



Injury accidents on rural single-carriageway roads, 1994–95: an analysis of STATS19 data

Prepared for Road Safety Division, Department of the Environment, Transport and the Regions

J Barker, S Farmer and D Nicholls

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Executive Summary

During the last decade, about three-quarters of injury accidents and more than two-thirds of the resulting casualties have been on built-up roads (speed limit ≤ 40 mph). As a result, research in traffic engineering for safety has concentrated on what can be done in urban areas, and in particular, on how vulnerable road users can be helped. This approach has, however, to some extent ignored the variation in accident *severity* between built-up and rural (speed limit ≤ 50 mph) roads.

The table below shows for the last eleven years for which statistics are available (Department of Transport, 1995), the percentage of (i) all casualties, (ii) all those killed or seriously injured (KSI), (iii) all those killed, and (iv) traffic (vehicle-kilometres) that were on rural roads (including motorways). It demonstrates the greater severity of accidents outside built-up areas and shows that fatalities considered alone are over-represented on rural roads. There is also an indication of a trend over the period: whilst the percentage of casualties and the percentage of traffic *outside* built-up areas (including motorways) has remained fairly constant, the percentage of fatalities has gradually increased.

This trend was first identified around 1990 and resulted in the, then, Department of Transport expanding its research through TRL to target the rural situation better. In the first instance, a detailed examination was undertaken of STATS19 accident data for all rural single-carriageway roads in Great Britain for the years 1988 and 1989. (Accidents on these roads accounted for about three-quarters of the accident costs for rural roads.) The results of this study, including detailed data tabulations, were published in 1992 (Taylor and Barker, 1992). Consequently, the programme of research has included the development of accident-remedial engineering measures suitable for tackling the types of accidents occurring on rural roads (for examples, refer to Barker, 1997).

In order to assess the current situation on rural roads, the STATS19 accident analyses described above have been repeated using 1994 and 1995 accident data. This report presents the results of these analyses (updating the tables in the previous report - Taylor & Barker, 1992) and compares the results of the present study with those obtained using 1988/89 data.

The analyses considered accident severity, road type, carriageway type, junction type, vehicle/pedestrian involvement, lighting/weather conditions, time of day, driver age and sex, alcohol involvement, vehicle type,

vehicle manoeuvre and vehicle performance as factors associated with accidents. They identify combinations of these factors most commonly occurring.

A few of the more notable results from the present study were:

- Most accidents occurred on A roads (53%); on 2-lane roads (90%); in 60 mph speed limits (96%); and away from junctions (63%). They mostly involved 2 vehicles and no pedestrians (55%); occurred during daylight (71%); and in fine weather (53%). 21% of all accidents (most of the 37% of all accidents at junctions) occurred at T/Y/staggered junctions. 7% and 6% of all accidents occurred at private drives and cross-roads respectively.
- Compared with accidents in built-up areas, those on RSCRs were more severe; only about a half as likely to be at a junction; almost one sixth as likely to involve a pedestrian and a quarter as likely to involve a pedal cycle; but they were three times as likely to involve a single vehicle (with no pedestrian).
- The accident severity ratio (ratio of KSI accidents to all injury accidents) for RSCRs was 0.27, being higher on the more major, wider roads, away from junctions, in the dark and in fine weather. It was also greater when male drivers, the oldest drivers, two-wheeled vehicles, public service vehicles, or heavy goods vehicles were involved.
- The most frequently-involved vehicle manoeuvre was 'going ahead - other' (44% of accident-involved vehicles at junctions and 44% away from junctions). Away from junctions 'going ahead on a left/right hand bend' featured next most frequently (35%) while at junctions, 'turning right' did so (21%).
- Single-vehicle accidents accounted for almost one third of all accidents. They were more likely than other accidents to be associated with B/C roads, night-time, the youngest drivers and with 'going ahead on a bend'. Young drivers were also disproportionately associated with positive breath tests and with accidents in the dark.
- Accidents involving vehicles doing the faster manoeuvres ('going ahead', 'overtaking') were more likely than other accidents to involve young drivers, male drivers, TWMVs, a pedestrian, skidding, leaving the carriageway, hitting objects on or off the carriageway, and to be more severe. Accidents involving slower manoeuvres ('right-turns', 'stopping', 'waiting') were disproportionately associated with female and

Percentage of all casualties (and traffic) that were on rural roads (including motorways), by injury severity (1985–1995)

| | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|--------------|------|------|------|------|------|------|------|------|------|------|------|
| i Casualties | 28 | 29 | 29 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| ii KSI | 35 | 36 | 36 | 37 | 38 | 38 | 38 | 38 | 39 | 42 | 39 |
| iii Killed | 48 | 51 | 50 | 52 | 54 | 54 | 52 | 55 | 55 | 56 | 59 |
| iv Traffic | n/k | n/k | n/k | 55 | 54 | 55 | 55 | 55 | 55 | 55 | 55 |

n/k = not known

older drivers. 'Parked' and 'stopping' manoeuvres were disproportionately associated with PSV/HGVs.

- 4% of all accidents involved a pedestrian. More than half of these involved a single vehicle, 'going ahead', not at a junction.
- 8% of all accidents involved two (non-overtaking) vehicles travelling in opposite directions on bends, not at a junction, and 8% involved two (non-overtaking) vehicles travelling in opposite directions, not at a bend or at a junction.
- High-performance cars were disproportionately involved in non-junction accidents, in single-vehicle accidents and in overtaking accidents. Their accident involvement was particularly associated with male drivers and with drivers in the 25 - 39 years age group.
- Comparisons between the earlier study years of 1988/89 and the current study of 1994/95 showed that accident characteristics were remarkably similar between the two periods. The main differences observed were: decreases in the total number and severity of accidents, the proportion of accident-involved drivers that were under 25 years old, the proportion of accident-involved company car drivers over 59 years old, and the proportion of TWMVs in accidents; and increases in the proportion of high performance cars in accidents.

1 Introduction

During the last decade, about three-quarters of injury accidents and more than two-thirds of the resulting casualties have been on built-up roads (speed limit ≤ 40 mph). As a result, research in traffic engineering for safety has concentrated on what can be done in urban areas, and in particular, on how vulnerable road users can be helped. The development of traffic calming measures, of techniques such as those applied in the Urban Safety Project (Mackie et al, 1990), and the development of detailed accident predictive relationships for various urban junction types (eg. Hall, 1986) are examples.

Table 1 and Figure 1 show for the last eleven years for which statistics are available (Department of Transport, 1995), the percentage of (i) all casualties, (ii) all those killed or seriously injured (KSI), (iii) all those killed, and (iv) traffic (vehicle-kilometres) that were on rural roads (including motorways). They demonstrate the greater severity of accidents outside built-up areas and show that fatalities considered alone are over-represented on rural roads. There is also an indication of a trend over the period: whilst the percentage of casualties and the percentage of traffic *outside* built-up areas (including motorways) has remained fairly constant, the percentage of fatalities has gradually increased.

This trend was first identified around 1990 and resulted in the, then, Department of Transport expanding its research through TRL to target the rural situation better. In the first instance, a detailed examination was undertaken of STATS19 accident data for all rural single-carriageway roads in Great Britain for the years 1988 and 1989. (Accidents on these roads accounted for about three-quarters of the accident costs for rural roads.) The results of this study, including detailed data tabulations, were published in 1992 (Taylor and Barker, 1992). Consequently, the programme of research has included the development of accident-remedial engineering measures suitable for tackling the types of accidents occurring on rural roads (for examples, refer to Barker, 1997).

In order to assess the current situation on rural roads, the STATS19 accident analyses described above have been repeated using 1994 and 1995 accident data. This report presents the results of these analyses (updating the tables in the previous report - Taylor & Barker, 1992) and compares them with those obtained using 1988/89 data.

The study concentrates on accident data for *rural single-carriageway roads* (henceforth *RSCRs*) and unless otherwise stated, all statistics presented relate to this database. The analysis has considered accident severity,

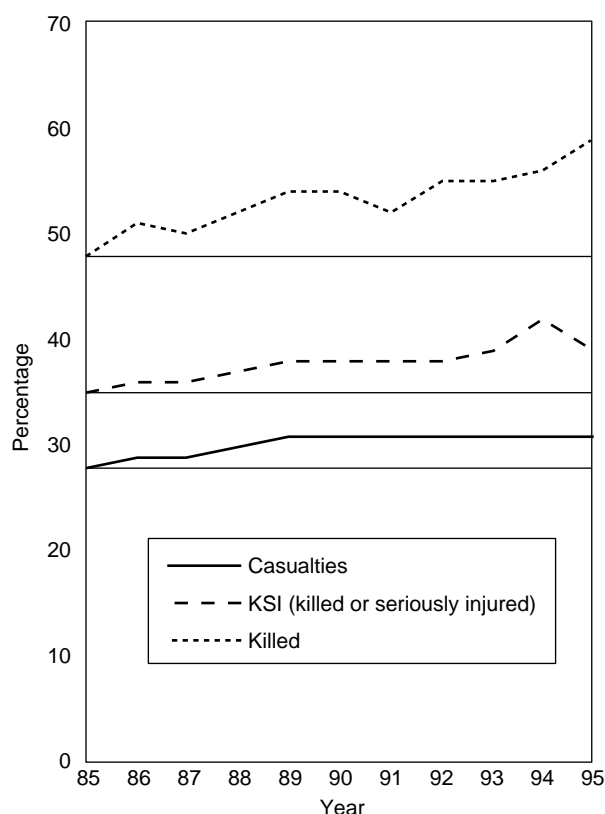


Figure 1 Percentage of all casualties that were on rural roads (including motorways) by injury severity (1985-1995)

road type, carriageway type, junction type, vehicle/pedestrian involvement, lighting/weather conditions, time of day, driver age and sex, alcohol involvement, vehicle type, vehicle manoeuvre and vehicle performance as factors associated with accidents. It identifies combinations of these factors most commonly occurring and was carried out using the TRL Microcomputer Accident Analysis Package MAAP5 (Hills et al, 1994). A subject index is provided at the end of the report to facilitate cross-referencing.

Sections 2-7 concern the analysis of 1994-95 data and section 8 summarises the principal changes in accident characteristics between 1988/89 and 1994/95.

2 The data — basic statistics

2.1 Introduction

Between January 1994 and December 1995 there were a total of 81515 personal injury accidents on rural single-carriageway roads involving 151787 vehicles and 130312 casualties. On

Table 1 Percentage of all casualties (and traffic) that were on rural roads (including motorways), by injury severity (1985-1995)

| | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|--------------|------|------|------|------|------|------|------|------|------|------|------|
| i Casualties | 28 | 29 | 29 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| ii KSI | 35 | 36 | 36 | 37 | 38 | 38 | 38 | 38 | 39 | 42 | 39 |
| iii Killed | 48 | 51 | 50 | 52 | 54 | 54 | 52 | 55 | 55 | 56 | 59 |
| iv Traffic | n/k | n/k | n/k | 55 | 54 | 55 | 55 | 55 | 55 | 55 | 55 |

n/k = not known

average, this represents 1.86 vehicles per accident (compared with 1.76 on built-up roads) and 1.60 casualties per accident (compared with 1.27 on built-up roads).

2.2 Accident tabulations

Tables 2 to 12 give a breakdown, by key characteristics, of the numbers and percentages of accidents or vehicles involved.

Where applicable, corresponding percentages for built-up areas are included in brackets for comparison. For RSCRs, the highest frequency category for each characteristic is identified in bold, where appropriate. These tables are broadly self-explanatory but some additional comments follow. The results are summarised in section 2.3 below.

- i Table 2. In the context of all accidents, these results mean that 41% of *all* fatal accidents, 25% of *all* serious injury accidents and 16% of *all* slight injury accidents occurred on RSCRs. The severity ratio (ratio of KSI to all injury accidents) was 0.27 for RSCRs compared with 0.16 for built-up roads.

