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Heavy Goods Vehicle Accidents on Motorways in Britain

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1. Introduction

The overall casualty rate per vehicle-km for motorways is less than a fifth of the casualty rate for all roads in Great Britain. However, motorway accidents are generally more serious than those on other roads. Motorways have relatively high flows of heavy goods vehicle (HGV) traffic. Comparatively few occupants of HGVs are injured in road accidents. However, many more people are injured in accidents involving HGVs. Therefore, HGV accidents on motorways are considered in this research. The features of HGV accidents can be very different from those of car accidents. Some findings from the analysis are believed to give useful information to improve traffic safety condition on motorways.

2. Overview of HGV traffic on motorways

General statistics for HGVs on motorways in Britain are mentioned. Average distance travelled per annum per HGV has increased gradually for ten years (38,000 km in 1980 to 41,000 km in 1990). This indicates that the activity of HGVs has increased faster than their numbers. About 7 percent of the traffic on all roads consisted of HGV (29,000 million vehicle-km) in 1991. The absolute number of HGVs has increased but the percentage of all motor vehicles that they form has fallen. On the other hand, the road length of motorways has been extended to 3,100km in 1991 in Britain. The rate of extension of the length is not very large[1]. Therefore, the traffic condition seems to be worsening in terms of traffic flow, and this gives rise to concern in terms of safety.

According to average 24-hour flow at selected points on the motorway networks, the percentage of HGVs on motorways lies between 5% and 20% of all traffic, with an average of 12.0%.

The percentage differs by locations and routes. The motorway M25 has higher rates than others, such as 19.7% and 19.0%. In the metropolitan area, there are motorways with low percentage of HGV traffic, such as M4 and M3 (about 8%). There are many motorways with high HGV traffic in the West Midlands (around 15%). In the north, there are a few motorways, but on the M8 and M90 the proportions of HGVs (around 8%) are lower than in other places[1]. The differences in the percentage of HGVs are considered to reflect the major trip purposes on each motorway.

3. Analysis of HGV accidents on motorways

3.1. Statistics for HGV accidents

The general characteristics of HGV accidents are discussed first. Although the rate for HGV driver casualties (32 per 100M vehicle-km) is a third of that of car driver casualties (10), the percentage of killed and killed or seriously injured among casualties in HGV accidents (1.7% and 19.0% in 1991) are both higher than those for car accidents (1.2% and 14.4%)[2]. This shows that once an HGV accident happens it can be more serious than one involving a car.

Considering accidents by location, the rate of accidents involving HGVs on non built-up roads (84 per 100M vehicle-km) is 1.8 times higher than that on built-up roads (46). And also over 80% the HGV occupant casualties are drivers (that is 80% on built-up and 85% on non built-up roads)[2].

On motorways, the number of casualties in accidents involving cars (8,859) is 3.5 times larger than that involving that involving HGVs (2,504).

On A roads, the former number is 133,295 and the latter, 11,613. In this case, the number of casualties in car accidents is 11.5 times larger than for HGVs. In other words, the risk of HGV accidents on motorways is relatively higher than that on all purpose A roads.

3.2. Detailed analysis for HGV accidents

The statistics for accidents involving HGVs on motorways in Britain are next used to discuss the present situation more precisely.

3.2.1. Statistics for accidents

The statistics for motorway accidents involving one or more HGV are shown in Table 1. The table shows total number of accidents for the 3 years from 1989 to 1991. There were 13,583, 14,035 and 13,119 accidents in 1989, 1990 and 1991 respectively.

For the vehicle type, most of accidents involved no towing or articulated vehicles. The proportion

involving articulated vehicles is smaller for single vehicle than multi vehicle accidents.

When accidents are categorised by abnormal movement, skidded, overturned and skidded+ overturned account for 23.4, 15.5 and 18.9 percent respectively of single-vehicle accidents. Among these groups, overturned accidents tend to be somewhat more serious than the other types in that the proportion that are fatal or serious is larger than that of the other types. In two and three or more vehicle accidents, less than 23 percent of the accidents involved any abnormal movement and the majority of these involved skidding. The proportion involving jackknifing is also smaller for multiple-vehicle accidents than for single-vehicle accidents.

For the locations of accidents, as is expected, many accidents happen on the main road -i.e. the carriageway excluding slip roads (93% in total). More precisely, about 85% of one vehicle accidents occur on the main road. About 90% of two vehicles and about 95% of three or more vehicles accidents occur on the main road, but for fatal 2-vehicle accidents the percentage is less than 84. In other words, the proportion of accidents that occur on the main roads is even higher for accidents involving many vehicles than for single-vehicle accidents.

Most other accidents happen on a lay-by or hard shoulder, off the carriageway, or in entering or leaving the main road. In particular, over ten percent (about 15% in 1989 and 1990) of the two-vehicle accidents occur on a lay-by or the hard shoulder.

3.2.2. Statistics for casualties

Casualties in the accidents involving HGVs are now considered. The statistics used are for casualties in accidents on motorways according to the number of vehicles, of which at least one was an HGV.

In single-vehicle HGV accidents, 28 percent of the casualties were fatal or serious (173 casualties out of 610), whereas in accidents with more than two vehicles only 20 percent were fatal or serious.

In two vehicle accidents, about 65% of casualties were car drivers. Most of the rest were HGV or LGV occupants. This tendency can be observed in the result for three or more vehicles accidents as well.

4. Discussion

Some important features of HGV accidents on motorways in Britain are revealed from statistics in this study. In particular, HGV traffic usually seems to relate with industrial activity in an area and tends to have more serious accidents on motorways rather than on all-purpose roads. In terms of the statistics, accident involvement of other vehicles has been considered as well.

Table 1 Motorway accidents involving one or more HGV (1989-1991;total accidents)

	Fatal	Serious	Slight
No Tow/Articulation	1,175	6,049	29,527
Articulated Vehicle	202	696	2,263
Double/Mult Trailer	4	7	25
Caravan	3	48	211
Single Trailer	11	70	307
Other Tow	5	21	62
Undefined	1	3	47
Non	981	4,655	24,252
Skidded	218	1,299	5,568
Skidded+Overturned	80	398	1,011
Jackknifed	26	76	256
Jackknifed+Overturned	8	17	68
Overturned	78	433	1,231
Undefined	10	16	56
Leaving Main Road	14	96	505
Entering Main Road	7	62	397
On The Main Road	1,248	6,341	30,360
On Minor Road	5	34	306
On Service Road	2	17	77
On Lay-By/Hd Shoulder	86	171	301
Entering Lay-By/Hd Shoulder	9	32	46
Leaving Lay-By/Hd Shoulder	2	13	41
Not On Carriageway	28	128	408
Missing	0	0	1
Total	1,401	6,894	32,442

These results suggest some countermeasures such as improvement of vehicle system as well as road management. Anti-locking braking systems are one example in terms of vehicle engineering. Also the speed limit for HGVs on motorways can be effective in reducing these accidents. Good vehicles with a maximum gross weight of more than 7.5 tonnes, buses longer than 12 metres and vehicle trailers must not use the right hand lane of motorways having three or more lanes; This is an example of a traffic management measure.

A review of other efforts to reduce HGV accidents in Britain is being carried out as a further study. These results will give useful ideas for safety planning in respect of HGV accidents in Japan through comparison between HGV accidents in Britain and in Japan.

Acknowledgements

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References

[1] The Department of Transport, Transport Statistics Great Britain 1990, HMSO, 1990 and similarly for 1991 & 1992.

[2] The Department of Transport, Road Accidents Great Britain 1991, HMSO, 1992.