



An investigation into factors associated with hard shoulder stoppages

Prepared for Quality Services (TSE) Division, Highways Agency

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Executive Summary

Hard shoulders on UK motorways enable drivers to pull over to the side of the road, in an emergency, without disrupting the flow of traffic. They also give access to emergency services trying to reach the scene of an accident when there are queues on the motorway.

Between June and September 1999 the Highways Agency instigated a questionnaire survey of drivers stopped on the hard shoulder to determine their reasons for stopping and, where vehicles were there as a result of an accident, the circumstances in relation to:

- Prevailing natural conditions such as light and weather.
- Features of the road.
- Driver characteristics.
- The journey.
- The vehicle.

The main findings from this study were as follows:

- i The majority (70%) of vehicles stopped were cars. Sixteen percent were heavy goods vehicles (HGVs) and light goods vehicles (LGVs) in equal proportion. Only 2% each of motorcycles and passenger service vehicles (PSVs) were reported.
- ii Three hundred and sixty vehicles (77% of the total) had stopped on the hard shoulder as a result of accidents. Twenty four of these had been involved in collisions with vehicles already on the hard shoulder. Vehicles hit while parked on the hard shoulder had been there for an average of just over 11 minutes and, in two cases, for as little as 10 seconds.
- iii Of the 360 accidents recorded 11.1% involved death or serious injury, 41.4% resulted in minor injuries and, in 47.5% of cases there were no personal injuries.
- iv Five point six percent of the accidents occurring on wet roads resulted in fatalities, compared with 2.9% on dry roads.
- v Five percent of the accidents reported as having occurred in visibility of less than 1,000m were fatalities. The corresponding figures for 1,000m to 9,000m and 'unlimited' visibility are 3.7% and 2.4% respectively.
- vi A time profile of stops on the hard shoulder throughout the day indicates a steady build up of these occurrences from the early morning to 18:00h.
- vii Nearly 8% of accidents reported at night involved fatalities, compared with 1.5% in daylight.
- viii There were no fatalities in accidents reported as having occurred in the vicinity of road works.
- ix Eight point three percent of the accidents reported as having occurred on concrete surfaced roads involved fatalities, compared with 2.8% on tarmac.
- x All 12 fatalities occurred where the speed limit was 70mph.

- xi Accidents, as indicated by fatalities, were most serious on downhill curves.
- xii There was evidence of alcohol/drugs intoxication in the case of 18 drivers (5%) of those stopped on the hard shoulder as a result of accidents. One third of all the alcohol/drug-related accidents involved death or serious injury.
- xiii Reported accidents in which driver fatigue was evident were proportionally more prevalent between midnight and 06:00h.
- xiv One hundred and forty three accidents (40% of all accidents) occurred in work-related journeys.
- xv No clear relationship was found between the time elapsed between taking a break and the occurrence of the accident, and the severity of the accident in work related journeys.
- xvi Driver distraction was associated with 28.6% of cases involving intoxication and 12.5% of cases involving fatigue, compared with only 7.3% where neither intoxication nor fatigue was involved.
- xvii No marked difference, with respect to accident severity, was found between cars, HGVs and LGVs.
- xviii Mechanical defect was associated with 13.1% of all recorded accidents. This was the case in 24.1% involving LGVs, 11.2% with cars and 4.0% with HGVs.

1 Introduction

Hard shoulders on motorways serve as a refuge where drivers can, in an emergency, pull over to the side of the road without obstructing the flow of traffic. They also provide an access route for emergency vehicles travelling to the scene of an accident in high traffic congestion. In the UK, to facilitate these functions, the law only allows drivers to stop on the hard shoulder in the event of a genuine emergency and not for casual or leisure reasons.

Because of the speed and proximity of passing traffic, the safety of vehicles parked on motorway hard shoulders and their occupants is a major cause for concern. Accidents on motorway hard shoulders and means of improving safety have been reviewed in previous unpublished work by TRL. In a follow-up to this, the Highways Agency instigated a questionnaire survey of drivers stopped on the hard shoulder between June and September 1999. This was carried out with the co-operation of police forces on motorways throughout the UK and co-ordinated by the Cheshire Constabulary. The findings from this are presented in the this report, which aims to determine:

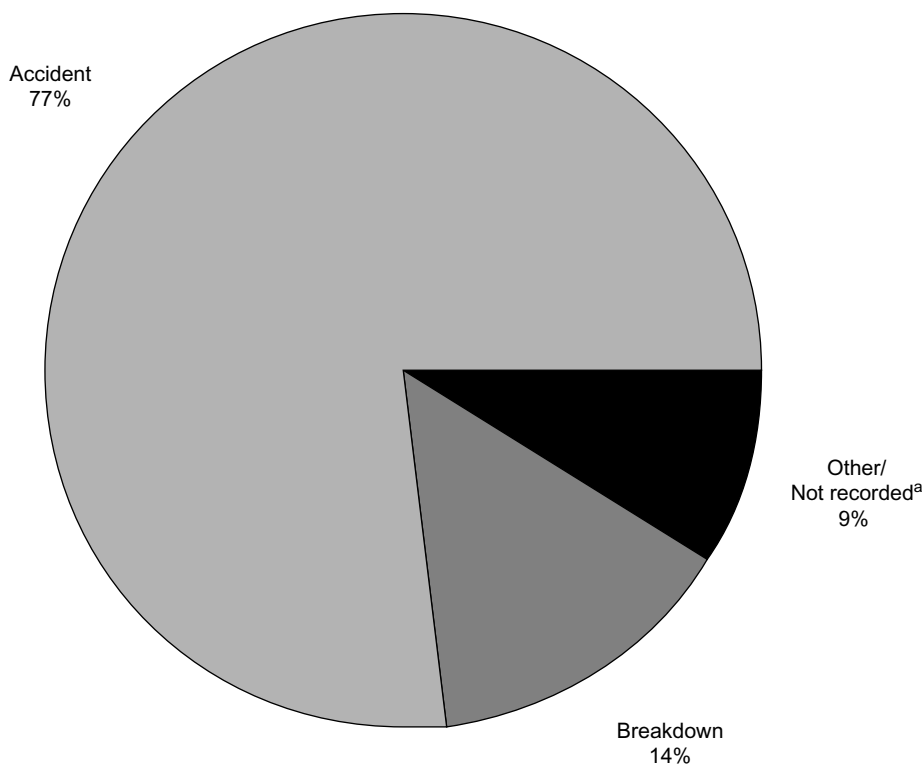
- The predominant reasons for hard shoulder stoppages.
- The influence of weather and light conditions on accidents and their severity.
- Effectiveness of road markings, gradient, alignment and lighting in reducing accidents and their severity.
- Relationship between time of day and driver factors (e.g. age, alcohol, fatigue) and accidents.

Many drivers, who are on their way to or from work, or driving in the course of work, are often under considerable pressure to reach their destinations on time and therefore fail to take a break in their journey. This report investigates the relationship between driver fatigue and the time elapsed between the driver breaking his or her journey (in work-related journeys) and the accident resulting in the hard shoulder stoppage.

2 Reasons for hard shoulder stoppages

A database was compiled containing 466 records of hard shoulder stoppages, collected by 34 police forces, operating on 27 motorways throughout the UK between June and September 1999. Most hard shoulder incidents were as a result of accidents (Figure 1), the 22.5% remaining incidents being largely as a result of breakdowns. It must be borne in mind, however, that the vast majority of non-accident motorway stoppages, attended to by the breakdown services, are not reported to the police and therefore not part of this study. If, however, a vehicle on the hard shoulder was subsequently involved in an accident, the police would be involved and it would then be recorded in this study.

Of the 360 instances of stopping on the hard shoulder as a result of accidents, 40 (11.1%) involved death or serious personal injury, 149 (41.4%) involved slight injury and in 171 (47.5%) cases there was no personal injury.



^a Including illness, abandoned vehicles, vehicle fires and running out of fuel

Figure 1 Reasons for stopping on the hard shoulder

3 Stoppages by vehicle type

The majority of vehicles stopped on the hard shoulder were cars (70%) as shown in Figure 2. Goods vehicles, both heavy (8%) and light (8%), were also prominent. Very few passenger service vehicles (PSVs) or motorcycles were recorded. The remainder were either vehicle types not recorded, or other vehicles which included several with caravans or trailers, a fire appliance, a mobile crane and even a pedal cycle (use of which is illegal on UK motorways). The latter had been abandoned without its owner or rider being traced.

4 Collisions with stationary vehicles on hard shoulder

The hard shoulder is a dangerous place where vehicles and people are at serious risk from being hit by passing vehicles. The longer a vehicle stands on the hard shoulder the greater the risk of it being struck. This raises the question of whether it is safer and/or more economical to repair broken down vehicles *in situ* or tow them away, particularly in the case of the wider vehicles such as heavy goods vehicles (HGVs) (Sherrington 1999).

Out of the 360 accidents recorded in the database, 24 (6.7%) involved collisions with vehicles already on the hard shoulder. About half (13) of these vehicles were on this part of the motorway by reason of having broken down (Table 1). Of those listed under 'other' one vehicle had already been involved in a road traffic accident.