Table 2 Accidents by severity

| Severity | No. | % | % |
|----------|-------|-----------|-------|
| Fatal | 2700 | 3 | (1) |
| Serious | 19302 | 24 | (15) |
| Slight | 59513 | 73 | (84) |
| All | 81515 | 100 | (100) |

Note: Figures in brackets are the equivalent percentages for built-up areas

- ii Table 3. This shows that accident *rates* (accidents per vehicle-kilometre) are highest on C/unclassified roads. Compared with built-up roads, RSCR accidents occurred more predominantly on A and B roads.

Table 3 Accidents by road type

| Road type | No. | % | % | Road length % | Traffic % | Accident rate (per 10 ⁶ veh-km) |
|----------------|-------|-----------|-------|---------------------------|---------------------------------|--------------------------------------------|
| A | 42926 | 53 | (44) | 15 | 62 | 0.30 |
| B | 15127 | 19 | (12) | 11 | 16 | 0.42 |
| C/unclassified | 23346 | 29 | (44) | 74 | 23 | 0.45 |
| Not known | 116 | <½ | - | - | - | - |
| All | 81515 | 100 | (100) | 100 | 100 | |
| | | | | [200x 10 ³ km] | [116x10 ⁹ veh-km/yr] | |

Figures in brackets are the equivalent percentages for built-up areas

Table 4 Accidents by carriageway type (total number of lanes)

| Carriageway type | No. | % |
|-------------------|-------|-----------|
| Single - 1 lane | 5354 | 7 |
| Single - 2 lanes | 73764 | 90 |
| Single - 3 lanes | 1659 | 2 |
| Single - ≥4 lanes | 738 | 1 |
| All | 81515 | 100 |

- iii Table 5. Because of the relatively small number of accidents on roads with 50 mph limits, and the likelihood that such limits are correlated with other factors (eg. traffic flows, lower design standards), speed limit has not been considered as a key variable in this report.

Table 5 Accidents by speed limit

| Speed limit | No. | % |
|-------------|-------|-----------|
| 50 mph | 2910 | 4 |
| 60 mph | 78603 | 96 |
| Not known | 2 | <½ |
| All | 81515 | 100 |

- iv Table 6. Unsignalised junctions (including private drives) featured in more than 36 of the 37 per cent of accidents at junctions. Pickering et al (1986) found that on rural A roads, the number of accidents likely to be *associated* with T-junctions was much higher than the number occurring within 20m of these junctions (the STATS19 definition of a junction accident). Including accidents up to 100m from junctions resulted in an increase in the junction accident figure of about 40%. If this is true of all junction types, the split between the percentage of accidents on RSCRs associated with a junction and those associated with links could be nearer to 50:50 than to the 37:63 indicated here.

Table 6 Accidents by junction type

| Junction type | No. | % | % |
|----------------|-------|-----------|-------|
| Roundabout | 579 | 1 | (7) |
| T/Y junction | 17322 | 21 | (41) |
| Crossroads | 4802 | 6 | (14) |
| Private drive | 5762 | 7 | (4) |
| Other junction | 1957 | 2 | (5) |
| All junctions | 30422 | 37 | (71) |
| No junction | 51093 | 63 | (29) |
| All | 81515 | 100 | (100) |

Figures in brackets are the equivalent percentages for built-up areas

- v Table 7. This shows that there were marked differences in vehicle and pedestrian involvement between RSCRs and built-up roads. In particular, the proportion of accidents involving a single vehicle but no pedestrian was much higher on RSCRs, and the proportion involving a single vehicle together with at least one pedestrian was much lower.
- vi Table 8. This distribution of accidents approximately follows the 24-hour distribution of all traffic in Great Britain.
- vii Table 10. Note that in Great Britain, roughly half of all days are dry.
- viii Table 11. Only 1% of road traffic in Great Britain in 1994/95 (less on rural roads) was two-wheeled vehicles (Department of Transport, 1996). The disproportionately high accident involvement *rate* (per kilometre travelled) of these vehicles is thus apparent.

Table 7 Accidents by numbers of vehicles and pedestrians involved

| Number of: Vehicles involved | Pedestrians involved | | | | |
|---------------------------------|----------------------|-------|-------|-------|------|
| | 0 | ≥1 | | All | |
| 1 | 23047 | 2485 | 25532 | | |
| | 8% | (9%) | 3% | (25%) | 31% |
| 2 | 44690 | 338 | 45028 | | |
| | 55% | (57%) | <½% | (1%) | 55% |
| ≥3 | 10873 | 82 | 10955 | | |
| | 13% | (8%) | <½% | (<½%) | 13% |
| All | 78610 | 2905 | 81515 | | |
| | 96% | (74%) | 4% | (26%) | 100% |

Figures in brackets are the equivalent percentages for built-up areas

Table 8 Accidents by time of day

| Hour | No. | % | % | Average % per hour | |
|-----------|-------|-----------|-------|--------------------|-----|
| 0000-0700 | 6524 | 8 | (6) | 1 | (1) |
| 0700-1000 | 14057 | 17 | (15) | 6 | (5) |
| 1000-1600 | 28022 | 34 | (36) | 6 | (6) |
| 1600-1900 | 17614 | 22 | (24) | 7 | (8) |
| 1900-0000 | 15298 | 19 | (19) | 4 | (4) |
| All | 81515 | 100 | (100) | | |

Figures in brackets are the equivalent percentages for built-up areas

Table 9 Accidents by lighting conditions

| Lighting | No. | % | % |
|----------------|-------|-----------|-------|
| Dark lit | 4582 | 6 | |
| Dark unlit | 17233 | 21 | |
| Dark not known | 1461 | 2 | |
| All dark | 23276 | 29 | (27) |
| Daylight | 58168 | 71 | (73) |
| Not known | 71 | <½ | (<½) |
| All | 81515 | 100 | (100) |

Figures in brackets are the equivalent percentages for built-up areas

Table 10 Accidents by weather/road surface condition

| Weather | Road surface condition | No. | % | % |
|-----------------|------------------------|-------|-----------|-------|
| Fine | Dry | 43408 | 53 | (67) |
| Fine | Wet | 16110 | 20 | (13) |
| Fine | Ice/snow | 2741 | 3 | (1) |
| Rain | Any | 13997 | 17 | (15) |
| Snow | Any | 1289 | 2 | (1) |
| Fog/mist | Any | 1336 | 2 | (<½) |
| Other/not known | Any | 2634 | 3 | (3) |
| All | All | 81515 | 100 | (100) |

Figures in brackets are the equivalent percentages for built-up areas

Table 11 Accident-involved vehicles by vehicle type

| Vehicle type | No. | % | % |
|--------------------------------------|--------|-----------|-------|
| Pedal cycle | 3566 | 2 | (8) |
| Two-wheeled motor vehicle (TWMV) | 8909 | 6 | (6) |
| Car | 119260 | 79 | (76) |
| Light goods vehicle (LGV) | 7927 | 5 | (4) |
| Public service/heavy goods (PSV/HGV) | 9526 | 6 | (5) |
| Other | 2599 | 2 | (1) |
| All | 151787 | 100 | (100) |

Figures in brackets are the equivalent percentages for built-up areas

ix Table 12. Similarities are seen here between the RSCR and built-up accident distributions for the various age groups. It is likely that this reflects that the percentage of driving done on RSCR roads (as opposed to built-up areas) is almost invariant with age. It is apparent from the figures shown that the accident *rate* associated with younger male drivers (especially those aged 25-39) is disproportionately high.

Table 12 Accident-involved drivers by age and sex

| Sex | Age | No. | % | % |
|-----------|-------|--------|-----------|-------|
| Male | ≤24 | 27672 | 18 | (18) |
| | 25-39 | 38093 | 25 | (25) |
| | 40-59 | 29634 | 20 | (17) |
| | ≥60 | 10788 | 7 | (5) |
| Female | ≤24 | 9881 | 7 | (7) |
| | 25-39 | 14283 | 9 | (11) |
| | 40-59 | 10694 | 7 | (7) |
| | ≥60 | 2989 | 2 | (1) |
| Not known | Any | 7753 | 5 | (10) |
| All | | 151787 | 100 | (100) |

Figures in brackets are the equivalent percentages for built-up areas

2.3 Summary

The results shown in the tables in section 2.2 can be summarised as follows:

- i Most accidents on RSCRs occurred
 - on A roads (53%)
 - on 2 lane roads (90%)
 - in 60 mph speed limits (96%)
 - away from junctions (63%).
- ii Most accidents on RSCRs
 - involved 2 vehicles and no pedestrians (55%)
 - occurred during daylight hours (71%)
 - in fine weather on dry roads (53%).
- iii Compared with accidents in built-up areas, accidents on RSCRs
 - were more severe
 - occurred more predominantly on A and B roads than on C/unclassified roads
 - were only about half as likely to be at a junction
 - were almost one sixth as likely to involve a pedestrian
 - were three times as likely to involve a single vehicle (with no pedestrian)

- were more likely to occur at night and in the morning peak period
- were more likely to occur in adverse weather conditions
- were only a quarter as likely to involve a pedal cycle.

3 Accident characteristics

In this section the characteristics considered in section 2 are examined with respect to each other and further features are introduced. Supporting tabulations contained in Appendix A (Tables A1 - A12) are referred to, as appropriate.

3.1 Accident severity

(Figures in bold in the remaining tables of this report are those representing important features which are discussed in the text).

Table 13 shows the ratio of KSI to all injury accidents for each junction type, by road type and by carriageway type. It can be seen that accidents on the more major, wider roads tended to be the most severe, and accidents away from junctions tended to be more severe than those at junctions. Non-junction accidents on the more major roads were the most severe sub-groups. These differences are highly statistically significant.

Table 13 Accident severity ratio — junction type by road type and carriageway type

| | Junction type | | | | | |
|-------------------------|---------------|-------------------|------|------|-------------------|------|
| | None | Private drive | T/Y | X | Other | All |
| Road type | | | | | | |
| A | 0.31 | 0.23 | 0.24 | 0.25 | 0.18 | 0.28 |
| B | 0.31 | 0.24 | 0.23 | 0.26 | 0.24 | 0.28 |
| C/unclassified | 0.26 | 0.24 | 0.20 | 0.24 | 0.19 | 0.24 |
| Carriageway type | | | | | | |
| 1-lane | 0.22 | 0.26 | 0.17 | 0.27 | 0.18 | 0.22 |
| 2-lane | 0.30 | 0.23 | 0.23 | 0.25 | 0.19 | 0.27 |
| 3-lane | 0.26 | 0.39 ¹ | 0.30 | 0.30 | 0.14 | 0.28 |
| ≥4-lane | 0.31 | 0.33 ¹ | 0.29 | 0.29 | 0.18 ¹ | 0.30 |
| All | 0.29 | 0.24 | 0.23 | 0.25 | 0.19 | 0.27 |

¹ <100 accidents

Severity ratios are also given in Tables 14 to 16, for vehicle involvement by weather and road surface condition, for lighting condition by driver age and sex, and for vehicle type by speed limit. Note that the severity ratios in Tables 15 and 16 are based on accident-involved vehicles - that is, they are calculated as the ratio of the number of vehicles involved in KSI accidents to the number involved in all injury accidents. Since the accident severity ratio was substantially invariant with the number of vehicles involved (Table 14), this (accident-involved vehicle) severity ratio is a meaningful measure: the overall severity ratio calculated on this basis was still 0.27.

