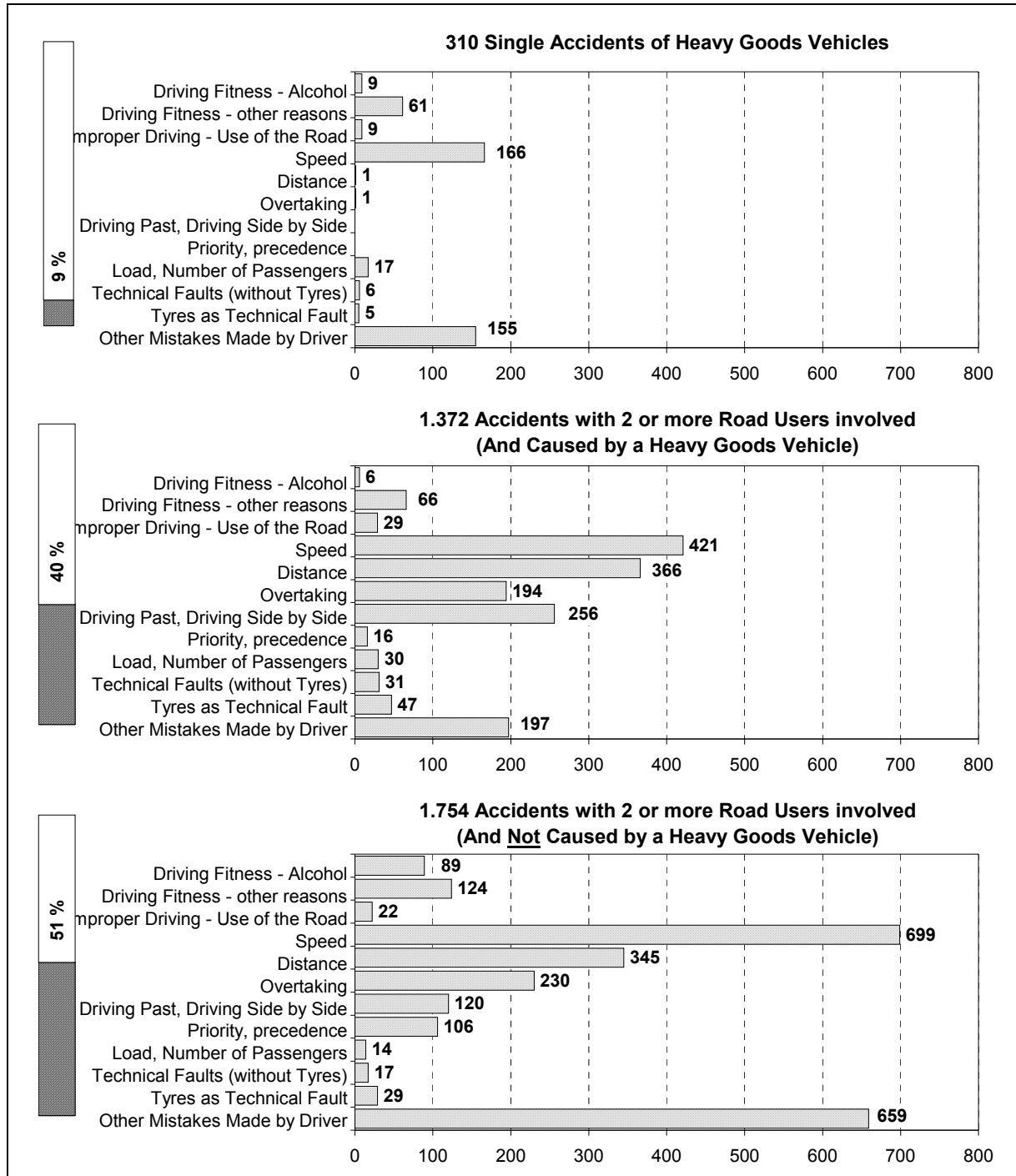
Driving accidents on motorways, where the driver lost control of his vehicle, are named in 19% of all cases. The main collision class of this accident type is skidding off the road, in 5,3% of all motorway accidents to right and in 4,5% to the left.



Picture 7: Accidents involving heavy goods vehicles on motorways by accident type and collision class (2001)

9% (310) of the accidents with heavy goods vehicles in 2001 were single accidents (Picture 8). The main cause of the single accidents is speed with 166 cases. In 155 cases there was no concrete accident cause assigned to the accident participant. Proceeding from their personal judgement, the police officers can name three participant-related accident causes for the main responsible participant and for one other participant, so there could be multiple entries in the described categories.

When there are two or more participants involved and the heavy goods vehicle is assigned to



Picture 8: Causes of accidents involving goods vehicles on motorways by main responsible for accident (2001)

be the main responsible participant (2001: 40%) the main causes are speed (421=31%) and distance (366=27%). Also, mistakes in overtaking and driving past or driving side by side are significantly high in this group (14% and 19%).

In the case of accidents in which the driver of the heavy goods vehicle is not assigned to be the main responsible participant (2001: 51%), speed led to the accident in 40% (699). The second strongest group of accidents causes is the rest group of "other mistakes by the driver". Main opponents of the of the heavy goods vehicles in motorway accidents with personal injuries are the passenger cars (76%).

Conclusion

The number of accidents involving heavy goods vehicles (German vehicles over 12t) within the years 1995 to 2001 was nearly constant. With 12.548 injury accidents the year 2001 shows the lowest number of injury accidents. In the year 1999 there was a negative peak with 14.054 injury accidents. Especially concerning the fatalities there is a remarkable change of absolute numbers through the years noticeable. The severity of accidents with heavy goods vehicles shows a slight decrease, but because of the dependence on the fatality numbers there is also some fluctuation viewable. The level of accident severity of heavy goods vehicles in 2001 (99T €) is nearly twice as high as the severity of all injury accidents. Although the highest severity was found on rural roads, the accidents on motorways attract higher attention in the media. This is especially the case when it comes to pileups with closures of the motorway.

160 persons were killed and 5.209 were injured in 3.436 heavy vehicle accidents involving personal injuries on motorways. More than half of these accidents were accidents between vehicles moving along in carriageway including a collision with preceding vehicles or vehicles alongside. In 2001, 9% of the motorway accidents with heavy goods vehicles were single accidents. In 40% of the accidents with two or more participants the driver of the heavy goods vehicle was the main responsible. In 51% of the cases the main responsible participant was not the heavy goods vehicle.

The main accident cause (regardless of the main responsibility) is "speed". 54% of the single accidents in 2001 were caused by "speed". If there were two or more participants and the heavy vehicle driver is the main responsible also "distance" as well as "mistakes while overtaking" and "mistakes while driving past or side by side" play a role as accident causes.

Because of the problem of determining a vehicle as a heavy goods vehicle in the accident data such for foreign vehicles and vehicles signed out an attempt of an overall estimation of the total number of accidents involving heavy goods vehicles was made. According to that the total number of such accidents lies between 14.000 and 15.000 for the year 2001. This is between 11% and 20% more compared to the number of accidents with German goods vehicles over 12t.