Table 1 Accidents involving stationary vehicles on hard shoulder hit by passing vehicles; listed by reason for being there and by severity of accident

Reason	Accident severity				Total
	Fatal	Serious	Slight	No injuries	
Broken down	1	2	4	6	13
Other	–	–	5	1	6
Law enforcement	–	–	–	2	2
Fire appliance	–	–	–	1	1
Maintenance	–	–	1	–	1
Traffic management	–	–	–	1	1
Total	1	2	10	11	24

One of these 24 incidents involved a fatality, two involved serious injury, 10 were accompanied by only slight injuries, and 11 involved damage only with no personal injuries. In terms of actual casualties, one person was killed, 3 seriously injured and 19 sustained slight injuries.

On average, vehicles which were hit whilst parked on the hard shoulder had been there for just over 11 minutes and, in two cases, for as little as 10 seconds.

Six hard shoulder collisions took place outside daylight hours and, of these, four occurred where there was no lighting.

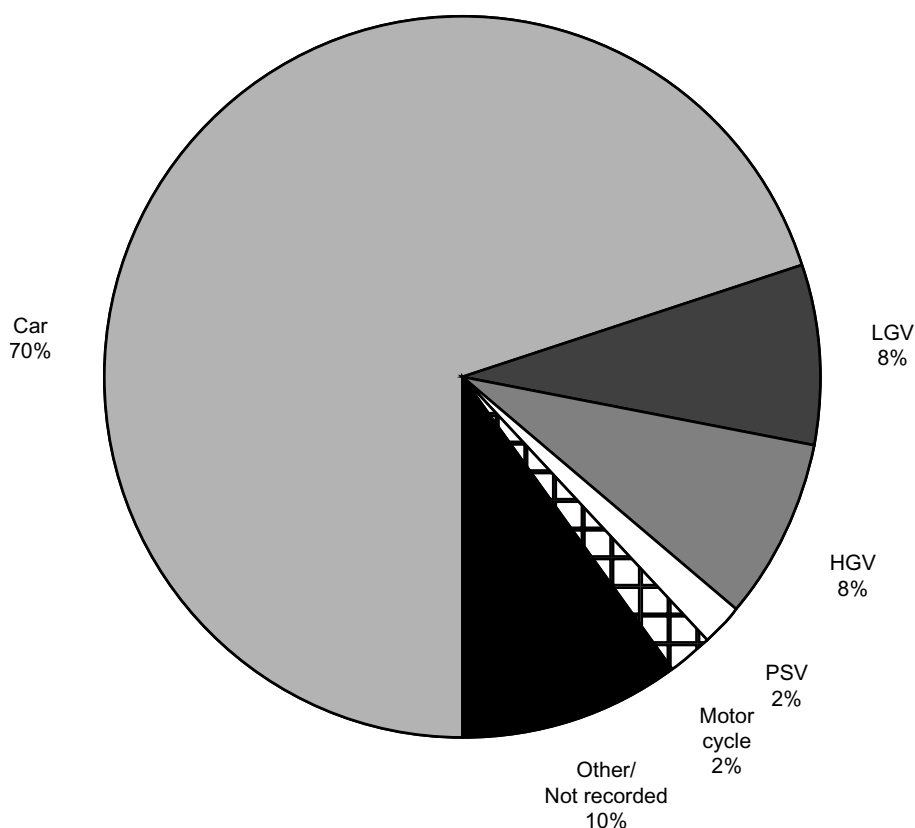


Figure 2 Hard shoulder stoppages by vehicle type

5 Weather and visibility

5.1 Weather

Most of the accidents recorded, 299 (83%) out of 360, took place under fine dry conditions. The incidence of rain was not found to be related to accident severity.

5.2 Road surface condition

The condition of the road surface has been grouped into 3 categories:

- 1 Dry - conditions under which the majority (276) of accidents occurred.
- 2 Wet/damp - with 71 accidents.
- 3 Other/not recorded - with 13 accidents.

Accidents, classed by severity, in relation to road surface condition, are expressed as percentages of the totals in Table 2. Comparing wet and dry road surfaces, these show, on the whole, similar proportions of casualty and non-casualty accidents. However, fatal accidents form 5.6% of the total on wet roads, compared with 2.9% on dry roads.

Table 2 Accidents in relation to road surface condition

Road surface condition	Accident severity (% of total)				Total accidents
	Fatal	Serious	Slight	No injuries	
Dry	2.9	8.3	41.7	47.1	276
Other/not recorded	0.0	7.7	61.5	30.8	13
Wet/damp	5.6	5.6	36.6	52.1	71
All conditions	3.3	7.8	41.4	47.5	360

5.3 Visibility

An accurate assessment of numbers and severities of accidents in relation to visibility is difficult, especially when the estimates of this parameter given in the questionnaires are bound to be subjective ones. In Table 3, accidents, by severity, are expressed as percentages of the totals in relation to three categories of visibility described as being unlimited, between 1 and 9km or less than 1km.