The tables show that accident severity was highest overall in dry weather, was higher in the dark (especially on unlit roads) than in the light, was higher when male

Table 14 Accident severity ratio — number of vehicles involved by weather and road surface condition

| No. of vehicles | Fine/dry | Wet | Ice/snow | Fog/mist | Other/unknown | All |
|-----------------|-------------|------|-------------|----------|---------------|------|
| 1 | 0.35 | 0.26 | 0.20 | 0.27 | 0.22 | 0.30 |
| 2 | 0.26 | 0.24 | 0.26 | 0.25 | 0.20 | 0.25 |
| ≥3 | 0.28 | 0.27 | 0.42 | 0.25 | 0.26 | 0.28 |
| All | 0.29 | 0.25 | 0.23 | 0.26 | 0.22 | 0.27 |

Table 15 (Accident-involved vehicle) severity ratio — lighting condition by driver/rider age and sex

| Sex | Age | Daylight | Dark/lit | Dark/unlit | All |
|--------|-------|----------|----------|-------------|------|
| Male | ≤24 | 0.26 | 0.30 | 0.33 | 0.28 |
| | 25-39 | 0.27 | 0.30 | 0.35 | 0.29 |
| | 40-59 | 0.27 | 0.32 | 0.36 | 0.28 |
| | ≥60 | 0.29 | 0.33 | 0.35 | 0.30 |
| | All | 0.27 | 0.30 | 0.35 | 0.28 |
| Female | ≤24 | 0.20 | 0.23 | 0.27 | 0.22 |
| | 25-39 | 0.20 | 0.21 | 0.28 | 0.21 |
| | 40-59 | 0.22 | 0.25 | 0.29 | 0.23 |
| | ≥60 | 0.28 | 0.27 | 0.35 | 0.29 |
| | All | 0.21 | 0.23 | 0.28 | 0.22 |
| All | | 0.25 | 0.28 | 0.33 | 0.27 |

Table 16 (Accident-involved vehicle) severity ratio — vehicle type by speed limit

| Speed limit | Vehicle type | | | | | |
|-------------|--------------|-------------|------|------|-------------|------|
| | Pedal cycle | TWMV | Car | LGV | PSV/HGV | All |
| 50 | 0.25 | 0.37 | 0.18 | 0.18 | 0.24 | 0.20 |
| 60 | 0.35 | 0.46 | 0.25 | 0.28 | 0.32 | 0.27 |
| All | 0.34 | 0.46 | 0.24 | 0.28 | 0.32 | 0.27 |

drivers were involved than when females were, and was highest for the oldest drivers. Particularly high severity ratios were associated with single-vehicle accidents in dry weather and also with accidents involving 3 or more vehicles in ice or snow. Accident severity was higher on 60 mph than 50 mph roads. It was also higher when pedal cycles or public service/heavy goods vehicles (PSV/HGVs) were involved and especially so when a two-wheeled motor vehicle (TWMV) was involved.

3.2 Junction type (Tables A1–A8)

In sections 3.2 to 3.6 combinations of characteristics are identified which have a greater tendency than would be expected (from the individual characteristics alone) to be associated with accidents. All of the results presented are highly statistically significant, due to the large numbers of accidents involved. There are also many other statistically significant features but those presented are the ones of greatest practical importance.

i *No junction* (51093 accidents; 63% of all RSCR accidents)

Accidents were more likely than those at junctions to be associated with:

- C/unclassified roads
- single-lane roads
- a single vehicle
- a pedestrian
- darkness (especially on unlit roads)
- the hours 1900 - 0700
- poor weather conditions
- young drivers

ii *Any junction* (30422; 37%)

Accidents were more likely than those away from junctions to be associated with:

- A roads
- fine weather conditions
- older drivers

iii *T/Y junctions* (17322; 21%)

In addition to the features in (ii), accidents were more likely than those away from junctions to be associated with:

- 2-, 3- and 4-lane roads
- 2 vehicles
- no pedestrians
- daylight, and darkness (lit roads)
- the hours 0700 - 1900

iv *Private drives* (5762; 7%)

In addition to the features in (ii), accidents were more likely than those away from junctions to be associated with:

- 2-lane roads
- 2 or more vehicles
- no pedestrians
- daylight
- the hours 0700 - 1900
- 2-wheeled vehicles

v *Crossroads* (4802; 6%)

In addition to the features in (ii), accidents were more likely than those away from junctions to be associated with:

- 3- and 4-lane roads
- 2 vehicles
- the hours 1000 - 1600
- daylight, and darkness (lit roads)

The relative incidence of accidents at and away from junctions on different road types is clearly associated with the frequency of junctions on those road types, and this is reflected in the above results. Similarly reflected is the likelihood that night-time lighting is associated with junctions. The association between accidents at private drives and daylight hours presumably reflects the period of greatest use of these accesses.

The results show a greater tendency for accidents away from junctions to involve a single vehicle, a pedestrian, and poor weather. The indication that young drivers are more likely to encounter difficulties away from junctions while older drivers are more likely to do so at junctions is

also an interesting finding which supports results from other research (Moore et al, 1982, for example). Again different usage of roads by these groups *could* contribute to the result but the analysis by vehicle manoeuvre in section 4 of the present report suggests this is unlikely to be the full explanation.

3.3 Road type (Tables A1–A8)

i *A roads* (42926 accidents; 53% of all RSCR accidents)

Accidents were more likely than on other road types taken together to be associated with:

- more than 2 vehicles
- darkness (on lit roads)
- PSV/HGVs
- older drivers

ii *B roads* (15127; 19%)

Accidents were more likely than on other road types taken together to be associated with:

- a single vehicle
- darkness (on unlit roads)
- the youngest (under 25) male drivers

iii *C/unclassified roads* (23346; 29%)

Accidents were more likely than on all road types taken together to be associated with:

- up to 2 vehicles
- a pedestrian
- darkness (on unlit roads)
- ice/snow
- 2-wheelers
- the youngest (under 25) drivers

Again, these results reflect the incidence of lighting on the different road types, and possibly the pattern of use of these road types by different vehicles and drivers. (PSV/HGVs are more likely to be using A roads, for example.) The extent to which the accident pattern for drivers of different ages is affected by their ability to cope with the situations found on different road types (rather than their travel patterns) is unknown.

3.4 Carriageway type (Tables A1–A8)

Carriageway type (that is, the number of lanes) is clearly correlated with road type and so exhibited similar tendencies. In particular:

i accidents on *single-lane roads* (5354 accidents; 7% of all RSCR accidents) were more likely than on other roads taken together to be associated with up to two vehicles, with two-wheelers and with the youngest (under 25) male drivers, and

ii accidents on the widest roads (*3 or 4 lanes* - 2397; 3%) were more likely to be associated with two or more vehicles, with older male drivers, and with the oldest (60 or over) female drivers.

3.5 Vehicle involvement (Tables A8–A11)

- i *Single-vehicle* accidents (25532 accidents; 31% of all RSCR accidents) were more likely than all other accidents together to involve a pedestrian, and to be associated with the hours 1900 - 0700, with icy/snowy conditions and with the youngest (under 25) drivers.
- ii *Two-vehicle* accidents (45028; 55%) were more likely than all other accidents together to be associated with the hours 0700 - 1900 and with older drivers.
- iii *Three- (or more) vehicle* accidents (10955; 13%) were more likely than all other accidents together to be associated with the hours 0700 - 1900, with wet weather conditions and with middle-aged drivers.
- iv *Pedal cycles* (3566 accident-involved vehicles - 2%) were more likely than all other vehicle types taken together to be involved in accidents in fine weather conditions.
- v *TWMVs* (8909 accident-involved vehicles - 6%) were more likely than all other vehicle types taken together to be involved in accidents in fine weather conditions.
- vi *PSV/HGVs* (9526 accident-involved vehicles - 6%) were more likely than all other vehicle types taken together to be involved in accidents in daylight or in fog.

The results for vehicle type are again presumably strongly influenced by the use of the different modes of transport in different conditions. Pedal cycles and motor cycles for example are ridden less in adverse weather conditions.

As well as the features mentioned here, the associations identified in sections 3.2 - 3.4 between single-vehicle accidents and single-lane roads, B/C roads and non-junction locations should be borne in mind (Table A3).

3.6 Time of day and lighting/weather conditions (Tables A9–12)

Accidents in the *dark* (23276 accidents; 29% of all RSCR accidents) were more likely than those in daylight to involve the youngest (under 25) drivers. These youngest drivers were involved in 31% and 9% of their accidents between the hours 1900 - 0400 and 2200 - 0000 respectively. The equivalent figures for older drivers (≥ 25) were only 15% and 3%.

These results probably also reflect patterns of travel, yet though young drivers may do a higher proportion of their driving after dark than do older drivers, this effect alone would probably not account for the size of the differences observed here. This would suggest that young drivers tend to have particular difficulty in the dark on RSCRs; alcohol however may be a factor (see section 3.7 below).

3.7 Breath tests

Overall, almost 2% of motor vehicle drivers/riders involved in accidents breath-tested positive or failed to co-operate with the test request. For PSV/HGV drivers the figure was, however, $< \frac{1}{2}\%$. For accidents away from junctions the figure was almost 3% while for those at junctions it was only 1%. For the youngest (under 25) male drivers, the figure was more than 3%; for female

drivers over 60, the figure was $< \frac{1}{2}\%$. Over all days of the week, 48% of the positive breath tests (including failure to co-operate) occurred between 2200 and 0200 hours.

3.8 Vehicle location and impacts

A further group of STATS19 variables considered were those concerning vehicle locations and impacts: 'vehicle location at the time of the accident', 'junction location at first impact', 'skidding and overturning', 'hit object in carriageway', 'vehicle leaving carriageway' and 'hit object off carriageway'. The characteristics which were most commonly associated with accidents are identified below.

i *Vehicle location at the time of the accident*

- 83% of vehicles in accidents were on the main road
- 6% were entering the main road
- 6% were on the minor road
- 4% were leaving the main road
- 2% were off the carriageway.

As one would expect, leaving or entering the main road features little in non-junction accidents. At junctions, 14% of vehicles were entering the main road and 8% were leaving it.

ii *Junction location at first impact*

- 59% of vehicles in accidents at junctions were in the middle of the junction when the accident occurred
- 30% were approaching the junction
- 7% were leaving the junction
- 4% did not impact.

iii *Skidding, jackknifing and overturning*

- 70% of vehicles in accidents did not skid, jackknife or overturn
- 27% skidded
- 7% overturned (Vehicles skidding/jackknifing
- $< \frac{1}{2}\%$ jackknifed. may also have overturned.)

The proportion of vehicles skidding, jackknifing or overturning was markedly higher away from junctions (35%) than at junctions (23%).

iv *Hit object in carriageway*

Overall, only 4% of vehicles in accidents hit an object in the carriageway. For non-junction accidents, the figure was 6%; for accidents at any junction, it was 2%. The most likely objects to be hit were the kerb (2% overall) and a parked vehicle (1% overall).

v *Vehicle leaving the carriageway*

- 76% of accident-involved vehicles did not leave the carriageway - either as the cause or as a consequence of the accident
- 13% left to their nearside
- 9% left to their offside.

In non-junction accidents, 31% of vehicles involved left the carriageway, while for accidents at junctions the figure was only 15%.

vi *Hit object off the carriageway*

16% of vehicles in accidents hit an object off the carriageway. For non-junction accidents this figure was 22%; for accidents at any junction it was 9%. The most likely objects to be hit were ‘unspecified’ (perhaps buildings, fences, walls or hedges) (7% overall), ‘entering a ditch’ (3% overall) and trees (3% overall).

4 Vehicle manoeuvres

Table 6 in section 2.2 showed that accidents at private drives, T/Y-junctions, crossroads and those away from junctions together comprised 97% of the accidents in the data-base. The present section identifies the vehicle manoeuvres most commonly associated with these accidents. Since manoeuvres relate to vehicles, all the numbers quoted are of accident-involved vehicles.

Table 17 shows the number of vehicles involved in accidents for the eighteen vehicle manoeuvres defined in STATS19, by junction type. For each of these junction types, the numbers of vehicles making the most frequently involved manoeuvres are shown in bold type and the percentage represented given beneath. It can be seen that the manoeuvres featuring most strongly varied between the junction types.

Table 18 shows the severity ratio based on accident-involved vehicles (calculated as in section 3.1) for each of the key manoeuvres identified in Table 17 (for all junction types together). Overall, accidents where the vehicle was ‘waiting to go ahead’ or ‘stopping’ were the least severe and those where the vehicle was ‘overtaking another on its offside’ or ‘going ahead on a bend’ were the most severe. As one might expect, manoeuvres associated with higher

speed appeared to result in the most severe casualties.