Table 3 Accidents in relation to visibility

Visibility (m)	Accident severity (% of total)				Total accidents
	Fatal	Serious	Slight	No injuries	
<1,000	5.0	6.7	42.5	45.8	120
>=1,000, <=9,000	3.7	9.9	37.0	49.4	81
Unlimited	2.4	8.1	43.5	46.0	124
Not recorded	0.0	5.7	40.0	54.3	35
All visibility conditions	3.3	7.8	41.4	47.5	360

Little can be concluded from this, however, as no information is available on the typical durations of each visibility condition, at what times of day they occurred and their relationship to traffic flows.

6 Time of day and street lighting

The trend in hard shoulder stoppages throughout the day (Figure 3) is generally reflected by stoppages arising from accidents (Figure 4). From about 08:00 onwards there is a steady build-up, culminating in what appears to be an evening rush-hour peak between 17:00 and 18:00. Very few stoppages were recorded between 04:00 and 05:00 and no morning rush-hour peak is discernible. A relatively high number of stoppages were recorded for the early hours of the morning between 01:00 and 04:00.

6.1 Accidents at night

Over 8% of accidents that took place at night involved fatalities, compared with 1.5% of those which occurred during daylight (Table 4).

Table 4 Accident severity at night and during daylight

Daylight/darkness	Accident severity (% of total)				Total accidents
	Fatal	Serious	Slight	No injuries	
Not recorded	0.0	0.0	57.1	42.9	7
Darkness	8.7	8.7	39.1	43.5	92
Daylight	1.5	7.7	41.8	49.0	261
All conditions	3.3	7.8	41.4	47.5	360

6.2 Accidents and street lighting

Further analysis of accidents which took place at night showed no indication that street lighting reduces accident severity. In fact, fatal accidents, as a percentage of total accidents, on lit stretches of motorway at night were significantly more than on unlit stretches (Table 5). For any meaningful conclusions to be drawn from these findings, however, they need to be examined in relation to relative lengths of lit and unlit stretches of road and the traffic flows on them. This information is not available for the roads covered by the survey.

Table 5 Accident severities at night on lit and unlit sections of motorway

Lighting	Accident severity (% of total)				Total accidents
	Fatal	Serious	Slight	No injuries	
Night time lit	23.1	7.7	38.5	30.8	26
Night time unlit	3.1	7.8	39.1	50.0	65

7 Other road features

The general road characteristics associated with the 360 accidents resulting in hard shoulder stoppages is summarised as follows:

- Roadworks: 16 with, 342 without, 2 not recorded.
- Rumblestrips: 318 with, 37 without, 5 not recorded.
- Road surface: 323 tarmac, 36 concrete, 1 not recorded.
- Speed limit: 346 at 70mph, 2 at 60mph, 11 at 30-50mph.
- Coloured hard shoulder: 40 with, 315 without, 5 not recorded.