In Appendix B (B1) tabulations are given (for all junction types together) of accident-involved vehicles for each of the manoeuvres in Table 18 by other main accident characteristics. Appendix B (B2) provides a detailed analysis of the junction type/vehicle manoeuvre combinations highlighted in Table 17. In each case, two types of information are given:

- i the most common situations in which the accidents occurred (road type, carriageway type, lighting conditions, weather/road surface conditions) and what they most commonly involved (number of vehicles and pedestrians)
- ii any characteristics which were more likely to be associated with the manoeuvre than with all other manoeuvres taken together for the junction type in question. (The characteristics considered are those introduced in sections 2 and 3).

Table 18 (Accident-involved vehicle) severity ratio by manoeuvre

| <i>Manoeuvre</i> | <i>Severity ratio</i> |
|--------------------------|-----------------------|
| Parked | 0.27 |
| Waiting to go ahead | 0.11 |
| Stopping | 0.11 |
| Turning right | 0.25 |
| Waiting to turn right | 0.16 |
| Overtaking (on offside) | 0.32 |
| Going ahead (left bend) | 0.31 |
| Going ahead (right bend) | 0.30 |
| Going ahead (other) | 0.28 |
| All | 0.27 |

Table 17 Accident-involved vehicles — vehicle manoeuvre by junction type

| <i>Manoeuvre</i> | <i>Junction type</i> | | | | | | | <i>All</i> |
|-----------------------------|----------------------|----------------------|--------------------|-------------------|-------------------------------|-------------|--------------------|------------|
| | <i>None</i> | <i>Private drive</i> | <i>T/Y</i> | <i>X</i> | <i>Signalised¹</i> | <i>Rest</i> | | |
| Reversing | 228 | 166 | 71 | 15 | 3 | 12 | 495 | |
| Parked | 2099 (2%) | 201 | 245 | 32 | 5 | 56 | 2638 (2%) | |
| Waiting to go ahead | 4363 (5%) | 690 | 1568 | 341 | 157 | 484 | 7603 (5%) | |
| Stopping | 2835 (3%) | 328 | 901 | 151 | 70 | 175 | 4460 (3%) | |
| Starting | 230 | 77 | 153 | 248 | 14 | 53 | 775 | |
| U-turn | 658 | 60 | 107 | 29 | 1 | 31 | 886 | |
| Turning left | 126 | 509 | 1294 | 223 | 23 | 163 | 2338 | |
| Waiting to turn left | 80 | 60 | 457 | 70 | 13 | 60 | 740 | |
| Turning right | 481 | 2818 (22%) | 7885 (23%) | 1352 (15%) | 323 (23%) | 701 | 13560 (9%) | |
| Waiting to turn right | 254 | 1038 | 2038 (6%) | 410 | 44 | 211 | 3995 (3%) | |
| Changing lane (left) | 88 | 5 | 14 | 1 | 4 | 10 | 122 | |
| Changing lane (right) | 396 | 21 | 59 | 5 | 5 | 15 | 501 | |
| Overtaking a moving vehicle | 5128 (6%) | 777 | 1073 | 257 | 13 | 199 | 7447 (5%) | |
| Overtaking a static vehicle | 747 | 112 | 187 | 33 | 7 | 27 | 1113 | |
| Overtaking (on nearside) | 148 | 49 | 92 | 33 | 5 | 10 | 337 | |
| Going ahead (left bend) | 15272 (17%) | 534 | 2002 (6%) | 164 | 16 | 318 | 18306 (12%) | |
| Going ahead (right bend) | 16120 (18%) | 394 | 2375 (7%) | 183 | 14 | 335 | 19421 (13%) | |
| Going ahead (other) | 39478 (44%) | 4953 (39%) | 14124 (41%) | 5604 (61%) | 681 (49%) | 2096 | 66936 (44%) | |
| Rest | 64 | 5 | 33 | 2 | 0 | 10 | 114 | |
| All | 88795 (100%) | 12797 (100%) | 34678 (100%) | 9153 (100%) | 1398 (100%) | 4966 (100%) | 151787 (100%) | |

¹All junction types except private drive

A number of the features identified in this analysis were to be expected - for example, 'going ahead on bends' was more likely to be associated with single-lane and C/unclassified roads because these are likely to be more bendy than other roads.

It is evident that characteristics of accidents were more associated with the vehicle manoeuvre involved than with the junction type. For example, accidents involving 'going ahead on a left or right hand bend' were more likely than those involving other manoeuvres to be single-vehicle accidents, whatever the junction type. Accidents involving the faster manoeuvres ('going ahead', 'overtaking') were more likely to involve young drivers, male drivers, TWMVs, pedestrians, skidding, leaving the carriageway, hitting objects on or off the carriageway and to result in a fatality. Accidents involving the slower manoeuvres ('right-turns', 'stopping' and 'waiting to go ahead') were disproportionately associated with female and older drivers. 'Parked' and 'stopping' manoeuvres were disproportionately associated with PSV/HGVs.

5 Some important accident sub-groups

In this section, groups of frequently-occurring accidents are explored in greater depth by sub-dividing them further.

5.1 Non-junction accidents involving 'going ahead'

The vehicles involved in accidents away from junctions while 'going ahead' comprised almost half of all accident-involved vehicles. Table 18 showed that such manoeuvres were associated with high accident severity ratios. These accidents therefore warrant closer inspection and are considered below in two groups - those involving 'going ahead - other' and those involving 'going ahead on a bend'. The percentage figures given are of *all* RSCR (or fatal RSCR) accidents.

5.1.1 Accidents involving 'going ahead — other'

34% of all RSCR accidents were accidents away from a junction which involved at least one vehicle making this manoeuvre. (Of all fatal RSCR accidents the percentage was 45%.)

These 34% of accidents divided into

- 12% involving 1 vehicle
- 16% involving 2 vehicles
- 6% involving ≥ 3 vehicles.

They included

- 8% involving 2 vehicles on 2-lane A roads
- 5% involving 1 vehicle on 2-lane A roads
- 6% involving 2 vehicles on 2-lane B/C/unclassified roads
- 6% involving 1 vehicle on 2-lane B/C/unclassified roads.

They included

- 4% involving 1 vehicle only and a male driver under 25
- 4% involving 1 car only and a driver under 25
- 2% involving 1 vehicle only and a pedestrian
- <1% involving 1 TWMV only and a rider under 25.

They included

- 8% involving only a single vehicle which left the carriageway
- (4% which occurred in the dark
- 4% which occurred in daylight
- 4% which occurred in fine weather
- 4% which occurred in poor weather).

5.1.2 Accidents involving 'going ahead on a bend'

27% of all RSCR accidents were accidents away from a junction which involved at least one vehicle making this manoeuvre. (Of all fatal RSCR accidents the percentage was 33%.)

These 27% of accidents divided into

- 14% involving 1 vehicle
- 12% involving 2 vehicles
- 2% involving 3 vehicles.

They included

- 7% involving 1 vehicle on a 2-lane B/C/unclassified road
- 6% involving 1 vehicle on a 2-lane A road
- 6% involving 2 vehicles on a 2-lane B/C/unclassified road
- 4% involving 2 vehicles on a 2-lane A road.

They included

- 5% involving 1 vehicle only and a male driver under 25
- 6% involving 1 car only and a driver under 25
- 1% involving 1 TWMV only and a rider under 25.

They included

- 12% involving only a single vehicle which left the carriageway
- (6% which occurred in the dark
- 6% which occurred in daylight
- 5% which occurred in fine weather
- 6% which occurred in adverse weather).

5.2 Single-vehicle accidents

Accidents involving a single vehicle comprised 31% of all RSCR accidents (section 2.2). The analysis in section 5.1 above identifies some important results relating to these accidents:

- 26% of all RSCR accidents (27% of fatal RSCR accidents) involved a single vehicle 'going ahead', away from a junction;
- 20% of all RSCR accidents (20% of fatal RSCR accidents) involved a single vehicle leaving the carriageway while 'going ahead', away from a junction. Of both these figures, over half occurred on bends;
- 9% of all RSCR accidents (9% of fatal RSCR accidents) involved a single vehicle driven or ridden by a male under 25, 'going ahead', away from a junction;
- 2% of all RSCR accidents (6% of fatal RSCR accidents) involved a pedestrian and a single vehicle 'going ahead', away from a junction. This represents over half of all RSCR pedestrian accidents.

5.2.1 Non-junction accidents involving ‘going ahead — other’

Of the non-junction, single-vehicle accidents involving ‘going ahead’, those involving ‘going ahead on a bend’ have some obvious explanation - the presence of the bend. Those involving ‘going ahead - other’, however, do not; this latter group were investigated more thoroughly. The following gives the most important results, all statistically significant at at least the 5% level. (The figures in round brackets are the percentages of all accidents involving a single vehicle, ‘going ahead - other’, not at a junction which have the characteristic shown. The figures in square brackets are the corresponding percentages for all RSCR accidents).

Accidents where a single vehicle was ‘going ahead - other’, not at a junction, were more likely than all other accidents:

- i to occur on unlit roads in the dark (35) [21]
- ii to involve the vehicle hitting the kerb (10) [4]
- iii to involve a driver/rider breath testing positive or failing to comply with the breath test request (7) [4]
- iv to involve the vehicle leaving the carriageway (67) [42]
- vi to involve a pedestrian casualty (16) [4]
- vii to occur in the presence of a carriageway hazard¹ (11) [4]

Note, in particular, result (iv).

In addition, in accidents in which the vehicle left the carriageway:

- i that vehicle skidded in 49% of cases
- ii a carriageway hazard existed and/or an object *in* the carriageway was hit in 27% of cases.

It is worth pointing out that there was no indication that wet weather conditions featured particularly prominently in these accidents - indeed, only a third of vehicles which skidded did so on wet roads.

It should be stressed that the STATS19¹ data gives no indication of the presence of vehicles, pedestrians or permanent objects at the scene of an accident if they were not directly involved in the impact. Thus another possible explanation for these accidents might be that the driver/ rider swerved to avoid another vehicle, pedestrian, or permanent object.

Alcohol involvement

Of the accident-involved drivers/riders who breath-tested positive or failed to comply with the test request ((iii) above):

- i 83% left the carriageway (compared to 24% of all drivers/riders in all RSCR accidents)

¹The STATS19 definition of a carriageway hazard is: a dislodged vehicle load, dog, other animal or non-permanent object in the carriageway, or involvement with a previous accident.

- ii 38% were involved between 2300 and 0200 hours (compared to 30% for all RSCR accidents).

5.2.2 Young drivers and time of day

Table 19 shows, for drivers under 25 years, the distribution of *single-vehicle* accidents by time of day, together with their severity ratio. 51% of single-vehicle accidents involving drivers under 25 occurred between 1900 and 0400 hours, and 32% between 2200 and 0400 hours. Accidents with the highest severity ratio occurred during the early hours of the morning.

Table 19 Distribution of single-vehicle accidents by time of day, with their severity ratio, for drivers under 25

| <i>Hour of day</i> | <i>% of accidents</i> | <i>% of fatal accidents</i> | <i>Severity ratio*</i> |
|--------------------|-----------------------|-----------------------------|------------------------|
| 0000-0400 | 15 | 25 | 0.34 |
| 0400-0700 | 5 | 4 | 0.29 |
| 0700-1000 | 11 | 3 | 0.21 |
| 1000-1500 | 16 | 9 | 0.26 |
| 1500-1900 | 18 | 15 | 0.30 |
| 1900-2200 | 19 | 21 | 0.28 |
| 2200-0000 | 17 | 24 | 0.31 |
| All | 100 | 100 | 0.29 |
| No. of Accidents | 10703 | 336 | |

*Severity ratio = 0.27 for all RSCR accidents (section 3.1)

5.3 Accidents involving two vehicles

Accidents involving two vehicles comprised 55% of all RSCR accidents (section 2.2). A greater understanding of these accidents was obtained by establishing, for each different manoeuvre of one vehicle (‘vehicle 1’), the distribution of manoeuvres for the second vehicle (‘vehicle 2’). Accidents have been considered in two groups - those occurring away from junctions, and those occurring at junctions.