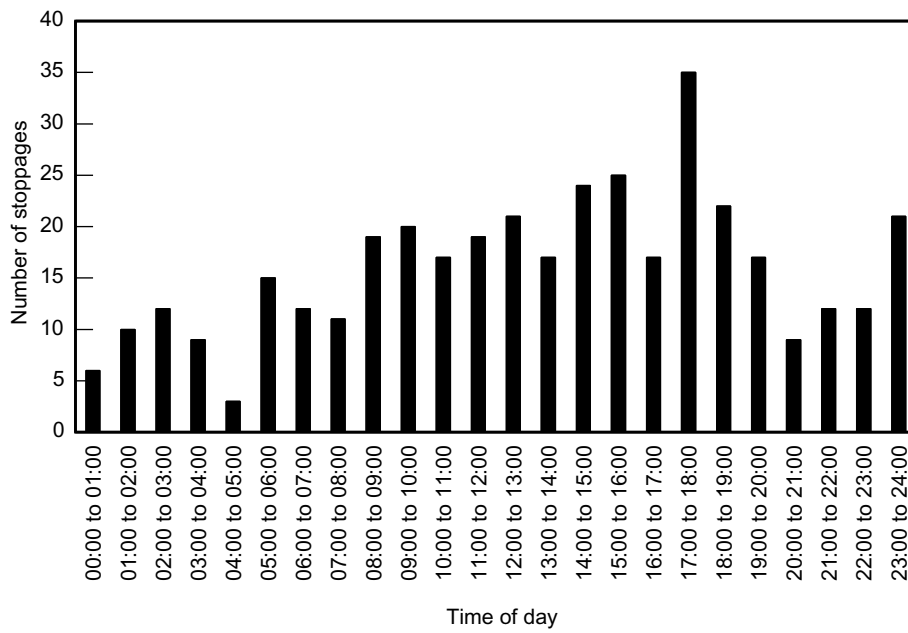


Figure 3 Hard shoulder stoppages throughout the day

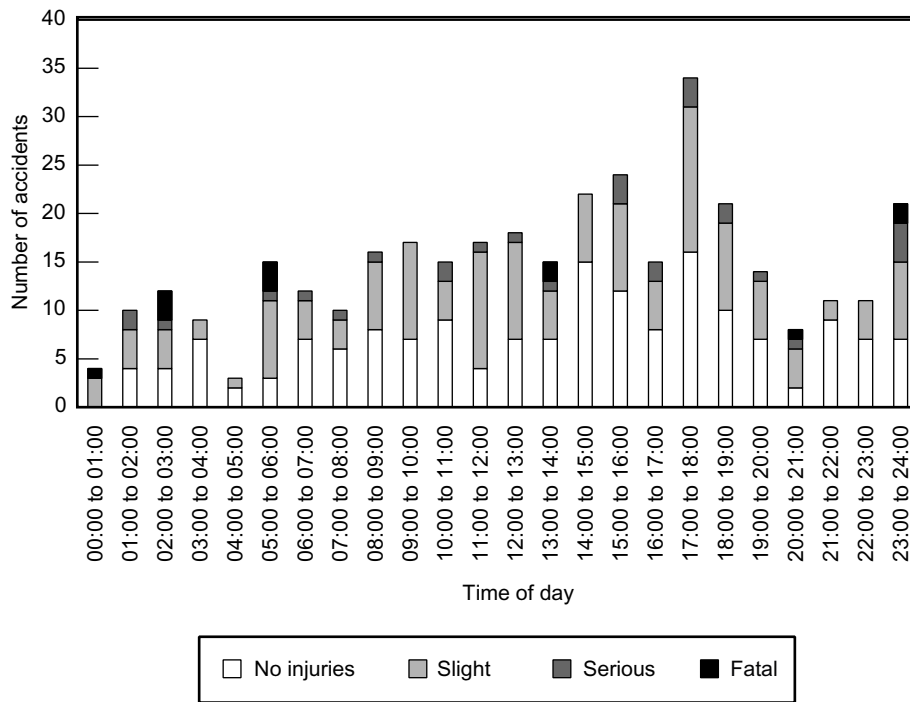


Figure 4 Hard shoulder stoppages due to accidents throughout the day

Road curvature: 102 curves, 228 straight, 30 not recorded.
 Carriageway 54 downhill, 105 flat, 53 uphill, 148 not
 gradient: recorded.
 Lighting: 127 with, 228 without, 5 not recorded.

7.1 Roadworks

Sixteen reported accidents took place where there were roadworks, compared with 342 where there were no roadworks (Table 6). Of those sixteen, 12.5% involved serious injury, 6.3% involved minor injuries and there were no fatalities. In the absence of roadworks 11.1% of accidents involved fatalities *and/or* serious injuries.

Table 6 Accident severity and roadworks

Presence of roadworks	Accident severity (% of total)				Total accidents
	Fatal	Serious	Slight	No injuries	
No	3.5	7.6	43.0	45.9	342
Not recorded	0.0	0.0	50.0	50.0	2
Yes	0.0	12.5	6.3	81.3	16
Total	3.3	7.8	41.4	47.5	360

7.2 Road surface

On a percentage basis accidents reported where the road surface was concrete tended to be more serious in terms of fatalities and serious injuries than those occurring on tarmac (Table 7).

Table 7 Accident severity and road surface

Road surface	Accident severity (% of total)				Total accidents
	Fatal	Serious	Slight	No injuries	
Concrete	8.3	11.1	41.7	38.9	36
Not recorded	0.0	0.0	0.0	100.0	1
Tarmac	2.8	7.4	41.5	48.3	323
Total	3.3	7.8	41.4	47.5	360