5.3.1 Accidents away from junctions

Table 20 shows the most commonly occurring vehicle manoeuvres for each vehicle in two-vehicle accidents away from junctions. Note that accidents in each row of the table are not mutually exclusive, because the ‘vehicle 1’ manoeuvres in one row comprise ‘vehicle 2’ manoeuvres in other rows.

For all vehicle 1 manoeuvres considered, the most common manoeuvre for the other vehicle was ‘going ahead’. This accounted for about 80% of the accidents in most cases. Given that the number of all RSCR accidents was 81515, it can also be shown using the results in the table that:

- i 8% of all RSCR accidents were two-vehicle accidents away from junctions which involved one vehicle ‘going ahead on a left hand bend’ and the other ‘going ahead on a right hand bend’;
- ii 8% of all RSCR accidents were two-vehicle accidents away from junctions which involved both vehicles ‘going ahead - other’.

Table 20 Commonly occurring vehicle manoeuvres in accidents involving two vehicles away from junctions

| <i>Manoeuvre Vehicle 1</i> | <i>Manoeuvre Vehicle 2</i> | <i>No. of Accidents (100%)</i> | |
|-----------------------------|-----------------------------|--------------------------------|-------|
| Parked | Going ahead ¹ | 84% | 1109 |
| | Overtaking static vehicle | 11% | |
| Stopped | Going ahead ¹ | 68% | 1095 |
| | Waiting to go ahead | 15% | |
| | Stopping | 13% | |
| Waiting to go ahead | Going ahead ¹ | 82% | 1402 |
| | Stopping | 11% | |
| Overtaking a moving vehicle | Going ahead ¹ | 81% | 2757 |
| | Overtaking a moving vehicle | 7% | |
| Going ahead-left hand bend | Going ahead-right hand bend | 81% | 8337 |
| Going ahead-right hand bend | Going ahead-left hand bend | 86% | 7862 |
| Going ahead-other | Going ahead-other | 48% | 13262 |
| | Overtaking a moving vehicle | 14% | |

¹ Going ahead on a left/right hand bend, or going ahead-other

Vehicle manoeuvres were also studied by road class for accidents involving two vehicles. The only relevant result was that those accidents involving one vehicle ‘going ahead on a (left or right hand) bend’ and the other vehicle ‘overtaking a moving vehicle on its offside’ were disproportionately likely to occur on A-roads (probably wider roads).

5.3.2 Accidents at junctions

Table 21 shows the most commonly occurring vehicle manoeuvres for each vehicle in two-vehicle accidents at junctions. Again note that accidents in different rows are not mutually exclusive.

Table 21 Commonly occurring vehicle manoeuvres in accidents involving two vehicles at junctions (all types)

| <i>Manoeuvre Vehicle 1</i> | <i>Manoeuvre Vehicle 2</i> | <i>No. of accidents (100%)</i> | |
|----------------------------|-----------------------------|--------------------------------|-------|
| Going ahead-other | Going ahead-other | 17% | 16761 |
| | Turning right | 50% | |
| | Waiting to turn right | 10% | |
| | Turning left | 6% | |
| Turning right | Going ahead-other | 74% | 11317 |
| | Overtaking a moving vehicle | 12% | |

As one might expect at junctions, most accidents involved a vehicle performing a turning manoeuvre - in particular, 11317 two-vehicle accidents at junctions involved a right-turner (14% of all RSCR accidents). In the majority of these accidents, the second vehicle was ‘going

ahead’. An examination of the associated information concerning ‘vehicle location at the time of the accident’ indicates that, at unsignalised T/Y junctions, in accidents in which there was a vehicle ‘turning right’ or ‘waiting to turn right’, about 70% were *entering* the main road and about 30% *leaving* the main road. This result broadly agrees with the distribution found by Pickering et al (1986).

Three of the STATS19 manoeuvre types are ‘starting’, ‘going ahead - other’ and ‘stopping’. For any one vehicle, these are mutually exclusive. This suggests that vehicles which were ‘going ahead - other’ *and* entering the main road at a junction might have been ‘*overrunners*’ (ie. accident-involved vehicles whose drivers were unaware of a junction altogether, or of its proximity) - otherwise they should have been classified as ‘starting’.

A total of 1214 vehicles in two-vehicle accidents were found to be ‘going ahead - other’ *and* entering the main road (823 of these were at unsignalised crossroads). The small number of vehicles that were ‘stopping’ and entering the main road would increase the number of overrunners. The present data therefore suggest that there could be at least 400 overrun accidents per year (involving two vehicles) at unsignalised crossroads and about half this number at other junction types. The rather small numbers of accidents involving a vehicle ‘starting’ and entering the main road, however, may indicate a problem with the STATS19 definitions here.

6 Characteristics of accident-involved cars

In section 4 it was observed that accidents involving the faster manoeuvres were, as a group, disproportionately associated with certain characteristics (young drivers, for example). Thus it is similarly interesting to examine the accident statistics with respect to *vehicle* characteristics which might be correlated with speed. Therefore, STATS19 data giving the registration marks of accident-involved vehicles have been used for 1994 (1995 data not available) to obtain the make and model of accident-involved cars from the Driver and Vehicle Licensing Agency. The proportion of accident-involved cars in 1994 for which data are available is 87%.

6.1 Models

The data comprised approximately 250 4-wheeled car models. Table 22 shows, by driver sex, the eight of these

Table 22 Most common models of car involved in accidents, by sex of driver (1994)

| <i>Male drivers</i> | <i>%</i> | <i>Female drivers</i> | <i>%</i> | <i>All drivers</i> | <i>%</i> |
|---------------------|----------|-----------------------|----------|--------------------|----------|
| Escort | 10 | Fiesta | 10 | Escort | 10 |
| Sierra | 6 | Escort | 9 | Fiesta | 7 |
| Cavalier | 6 | Metro | 7 | Sierra | 5 |
| Fiesta | 6 | Astra/Belmont | 5 | Cavalier | 5 |
| Astra/Belmont | 5 | Sierra | 4 | Astra/Belmont | 5 |
| Metro | 3 | Nova | 3 | Metro | 4 |
| Orion | 3 | Cavalier | 3 | Orion | 2 |
| Rover 200 | 2 | Peugot 205 | 3 | Rover 200 | 2 |

models most frequently involved in RSCR accidents: these account for 40% of the 52503 accident-involved cars of known model and known driver sex.

It can be seen that Escorts were the most common model for all accident-involved drivers. This applied to all age groups except: males, 40-59 years, for which Sierras were the most common model; and females, less than 25 years or exceeding 59 years (and overall) for which Fiestas were the most common model. Besides this, accident involvement of models (which largely reflects ownership) was somewhat variant with both age and sex.

The results are broadly consistent with those for accident-involved fleet cars reported by Renouf (1991) and also closely follow fleet car ownership rankings for 1987 given in that report. However, it must be stressed that exposure (mileage travelled) for different models is clearly a major factor in accident involvement and a lack of knowledge of this makes interpretation of results of this sort strictly inconclusive.

An investigation of vehicle models associated with different accident types (as compared to all RSCR accident-involved vehicles) was carried out. The results showed that the Ford Escort and Orion models were significantly over-represented in single-vehicle accidents and in accidents where the vehicle was 'overtaking a moving vehicle' at the time of the accident. (Note: these two accident types are not necessarily exclusive). Escorts comprised 10% of all accident-involved vehicles and Orions 2%. However, 12% of vehicles 'overtaking a moving vehicle' were Escorts and 6% were Orions. 12% of single-vehicle accidents involved Escorts and 3% involved Orions.

6.2 Performance and ownership

Cars were classified as either 'high-performance' (typically having an acceleration of 0 to 60 mph in less than 10 seconds or marketed as high performance), or 'other'. Car ownership was classified as either 'company', 'private' or 'unknown'. No information concerning exposure was available for the different performance or ownership classes.

Table 23 shows the percentage of RSCR accident-involved cars in the different performance/ownership groups with (in brackets) the corresponding percentage for built-up roads. The percentage of accident-involved cars on RSCRs

Table 23 Percentage of accident-involved cars on RSCRs (and built-up roads) by performance and ownership — 1994

| Ownership | Car performance | | | |
|---------------------------|-------------------|-------------|-------|----------|
| | High | Other | All | |
| Company | 2.0 (1.5) | 11.9 (9.9) | 14 | (11.4) |
| Private | 7.3 (6.6) | 64.6 (72.7) | 71.9 | (79.3) |
| All (including not known) | 10.7 (8.9) | 89.3 (91.1) | 100 | (100) |
| No. of cars: | | | 52886 | (191980) |

Figures in brackets are the equivalent percentages for built-up areas

which were high-performance (10.7%) was statistically significantly higher than the percentage on urban roads (8.9%). However, the percentage of all cars that are licensed in the high-performance group is not known.

Table 24 shows the percentage of RSCR accident-involved drivers in different age and sex groups by performance of their car, and, for all cars with known ownership, by car ownership. It can be seen that the proportion of accident-involved male drivers of high-performance cars was somewhat higher than that of other cars - but this would probably be expected because it is likely that they drive high-performance cars more than females do.

Table 24 Percentage of accident-involved drivers — performance and ownership by driver age and sex (1994)

| Driver age/sex | Car performance | | Ownership | | All (including ownership unknown) |
|----------------|-----------------|-------|-----------|-----------|-----------------------------------|
| | High | Other | Private | Company | |
| Male | 75 | 67 | 65 | 79 | 67 |
| Female | 25 | 33 | 35 | 21 | 33 |
| Both | 100 | 100 | 100 | 100 | 100 |
| ≤24 | 23 | 27 | 29 | 15 | 27 |
| 25-39 | 43 | 33 | 32 | 43 | 34 |
| 40-59 | 27 | 27 | 25 | 36 | 27 |
| ≥60 | 5 | 12 | 12 | 4 | 11 |
| Not known | 2 | 1 | 2 | 2 | 2 |
| All | 100 | 100 | 100 | 100 | 100 |
| No. of cars | 5626 | 46877 | 37743 | 7352 | 52503 |

Similarly, drivers of high-performance cars who were aged between 25 and 39 were disproportionately accident-involved, almost certainly because it is this age-group who are most likely to drive such cars. The same applied to this age-group and to all males when considered as drivers of company-owned cars. Information concerning the age of owners would be unlikely to facilitate further interpretation because drivers (particularly young drivers) are not necessarily owners.

Table 25 displays the percentage of cars involved in selected accident types by car performance, and, for all cars with known ownership, by car ownership. It shows, for example, that 61% of accident-involved high-performance cars were in accidents away from junctions and that 13% of accident-involved company-owned cars were in single-vehicle accidents. Note that the accident types listed are not independent and do not include all types.

This table provides particularly interesting results because their interpretation is unlikely to be confounded by unknown exposure. A greater percentage of high-performance cars than other cars featured in all of the accident types shown. In other words, high-performance cars are disproportionately involved in these accident types, which are, broadly, those assumed to be associated with higher speeds. Privately-owned cars are more likely to be involved in single-vehicle accidents than are company-owned cars.

Table 25 Percentage of cars involved in selected accident types by performance and ownership — 1994

| Accident types | Car performance | | Ownership | | All (including ownership unknown) |
|---------------------------------------------------------------|-----------------|-------|-----------|-----------|--------------------------------------------|
| | High | Other | Private | Company | |
| Single vehicle | 20 | 16 | 17 | 13 | 17 |
| Not at a junction | 61 | 57 | 57 | 58 | 57 |
| Single vehicle, not at a junction | 18 | 14 | 15 | 11 | 15 |
| Single vehicle, not at a junction and leaving the carriageway | 15 | 12 | 12 | 9 | 12 |
| Not at a junction, overtaking a moving vehicle | 5 | 3 | 3 | 3 | 3 |
| No. of cars | 5626 | 46877 | 37743 | 7352 | 52503 |

Table 26 shows, for non-junction accidents involving only a single car leaving the carriageway, the percentage occurring at night (1900 - 0700 hours) in each performance/ownership group. It can be seen in this type of accident that privately-owned high-performance cars were disproportionately involved at night.