Table 9 Accident severity in relation to road alignment

Curvature	Gradient	Accident severity (% of total)					Total
		Fatal	Fatal or serious	Serious	Slight	No injuries	
Curve	Uphill	0.0	20.0	20.0	20.0	60.0	5
Curve	Downhill	12.5	16.7	4.2	37.5	45.8	24
Straight	Uphill	0.0	16.7	16.7	33.3	50.0	30
Straight	Flat	0.0	11.1	11.1	27.8	61.1	18
Straight	Uphill	5.6	5.6	0.0	66.7	27.8	18
Straight	Downhill	0.0	0.0	0.0	16.7	83.3	6
Not recorded	Flat	11.1	22.2	11.1	33.3	44.4	9
Not recorded	Not recorded	0.0	20.0	20.0	40.0	40.0	10
Curve	Not recorded	2.1	12.5	10.4	50.0	37.5	96
Curve	Not recorded	7.1	11.9	4.8	26.2	61.9	42
Not recorded	Flat	2.6	6.4	3.8	42.3	51.3	78
Not recorded	Downhill	0.0	4.2	4.2	50.0	45.8	24

7.3 Speed limit

The vast majority of accidents, and all those involving death or serious injury, took place in areas where the national speed limit for motorways, 70mph, was in force. Speed limits of less than 70mph are in force generally on motorway sections such as slip roads and those where road works are in progress. The two accidents, which were reported in speed limit zones of 40mph or below, involved no personal injury. (Table 8)

Table 8 Number of accidents by severity in relation to speed limit

Speed limit (mph)	Number of accidents by severity				Total accidents
	Fatal	Serious	Slight	No injuries	
30	–	–	–	1	1
40	–	–	–	1	1
50	–	–	2	7	9
60	–	–	1	1	2
70	12	28	145	161	346

7.4 Road alignment and gradient

Where both gradient (stated as being uphill, downhill or flat) and curvature (curve or straight) were given, hard shoulder stoppages as a result of accidents were most serious on downhill curves (Table 9).

7.5 Rumblestrips and hard shoulders

A rumblestrip is often laid between the hard shoulder and the carriageway and its purpose is to provide an audible alert to drivers who accidentally veer off the carriageway to the nearside. No evidence came to light, from the survey, as to the effectiveness of rumblestrips in reducing accident severity.

8 Driver characteristics

8.1 Drivers by age and sex

The majority of drivers interviewed were aged between 20 and 50 years. In all age groups male drivers predominated (Figure 5).

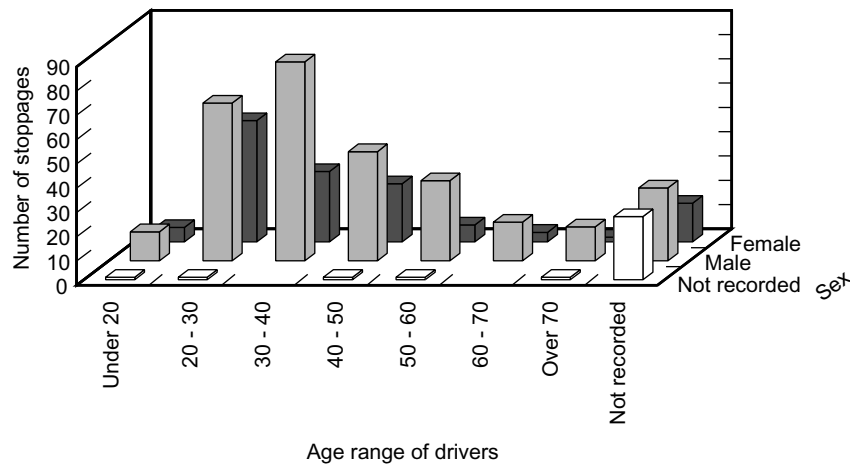


Figure 5 Age distribution for all hard shoulder stoppages by sex of driver

8.2 Alcohol/drugs

Evidence of intoxication by alcohol or drugs was found in 18 (5%) of the 360 drivers stopped on the hard shoulder as a result of accidents. One third of these drug/alcohol-related accidents involved death or serious injury. Nearly all of the drivers concerned were younger drivers between the ages of 20 and 40 years.

Of all cases of vehicle *stoppages* (whether or not an accident was involved) on hard shoulders, in which there was any evidence of drug or alcohol intoxication, most (16) occurred during trips for leisure or social purposes and four in work-related trips. All the drivers in this survey, who were suspected or proved to be under the influence of drugs or alcohol, were apprehended after 18:00 and before noon (Table 10).

Table 10 Hard shoulder stoppages in relation to evidence of driver intoxication by alcohol or drugs by time of day

Time of day	Evidence of alcohol or drugs			Total
	Yes	No	Not recorded	
00:00 - 03:00	2	26	–	28
03:00 - 06:00	4	23	–	27
06:00 - 09:00	1	41	–	42
09:00 - 12:00	5	51	–	56
12:00 - 15:00	–	62	–	62
15:00 - 18:00	–	75	2	77
18:00 - 21:00	1	47	–	48
21:00 - 24:00	7	37	1	45
Not recorded	1	55	25	81
Total	21	417	28	466

8.3 Illness

Illness was associated with 10 out of the 466 hard shoulder stoppages reported. In two of these cases illness of the drivers, both over 70 years old, resulted in, or was associated with a road traffic accident.