Table 26 Percentage (and number) of non-junction accidents involving a single vehicle leaving the carriageway, which occurred at night, by performance and ownership — 1994

| Ownership | Car performance | | |
|-------------------------|-----------------|-----------|-----------|
| | High | Other | All |
| Company | 47 (50) | 46 (253) | 46 (303) |
| Private | 57 (324) | 51 (2004) | 52 (2328) |
| All (including unknown) | 55 (458) | 50 (2771) | 50 (3229) |

The data have also been used to calculate (accident-involved vehicle) severity ratios (as in section 3.1) by performance and ownership. The results, shown in Table 27, demonstrate the higher (accident-involved vehicle) severity ratio associated with high-performance vehicles, a difference which is statistically significant.

Table 27 (Accident-involved vehicle) severity ratios by performance and ownership — 1994

| Ownership | Car performance | | |
|-------------------------|-----------------|-------|------|
| | High | Other | All |
| Company | 0.25 | 0.24 | 0.24 |
| Private | 0.27 | 0.24 | 0.24 |
| All (including unknown) | 0.27 | 0.24 | 0.25 |

7 Data comparison between 1994/95 and 1988/89

There has been a reduction in the number of personal injury accidents occurring on RSCRs in the two-year period 1994/95 compared with those occurring in 1988/89 (Taylor and Barker, 1992). However, the characteristics of such accidents have remained broadly consistent. Comparing 1994/95 with 1988/89, the most conspicuous changes implied by the data are as follows:

- i The number of personal injury accidents recorded over two years on RSCRs has fallen by 12%, from 92630 to 81515. This is slightly greater than the proportional change observed on built-up roads (-9%) and is very different from that for motorways (+21%). Overall, the reduction observed on RSCRs is in line with the general trend of a 2% per year decline in all road accidents.
- ii Of *all* fatal road accidents, 41% are occurring on RSCRs - an increase of 5%. Though the number of fatal accidents on RSCRs fell from 3446 to 2700, the change (-22%) was proportionately less than that of fatal 'built-up' accidents (-37%).
- iii The accident severity ratio has fallen from 0.31 to 0.27. This compares with a corresponding fall in the built-up accident severity ratio from 0.21 to 0.16 over the same period. Both represent improving situations, but the change in 'built-up' is proportionately greater. The general improvement can perhaps be credited to better vehicle design and road safety measures while, at the same time, increasing traffic congestion has perhaps impacted on driver speed (especially in built-up areas) and reduced accident severities. It is possible also that safety investments on rural roads are proportionately less than on urban roads.
- iv Of *all* RSCR accident-involved drivers/riders, the percentage who were male and under 25 years old has fallen from 25% to 18% (a percentage drop of 28%) whilst the proportion who were young females has not changed. Similar changes have been observed in the corresponding data for urban roads. It is not known how the proportion of miles driven/ridden on RSCRs by young men and women has changed over the same period. However, some trend data are available by age and sex regarding population (OPCS, 1996), proportion of population with car licences (Department of Transport, 1996), all injury accidents in GB

(Department of Transport, 1995) and on licensing details (Department of Transport, 1996b). The age groups and the years were not the same in each data set though, so only very rough estimates of changes in driver age and sex for the same period were possible. The best estimates were that the change in the percentage of car licence holders that were young and male was between about -11% and -18%, and that the equivalent percentage change for young women was between about +1% and +11%. Therefore, it would appear that changes in the driving population may partly account for the drop in proportion of young male accident-involvements, and that the unchanged involvement for young females represents a reduction in accident rate when changes in the driving population are considered.

Changes in the proportion of miles ridden on motorcycles by young men may have contributed to the drop in the proportion of accident-involved young drivers. However, it is not possible to isolate such changes using licencing information as TWMVs with engine sizes less than 125cc can be ridden with car or TWMV licences. Nevertheless, between 1986 and 1996, the motorcycle stock in GB fell by 37%, and between 1988/89 and 1994/95 there have been similar drops in the percentage of accident-involved vehicles that were TWMVs (about 25% on RSCRs; 45% on urban roads). It is possible that young males are now less likely to ride TWMVs and (even if they are driving cars instead of TWMVs) may, consequently, have a lower likelihood of being involved in accidents.

The reasons behind the proportional drop in young male car licences, the proportional increase in young female car licences, and the drop in the numbers of TWMVs are not known but they may, perhaps, include the fact that young males generally have to pay higher insurance premiums than young females. In addition, there were several changes to the law in 1989 and 1990 that probably had significant effects on young drivers and males in particular: Accompanied motorcycle testing became mandatory; basic training for motorcyclists was made compulsory; learner motorcyclists were banned from carrying pillion passengers; drivers accompanying 'L' drivers were required to be over 21 years old and to have held a full driving licence for 3 years.

- v The proportion of accident-involved cars that were classified as 'High' performance more than doubled from 5% to 11%. The percentage of registered cars with an engine capacity exceeding 1500cc rose from 45% to 55% between 1984 and 1994. The increase in accidents probably reflects, at least partly, an increase in exposure. The promotion of particular car models against this criterion is not welcome from a safety or environmental point-of-view, particularly as these vehicles have been shown to be over-represented in the accidents involving the faster vehicle manoeuvres.
- vi Accidents involving 'company car' drivers aged over 59 years fell from 10% to 4% of the total. This is possibly attributable to demographic changes in employment which occurred over the period.

8 Summary

(Details are given in the main text in the sections shown in brackets.) Although some results may appear self-evident, they are included for completeness.

- i An analysis of STATS19 injury accident data for rural single-carriageway roads (RSCRs) for the years 1994 and 1995 has been carried out. Results have been presented with respect to a range of features, including characteristics of accident-involved vehicles and their drivers/riders. The following are some of the main findings.
- ii Most accidents occurred on A roads (53%); on 2-lane roads (90%); in 60 mph speed limits (96%); and away from junctions (63%). They mostly involved 2 vehicles and no pedestrians (55%); occurred during daylight (71%); and in fine weather (53%). 21% of all accidents (most of the 37% of all accidents at junctions) occurred at T/Y/staggered junctions. 7% and 6% of all accidents occurred at private drives and cross-roads respectively. (2)
- iii Compared with accidents in built-up areas, those on RSCRs were more severe; only about a half as likely to be at a junction; almost one sixth as likely to involve a pedestrian and a quarter as likely to involve a pedal cycle; but they were three times as likely to involve a single vehicle (with no pedestrian). (2)
- iv The accident severity ratio (ratio of KSI accidents to all injury accidents) for RSCRs was 0.27, being higher on the more major, wider roads, away from junctions, in the dark and in fine weather. It was also greater when male drivers, the oldest drivers, two-wheeled vehicles, public service vehicles, or heavy goods vehicles were involved. (3.1)
- v Almost 2% of all accident-involved drivers/TWMV riders breath tested positive or failed to comply with the test request. (3.7)
- vi Most accident-involved vehicles (76%) did not leave the carriageway; most (94%) did not hit an object in the carriageway other than a vehicle or pedestrian; most (70%) did not skid, jackknife or overturn. Most (83%) were on the main road at the time of the accident; at junctions, most (59%) were in the centre of the junction. Leaving the carriageway and skidding/jackknifing/overturning were more frequent events away from junctions. (3.8)
- vii The most frequently-involved vehicle manoeuvre was 'going ahead - other' (44% of accident-involved vehicles at junctions and 44% away from junctions). Away from junctions 'going ahead on a left/right hand bend' featured next most frequently (35%) while at junctions, 'turning right' did so (21%). (4)
- viii Accidents away from junctions were more likely than those at junctions to be associated with a single vehicle, a pedestrian, poor weather, darkness, young drivers and a positive breath test. (3.2; 3.7)
- ix Single-vehicle accidents accounted for almost one third of all accidents. They were more likely than other accidents to be associated with B/C roads, night-time,

the youngest drivers and with 'going ahead on a bend'. Young drivers were also disproportionately associated with positive breath tests and with accidents in the dark. (2; 3.5; 3.6; 3.7; 4)

- x Accidents involving vehicles doing the faster manoeuvres ('going ahead', 'overtaking') were more likely than other accidents to involve young drivers, male drivers, TWMVs, a pedestrian, skidding, leaving the carriageway, hitting objects on or off the carriageway, and to be more severe. Accidents involving slower manoeuvres ('right-turns', 'stopping', 'waiting') were disproportionately associated with female and older drivers. 'Parked' and 'stopping' manoeuvres were disproportionately associated with PSV/HGVs. (4)
- xi 26% of all accidents involved a single vehicle 'going ahead', not at a junction. About a third of these involved a male driver/rider under the age of 25 and just over half occurred on a bend. 20% of all accidents involved a single vehicle leaving the carriageway while 'going ahead', not at a junction. (5.1; 5.2)
- xii 4% of all accidents involved a pedestrian. More than half of these involved a single vehicle, 'going ahead', not at a junction. (2; 5.2)
- xiii 8% of all accidents involved two (non-overtaking) vehicles travelling in opposite directions on bends, not at a junction, and 8% involved two (non-overtaking) vehicles travelling in opposite directions, not at a bend or at a junction. (5.3.1)
- xiv 14% of all accidents involved two vehicles at a junction, with at least one vehicle 'turning right'. The other vehicle was usually 'going ahead'. At T/Y junctions, about 70% of the right-turners were entering the main road and about 30% were leaving it. (5.3.2)
- xv Up to about 1% of all accidents could have been junction 'overrun' accidents - ie. where a vehicle failed to stop to give way. (5.3.2)
- xvi High-performance cars were disproportionately involved in non-junction accidents, in single-vehicle accidents and in overtaking accidents. Their accident involvement was particularly associated with male drivers and with drivers in the 25 - 39 years age group. (6.2)
- xvii Comparisons between the earlier study years of 1988/89 and the current study of 1994/95 showed that accident characteristics were remarkably similar between the two periods. The main differences observed were: decreases in the total number and severity of accidents, the proportion of accident-involved drivers that were under 25 years old, the proportion of accident-involved company car drivers over 59 years old, and the proportion of TWMVs in accidents; and increases in the proportion of high performance cars in accidents. (7)

In conclusion, this study has shown that since the 1988/89 study (Taylor and Barker, 1992) the total number of accidents on RSCRs has fallen in line with that of all roads. However, the decrease in accident *severity* has occurred at a much slower rate on RSCRs than on all roads. Differences between the two study periods relating to specific types of accident are thought to largely reflect differences in driving.

There were significant decreases in the proportions of accident-involved drivers who were young males, and of vehicles that were TWMVs. There was also a significant increase in the proportion of accident-involved vehicles that were classified as 'high performance'.

However, broadly speaking the accident pattern is remarkably similar to before, with accidents on RSCRs not being well clustered in terms of their location or their characteristics. Vehicle speeds are still important, as indicated by the prominence of a number of STATS19 variables that are likely to relate to speed. The current accident pattern provides a basis for the continued development of low-cost measures to reduce vehicle speeds and the number and severity of injury accidents on rural single-carriageway roads.

9 Acknowledgements

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Appendix A: Supporting tabulations for Section 3

Table A1 Percentage of accidents — junction type by road type

| Road type | Junction type | | | | | All | |
|----------------|---------------|-------------|------------|-------------|-------------|-------------|--------------|
| | Private drive | | T/Y | X | Other types | % | No. |
| | None | | | | | | |
| A | 57* (48)* | 8 (61) | 24 (60) | 7 (59) | 4 (68) | 100 (53) | 42926 |
| B | 62 (18) | 7 (18) | 22 (19) | 7 (21) | 3 (15) | 100 (19) | 15127 |
| C/unclassified | 73 (33) | 5 (21) | 16 (22) | 4 (20) | 2 (16) | 100 (29) | 23346 |
| Not known | | | | | | | 116 |
| All | % | 63 (100) | 7 (100) | 21 (100) | 6 (100) | 3 (100) | 100 (100) |
| | No. | 51093 | 5762 | 17322 | 4802 | 2536 | 81515 |

*figures with brackets are column percentages; those without are row percentages.