8.4 Fatigue

The survey forms did not always give an indication of how the officer attending an accident gauged the driver's state of tiredness. Where they were given they were presumably subjective assessments or the driver was questioned. In many instances the accident description states that the driver lost control of the vehicle after falling asleep. Driver fatigue was associated with 36 (10%) of all reported accidents. No easily discernible trend was observed of instances of fatigue in relation to age.

In relation to time of day, accidents involving fatigued drivers were more prevalent, in proportion to the total, in the early hours of the morning between midnight and 06:00 and especially after 03:00 (Table 11).

Table 11 Accidents in relation to driver fatigue by time of day

Time of day	Evidence of fatigue (% of total accidents)			Total accidents
	Yes	No	Not recorded	
00:00 - 03:00	23.1	76.9	–	26
03:00 - 06:00	33.3	63.0	3.7	27
06:00 - 09:00	7.9	92.1	–	38
09:00 - 12:00	4.1	91.8	4.1	49
12:00 - 15:00	7.3	92.7	–	55
15:00 - 18:00	8.2	89.0	2.7	73
18:00 - 21:00	4.7	93.0	2.3	43
21:00 - 24:00	7.0	90.7	2.3	43
Not recorded	16.7	83.3	–	6
Total	10.0	88.1	1.9	360

Tiredness is a major factor which impairs a driver's concentration. In the event of an accident it is important, therefore, to know how much time has elapsed since the driver last took a break from driving, especially if the journey is work-related. In the latter situation the driver is likely to be under greater pressure to reach his or her destination by a given time than if the journey is being undertaken for social or leisure purposes. One hundred and forty three (40%) of all accidents reported in the survey occurred in work-related journeys, i.e. those in which the

driver was travelling to or from work or in the course of work. Twelve of these involved fatal or serious injuries.

From the survey data the time elapsed between the break and the accident in work related journeys averaged a little under 2½ hours and ranged from 0 to ‘at least 24’ hours. In 50% of reported cases the time since the last break was not recorded. The relationship between driver fatigue and time elapsed since the break for work-related trips is given in Table 12. This shows little or no evidence of any increase in driver fatigue with unbroken time on the road.

Table 12 Accidents and driver fatigue in work-related journeys in relation to time elapsed between break in journey and accident

Time elapsed (hh:mm)	Evidence of fatigue (% of total accidents ^a)			Total accidents ^a
	Yes	No	Not recorded	
00:00 - 00:30	11.1	88.9	–	9
00:30 - 01:00	7.1	92.9	–	14
01:00 - 01:30	7.7	92.3	–	13
01:30 - 08:00	11.1	88.9	–	27
More than 8 hours	12.5	87.5	–	8
Not recorded	13.9	80.6	5.6	72
Total	11.9	85.3	2.8	143

^a Reported for work-related journeys

8.5 Distraction

Accidents where evidence of driver distraction is reported include such instances as:

- Taking sudden evasive action to avoid other vehicles, animals or debris in the carriageway.
- Distraction by passengers.
- Drivers whose attention is focused on other things than their driving, such as lighting cigarettes, searching for items in door pockets and changing CDs.

It is expected that drivers’ reaction times to unforeseen events such as those described above would be impaired by fatigue, intoxication by alcohol or drugs, or by illness. This is borne out by Table 13. Driver distraction was reported for 28.6% of accidents involving intoxication by alcohol or drugs, and for 12.5% of accidents involving driver fatigue, compared with only 7.3% where none of these factors were recorded.

Table 13 Driver distraction in relation to other factors causing impairment of driving ability

	Evidence of driver distraction (% of total accidents)			Total accidents
	Yes	No	Not recorded	
All accidents	8.6	90.0	1.4	360
Excluding alcohol/ drugs, illness and fatigue	7.3	92.7	–	300
Alcohol/drugs	28.6	71.4	–	14
Fatigue	12.5	87.5	–	32
Illness	0.0	100.0	–	2

9 Vehicle characteristics

9.1 Vehicle type and accident severity

Of the 360 accidents recorded 11.1% resulted in death or serious injury, 41.4% involved only minor injuries and in slightly under half there were no injuries. There was no marked difference between the three most predominant vehicle types with respect to accident severity (Table 14).