Table A2 Percentage of accidents — junction type by carriageway type

| Carriageway type | Junction type | | | | | All | |
|------------------|---------------|-------------|------------|-------------|-------------|-------------|--------------|
| | Private drive | | T/Y | X | Other types | % | No. |
| | None | | | | | | |
| 1-lane | 84 (9) | 3 (3) | 9 (3) | 2 (2) | 2 (5) | 100 (7) | 5354 |
| 2-lane | 62 (89) | 7 (95) | 22 (93) | 6 (91) | 3 (89) | 100 (90) | 73764 |
| 3-lane | 40 (1) | 5 (1) | 38 (4) | 10 (3) | 7 (5) | 100 (2) | 1659 |
| 4-lane | 48 (1) | 7 (1) | 20 (1) | 20 (3) | 6 (2) | 100 (1) | 738 |
| All | % | 63 (100) | 7 (100) | 21 (100) | 6 (100) | 3 (100) | 100 (100) |
| | No. | 51093 | 5762 | 17322 | 4802 | 2536 | 81515 |

*figures with brackets are column percentages; those without are row percentages.

Table A3 Percentage of accidents — road type, junction type and carriageway type by number of vehicles involved and number of pedestrians involved

| Road type | Number involved | | | | | | | |
|-------------------------|-----------------|---------------|---------------|---------------|-------------|---------------|-------------|----------------|
| | Vehicles | | | | Pedestrians | | | |
| | 1 | 2 | ≥3 | All | 0 | ≥1 | All | No. |
| A | 26 | 55 | 19 | 100 | 97 | 3 | 100 | 42926 |
| B | 36 | 53 | 11 | 100 | 97 | 3 | 100 | 15127 |
| C/unclassified | 37 | 57 | 6 | 100 | 96 | 4 | 100 | 23346 |
| Not known | | | | | | | | 116 |
| Junction type | | | | | | | | |
| None | 43 | 44 | 13 | 100 | 96 | 4 | 100 | 51093 |
| Private drive | 6 | 74 | 21 | 100 | >99.5 | <½ | 100 | 5762 |
| T/Y | 15 | 71 | 14 | 100 | 97 | 3 | 100 | 17322 |
| X | 6 | 81 | 12 | 100 | 98 | 2 | 100 | 4802 |
| Other types | 16 | 71 | 12 | 100 | 98 | 2 | 100 | 2536 |
| Carriageway type | | | | | | | | |
| 1-lane | 33 | 64 | 3 | 100 | 96 | 4 | 100 | 5354 |
| 2-lane | 32 | 54 | 14 | 100 | 96 | 4 | 100 | 73764 |
| 3-lane | 13 | 64 | 23 | 100 | 97 | 3 | 100 | 1659 |
| 4-lane | 20 | 63 | 17 | 100 | 97 | 3 | 100 | 738 |
| All | % | 31 (25532) | 55 (45028) | 13 (10955) | 100 | 96 (78610) | 4 (2905) | 100 (81515) |

Table A4 Percentage of accidents — road type and junction type by lighting condition

| Road type | Lighting condition | | | | | | |
|----------------------|--------------------|---------------|-------------|---------------|---------------|------------|----------------|
| | Daylight | Dark /lit | Dark /unlit | All dark | Not known | All | |
| | | | | | | % | No. |
| A | 72 | 7 | 19 | 28 | <½ | 100 | 42926 |
| B | 70 | 5 | 24 | 30 | <½ | 100 | 15127 |
| C/unclassified | 71 | 4 | 24 | 29 | <½ | 100 | 23346 |
| M-way/not known | | | | | <½ | | 116 |
| Junction type | | | | | | | |
| None | 68 | 5 | 26 | 32 | <½ | 100 | 51093 |
| Private drive | 81 | 5 | 13 | 19 | <½ | 100 | 5762 |
| T/Y | 76 | 8 | 14 | 24 | <½ | 100 | 17322 |
| X | 79 | 6 | 14 | 21 | <½ | 100 | 4802 |
| Other | 77 | 11 | 11 | 23 | <½ | 100 | 2536 |
| All | % | 71 (58168) | 6 (4582) | 21 (17233) | 29 (23276) | <½ (71) | 100 (81515) |

Table A5 Percentage of accidents — road type and junction type by weather and road surface condition

| | Weather/road surface condition | | | | | All | |
|----------------------|--------------------------------|-------|----------|----------|-----------|-----|-------|
| | Fine & dry | Wet | Ice/snow | Fog/mist | Not known | % | No. |
| | Road type | | | | | | |
| A | 54 | 37 | 4 | 2 | 3 | 100 | 42926 |
| B | 52 | 38 | 5 | 2 | 3 | 100 | 15127 |
| C/unclassified | 52 | 36 | 6 | 2 | 4 | 100 | 23346 |
| M-way/not known | | | | | 3 | | 116 |
| Junction type | | | | | | | |
| None | 49 | 39 | 7 | 2 | 4 | 100 | 51093 |
| Private drive | 61 | 34 | 1 | 1 | 2 | 100 | 5762 |
| T/Y | 58 | 35 | 3 | 2 | 3 | 100 | 17322 |
| X | 64 | 30 | 2 | 1 | 2 | 100 | 4802 |
| Other types | 60 | 33 | 2 | 1 | 4 | 100 | 2536 |
| All | | | | | | | |
| % | 53 | 37 | 5 | 2 | 3 | 100 | |
| No. | 43408 | 30107 | 4030 | 1338 | 2632 | | 81515 |

Table A6 Percentage of accident-involved vehicles — road type, junction type and carriageway type by vehicle type

| | Vehicle type | | | | | | All | |
|-------------------------|------------------|------|-----|-----|----------|----------------|-----|--------|
| | Pedal cycle | TWMV | Car | LGV | PSV /HGV | Unknown /other | % | No. |
| | Road type | | | | | | | |
| A | 2 | 5 | 79 | 5 | 7 | 1 | 100 | 85211 |
| B | 3 | 7 | 79 | 5 | 5 | 2 | 100 | 26703 |
| C/unclassified | 4 | 6 | 78 | 5 | 5 | 3 | 100 | 39563 |
| M-way/not known | 0 | <½ | 84 | 5 | 9 | 1 | 100 | 310 |
| Junction type | | | | | | | | |
| None | 2 | 6 | 78 | 5 | 7 | 2 | 100 | 88795 |
| Private drive | 2 | 7 | 77 | 5 | 6 | 3 | 100 | 12797 |
| T/Y | 2 | 6 | 80 | 5 | 5 | 1 | 100 | 35115 |
| X | 2 | 5 | 83 | 5 | 5 | 1 | 100 | 10007 |
| Other types | 3 | 6 | 80 | 4 | 6 | 2 | 100 | 5073 |
| Carriageway type | | | | | | | | |
| 1-lane | 4 | 6 | 76 | 5 | 5 | 3 | 100 | 9136 |
| 2-lane | 2 | 6 | 79 | 5 | 6 | 2 | 100 | 137518 |
| 3-lane | 2 | 5 | 80 | 6 | 7 | 1 | 100 | 3630 |
| 4-lane | 2 | 4 | 78 | 7 | 8 | 1 | 100 | 1503 |
| All | | | | | | | | |
| % | 2 | 7 | 79 | 5 | 6 | 2 | 100 | 151787 |

Table A7 Percentage of accident-involved vehicles — road type, junction type and carriageway type by driver/rider age and sex

| | Driver/rider age (years) | | | | | All | | |
|---------------------------|--------------------------|-----|-------|-------|-----|-------------|-------|-----|
| | Male | ≤24 | 25-39 | 40-59 | ≥60 | Age unknown | % | No. |
| | Road type | | | | | | | |
| A | 22 | 36 | 29 | 11 | 2 | 100 | 61449 | |
| B | 28 | 34 | 27 | 10 | 2 | 100 | 19021 | |
| C/unclassified | 33 | 33 | 26 | 8 | 2 | 100 | 27747 | |
| Not known | 12 | 39 | 36 | 7 | 6 | 100 | 226 | |
| Junction type | | | | | | | | |
| None | 28 | 36 | 27 | 8 | 2 | 100 | 64381 | |
| Private drive | 23 | 35 | 29 | 12 | 2 | 100 | 9120 | |
| T/Y | 24 | 34 | 29 | 13 | 2 | 100 | 24379 | |
| X | 21 | 33 | 29 | 16 | 2 | 100 | 6973 | |
| Other types | 20 | 36 | 29 | 11 | 4 | 100 | 3536 | |
| Carriageway type | | | | | | | | |
| 1-lane | 34 | 32 | 26 | 8 | 2 | 100 | 6532 | |
| 2-lane | 26 | 35 | 28 | 10 | 2 | 100 | 98109 | |
| 3-lane | 20 | 36 | 31 | 12 | 2 | 100 | 2653 | |
| 4-lane | 22 | 37 | 30 | 10 | 4 | 100 | 1095 | |
| All known male | | | | | | | | |
| % | 26 | 35 | 27 | 10 | 2 | 100 | | |
| Female | | | | | | | | |
| Road type | | | | | | | | |
| A | 25 | 38 | 28 | 8 | 2 | 100 | 21189 | |
| B | 27 | 36 | 29 | 8 | 1 | 100 | 6910 | |
| C/unclassified | 27 | 37 | 28 | 7 | 2 | 100 | 10312 | |
| Not known | 27 | 40 | 21 | 7 | 5 | 100 | 73 | |
| Junction type | | | | | | | | |
| None | 28 | 38 | 27 | 7 | 1 | 100 | 20912 | |
| Private drive | 24 | 37 | 28 | 9 | 2 | 100 | 3383 | |
| T/Y | 25 | 36 | 29 | 9 | 2 | 100 | 9904 | |
| X | 21 | 34 | 31 | 13 | 1 | 100 | 2874 | |
| Other types | 23 | 39 | 28 | 7 | 4 | 100 | 1411 | |
| Carriageway type | | | | | | | | |
| 1-lane | 26 | 37 | 29 | 7 | 1 | 100 | 2320 | |
| 2-lane | 26 | 37 | 28 | 8 | 2 | 100 | 34927 | |
| 3-lane | 23 | 35 | 32 | 10 | 1 | 100 | 877 | |
| 4-lane | 26 | 38 | 29 | 6 | 3 | 100 | 360 | |
| All known female | | | | | | | | |
| % | 26 | 37 | 28 | 8 | 2 | 100 | | |
| Gender unknown | | | | | | | | |
| Road type | | | | | | | | |
| A | 2 | 4 | 2 | <½ | 92 | 100 | 2573 | |
| B | 2 | 5 | 2 | <½ | 92 | 100 | 826 | |
| C/unclassified | 2 | 6 | 1 | <½ | 90 | 100 | 1503 | |
| Not known | 0 | 0 | 0 | 0 | 100 | 100 | 9 | |
| Junction type | | | | | | | | |
| None | 2 | 5 | 2 | <½ | 92 | 100 | 3501 | |
| Private drive | 1 | 3 | 1 | 0 | 95 | 100 | 294 | |
| T/Y | 3 | 6 | 2 | <½ | 89 | 100 | 832 | |
| X | 2 | 7 | 2 | <½ | 87 | 100 | 160 | |
| Other types | 2 | 3 | 1 | 0 | 94 | 100 | 126 | |
| Carriageway type | | | | | | | | |
| 1-lane | 3 | 6 | 3 | <½ | 88 | 100 | 284 | |
| 2-lane | 2 | 5 | 2 | <½ | 91 | 100 | 4481 | |
| 3-lane | 0 | 2 | 3 | 1 | 94 | 100 | 100 | |
| 4-lane | 0 | 0 | 2 | 0 | 98 | 100 | 48 | |
| All gender unknown | | | | | | | | |
| % | 2 | 5 | 2 | <½ | 91 | 100 | | |