Table 14 Accident severity by type of vehicle involved

Vehicle type	Accident severity (% of total accidents)			Total accidents
	KSP ^b	Slight	No injuries	
Car ^a	11.2	43.7	45.1	277
LGV ^a	10.3	41.4	48.3	29
HGV	12.0	36.0	52.0	25
Other	10.3	24.1	65.5	29
All vehicles	11.1	41.4	47.5	360

^a excluding vehicles towing caravans or trailers

^b With persons killed or seriously injured

9.2 Accidents and mechanical defects

Evidence of mechanical defects, including burst or punctured tyres, was associated with 13.1% of all recorded accidents. As many as 24.1% of light goods vehicles (LGVs) involved in accidents had some mechanical defect, compared with 11.2% of cars (excluding those with caravans or trailers) and only 4% of HGVs (Table 15).

Table 15 Accidents in relation to vehicle type and evidence of mechanical defect

Vehicle type	Evidence of mechanical defect (% of total accidents)			Total accidents
	Yes	No	Not recorded	
Car ^a	11.2	88.4	0.4	277
LGV ^a	24.1	72.4	3.4	29
HGV	4.0	96.0	0.0	25
Other	27.6	72.4	0.0	29
All vehicles	13.1	86.4	0.6	360

^a excluding vehicles towing caravans or trailers

10 Summary

Between June and September 1999 a questionnaire survey was conducted of 466 hard shoulder stoppages on motorways throughout the UK. This recorded reasons for the stoppages with respect to light and weather conditions, road features and driver/vehicle/journey characteristics. The main findings from the data analysis are as follows:

- The majority (70%) of vehicles stopped were cars. Sixteen percent were goods vehicles (HGV and LGV in equal proportion). Only 2% each of motorcycles and PSVs were reported.
- Three hundred and sixty vehicles (77% of the total) had stopped on the hard shoulder as a result of accidents. Twenty four of these had been involved in collisions with vehicles already on the hard shoulder.

Vehicles hit on the hard shoulder had been there for an average of just over 11 minutes and, in two cases, for as little as 10 seconds.

- iii Of the 360 accidents recorded 11.1% involved death or serious injury, 41.4% resulted in minor injuries and, in 47.5% of cases there were no personal injuries.
- iv Five point six percent of the accidents occurring on wet roads resulted in fatalities, compared with 2.9% on dry roads.
- v Five percent of accidents reported as having occurred in visibility of less than 1,000m were fatalities. The corresponding figures for 1,000m to 9,000m and 'unlimited' visibility are 3.7% and 2.4% respectively.
- vi A time profile of stops on the hard shoulder throughout the day indicates a steady build up of these occurrences from the early morning to 18:00h.
- vii Nearly 8% of accidents reported at night were fatalities, compared with 1.5% in daylight.
- viii There were no fatalities in accidents reported as having occurred in the vicinity of road works.
- ix Eight point three percent of accidents reported as having occurred on concrete surfaced roads involved fatalities, compared with 2.8% on tarmac.
- x All 12 fatalities occurred where the speed limit was 70mph.
- xi Accidents, as indicated by fatalities, were most serious on downhill curves.
- xii There was evidence of alcohol/drugs intoxication in the case of 18 (5%) drivers of those stopped on the hard shoulder as a result of accident. One third of all the alcohol/ drug-related accidents involved death or serious injury.
- xiii Reported accidents in which driver fatigue was evident were proportionally more prevalent between midnight and 06:00h.
- xiv One hundred and forty three accidents (40% of all accidents) occurred in work-related journeys.
- xv No clear relationship was indicated between the time elapsed between taking a break and the accident and the severity of the accident in work related journeys.
- xvi Driver distraction was associated with 28.6% of cases involving intoxication and 12.5% of cases involving fatigue, compared with only 7.3% where neither intoxication nor fatigue was involved.
- xvii No marked difference, with respect to accident severity, was noted between cars, HGVs and LGVs.
- xviii Mechanical defect was associated with 13.1% of all recorded accidents. This was the case in 24.1% of LGVs, 11.2% of cars and 4.0% of HGVs.

11 Reference

Sherrington M (1999). *Hard choices*. Commercial Motor. Vol.189, No.4811, pp40-1. Reed Business Information Ltd, Sutton, Surrey.

Abstract

In the summer of 1999 the Highways Agency instigated a questionnaire survey of drivers stopped on the hard shoulders of motorways. This had the aim of determining the factors contributing to motorway accidents, with respect to those relating to weather, time of day and visibility, road characteristics and driver and vehicle related factors.

Data were collected between June and September with the co-operation of police forces throughout the UK and the exercise was co-ordinated by the Cheshire Constabulary. TRL analysed the data from the study and reported the findings.

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