Table A8 Percentage of accidents — road type, junction type and number of vehicles involved by time of day

| to | Time of day (hour) | | | | | All | |
|------------------------|--------------------|------|------|------|------|-----|-------|
| | 0000 | 0700 | 1000 | 1600 | 1900 | % | No. |
| | 0700 | 1000 | 1600 | 1900 | 0000 | | |
| Road type | | | | | | | |
| A | 8 | 17 | 36 | 22 | 17 | 100 | 42926 |
| B | 8 | 18 | 32 | 22 | 20 | 100 | 15127 |
| C/unclassified | 8 | 17 | 33 | 21 | 21 | 100 | 23346 |
| Not known/other | 11 | 13 | 41 | 23 | 11 | 100 | 116 |
| Junction type | | | | | | | |
| None | 10 | 17 | 32 | 20 | 21 | 100 | 51093 |
| Private drive | 3 | 18 | 43 | 22 | 13 | 100 | 5762 |
| T/Y | 5 | 18 | 37 | 24 | 15 | 100 | 17322 |
| X | 4 | 17 | 40 | 24 | 15 | 100 | 4802 |
| Other | 5 | 17 | 38 | 24 | 16 | 100 | 2536 |
| No. of vehicles | | | | | | | |
| 1 | 17 | 13 | 25 | 16 | 28 | 100 | 25532 |
| 2 | 4 | 19 | 38 | 24 | 15 | 100 | 45028 |
| ≥3 | 3 | 21 | 41 | 25 | 11 | 100 | 10955 |
| All | | | | | | | |
| % | 8 | 17 | 34 | 22 | 19 | 100 | 81515 |

Table A9 Percentage of accidents — number of vehicles involved by weather and road surface condition

| No. of vehicles | Weather/road surface condition | | | | | All | |
|-----------------|--------------------------------|-----|-----------|-----------|----------------|-----|-------|
| | Fine & dry | Wet | Ice /snow | Fog /mist | Unknown /other | % | No. |
| | | | | | | | |
| 1 | 49 | 37 | 9 | 2 | 4 | 100 | 25532 |
| 2 | 56 | 36 | 3 | 1 | 3 | 100 | 45028 |
| ≥3 | 53 | 40 | 3 | 2 | 3 | 100 | 10955 |
| All | | | | | | | |
| % | 53 | 37 | 5 | 2 | 3 | 100 | 81515 |

Table A10 Percentage of accident-involved vehicles — lighting condition and weather and road surface condition by vehicle type

| | Vehicle type | | | | | | All | |
|---------------------------------------|--------------|------|-----|-----|----------|----------------|-----|--------|
| | Pedal cycle | TWMV | Car | LGV | PSV /HGV | Unknown /other | % | No. |
| | | | | | | | | |
| Lighting condition | | | | | | | | |
| Daylight | 3 | 6 | 77 | 6 | 7 | 2 | 100 | 113800 |
| Dark/lit | 2 | 5 | 84 | 4 | 4 | 1 | 100 | 8396 |
| Dark/unlit | 2 | 4 | 84 | 4 | 4 | 1 | 100 | 27166 |
| All dark | 2 | 5 | 84 | 4 | 4 | 1 | 100 | 37863 |
| Unknown/other | 0 | 2 | 82 | 5 | 7 | 3 | 100 | 124 |
| Weather/road surface condition | | | | | | | | |
| Fine & dry | 3 | 8 | 76 | 5 | 6 | 2 | 100 | 81762 |
| Wet | 1 | 3 | 82 | 6 | 7 | 1 | 100 | 56619 |
| Ice/snow | 1 | 2 | 83 | 7 | 6 | 1 | 100 | 6222 |
| Fog/mist | 1 | 3 | 79 | 5 | 10 | 1 | 100 | 2468 |
| Unknown/other | 2 | 4 | 83 | 5 | 5 | 2 | 100 | 4716 |
| All | | | | | | | | |
| % | 2 | 6 | 79 | 5 | 6 | 2 | 100 | 151787 |

Table A11 Percentage of accident-involved vehicles — driver/rider age and sex by number of vehicles involved, lighting condition and weather and road surface condition

| <i>Driver/rider age (years)</i> | | | | | | | | <i>Driver/rider age (years)</i> | | | | | | | |
|---------------------------------------|-----------|-------|-------|-----------|--------------------|------------|------------|---------------------------------------|-----------|-------|-------|-----------|--------------------|------------|------------|
| <i>Male</i> | ≤ 24 | 25-39 | 40-59 | ≥ 60 | <i>Age unknown</i> | <i>All</i> | | <i>Gender unknown</i> | ≤ 24 | 25-39 | 40-59 | ≥ 60 | <i>Age unknown</i> | <i>All</i> | |
| | | | | | | % | <i>No.</i> | | | | | | | % | <i>No.</i> |
| No. of vehicles | | | | | | | | No. of vehicles | | | | | | | |
| 1 | 30 | 17 | 11 | 10 | 8 | 18 | 19168 | 1 | 18 | 8 | 9 | 0 | 7 | 7 | 357 |
| 2 | 53 | 59 | 62 | 66 | 62 | 59 | 63738 | 2 | 62 | 64 | 57 | 73 | 58 | 59 | 2861 |
| ≥ 3 | 17 | 24 | 28 | 24 | 29 | 23 | 25398 | ≥ 3 | 20 | 28 | 34 | 27 | 35 | 34 | 1669 |
| Not known | <1/2 | <1/2 | <1/2 | <1/2 | 0 | <1/2 | 85 | Unknown | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lighting condition | | | | | | | | Lighting condition | | | | | | | |
| Daylight | 65 | 74 | 78 | 84 | 76 | 74 | 80084 | Daylight | 59 | 71 | 76 | 91 | 65 | 66 | 3219 |
| Dark/lit | 7 | 6 | 5 | 4 | 6 | 6 | 6112 | Dark/lit | 12 | 4 | 2 | 9 | 7 | 7 | 333 |
| Dark/unlit | 26 | 18 | 16 | 11 | 15 | 19 | 20422 | Dark/unlit | 21 | 21 | 5 | 0 | 25 | 25 | 1215 |
| Dark/unknown | 2 | 2 | 1 | 1 | 3 | 2 | 1682 | Dark/unknown | 8 | 3 | 1 | 0 | 2 | 2 | 115 |
| Not known | <1/2 | <1/2 | <1/2 | <1/2 | <1/2 | <1/2 | 89 | Unknown | 0 | 0 | 0 | 0 | <1/2 | <1/2 | |
| Weather/road surface condition | | | | | | | | Weather/road surface condition | | | | | | | |
| Fine & dry | 56 | 54 | 52 | 59 | 60 | 55 | 59162 | Fine & dry | 60 | 55 | 62 | 64 | 60 | 60 | 2910 |
| Wet | 37 | 37 | 39 | 34 | 30 | 37 | 40030 | Wet | 26 | 40 | 30 | 18 | 32 | 33 | 1592 |
| Ice/snow | 3 | 4 | 4 | 3 | 3 | 4 | 4191 | Ice/snow | 2 | 1 | 3 | 0 | 2 | 2 | 115 |
| Fog/mist | 1 | 2 | 2 | 1 | 2 | 2 | 1772 | Fog/mist | 2 | 2 | 3 | 0 | 2 | 2 | 86 |
| Other/unknown | 3 | 3 | 3 | 3 | 5 | 3 | 3234 | Other/unknown | 10 | 2 | 3 | 18 | 4 | 4 | 183 |
| All male | | | | | | | | All gender unknown | | | | | | | |
| % | 100 | 100 | 100 | 100 | 100 | 100 | | % | 100 | 100 | 100 | 100 | 100 | 100 | |
| No. | 27672 | 38093 | 29634 | 10788 | 2202 | 108389 | | No. | 90 | 223 | 79 | 11 | 4484 | 4887 | |
| Female | | | | | | | | | | | | | | | |
| No. of vehicles | | | | | | | | | | | | | | | |
| 1 | 24 | 14 | 11 | 11 | 8 | 16 | 5975 | | | | | | | | |
| 2 | 56 | 61 | 64 | 68 | 57 | 61 | 23384 | | | | | | | | |
| ≥ 3 | 20 | 25 | 25 | 21 | 35 | 24 | 9095 | | | | | | | | |
| Unknown | <1/2 | <1/2 | <1/2 | 0 | 0 | <1/2 | 30 | | | | | | | | |
| Lighting condition | | | | | | | | | | | | | | | |
| Daylight | 73 | 81 | 81 | 86 | 78 | 79 | 30478 | | | | | | | | |
| Dark/lit | 6 | 5 | 5 | 3 | 6 | 5 | 1949 | | | | | | | | |
| Dark/unlit | 19 | 13 | 13 | 10 | 14 | 14 | 5527 | | | | | | | | |
| Dark/unknown | 2 | 1 | 1 | 1 | 2 | 1 | 500 | | | | | | | | |
| Unknown | <1/2 | <1/2 | <1/2 | 0 | 0 | <1/2 | 30 | | | | | | | | |
| Weather/road surface condition | | | | | | | | | | | | | | | |
| Fine & dry | 51 | 50 | 51 | 57 | 52 | 51 | 19680 | | | | | | | | |
| Wet | 39 | 40 | 39 | 36 | 38 | 39 | 14982 | | | | | | | | |
| Ice/snow | 5 | 5 | 5 | 3 | 4 | 5 | 1914 | | | | | | | | |
| Fog/mist | 2 | 2 | 1 | 1 | <1/2 | 2 | 607 | | | | | | | | |
| Other/unknown | 3 | 3 | 3 | 3 | 6 | 3 | 1301 | | | | | | | | |
| All female | | | | | | | | | | | | | | | |
| % | 100 | 100 | 100 | 100 | 100 | 100 | | | | | | | | | |
| No. | 9881 | 14283 | 10694 | 2989 | 637 | 38484 | | | | | | | | | |

Table A12 Percentage of accident-involved vehicles — driver/rider age by time of day

| <i>Time of day (hour)</i> | | | | | | | | | |
|---------------------------|------|------|------|------|------|------|------|------------------|------------|
| <i>Driver age to</i> | 0000 | 0400 | 0700 | 1000 | 1500 | 1900 | 2200 | <i>All known</i> | |
| | | | | | | | | % | <i>No.</i> |
| ≤ 24 | 6 | 3 | 15 | 24 | 29 | 16 | 9 | 100 | 37650 |
| 25-39 | 3 | 3 | 20 | 29 | 29 | 11 | 4 | 100 | 52612 |
| 40-59 | 2 | 2 | 21 | 32 | 31 | 10 | 3 | 100 | 40411 |
| ≥ 60 | 1 | 1 | 13 | 43 | 32 | 7 | 2 | 100 | 13791 |
| All known % | 3 | 3 | 18 | 30 | 30 | 11 | 5 | 100 | |

Appendix B: Analysis of vehicle manoeuvres

B1 All junction types: tabulations

Tables B1 to B8 present a breakdown of accident-involved manoeuvres (see section 4) by key accident characteristics, for all junction types together.

Table B1 Percentage of accident-involved vehicles — manoeuvre by road type

| Manoeuvre | Road type | | | | No. |
|--------------------------------|-----------|----|--------|-----|-------|
| | A | B | C/unc. | All | |
| Parked | 52 | 21 | 27 | 100 | 2638 |
| Waiting to go ahead | 77 | 11 | 11 | 100 | 7603 |
| Stopping | 74 | 11 | 14 | 100 | 4460 |
| Turning right | 63 | 19 | 19 | 100 | 13560 |
| Waiting to turn right | 75 | 15 | 10 | 100 | 3995 |
| Overtaking moving vehicle(o/s) | 67 | 18 | 14 | 100 | 7447 |
| Going ahead (left bend) | 39 | 20 | 41 | 100 | 18306 |
| Going ahead (right bend) | 39 | 21 | 40 | 100 | 19421 |
| Going ahead (other) | 58 | 17 | 24 | 100 | 66936 |
| All % | 56 | 18 | 26 | 100 | |

Table B2 Percentage of accident-involved vehicles — manoeuvre by carriageway type

| Manoeuvre | Carriageway type (no. of lanes) | | | | | No. |
|---------------------------|---------------------------------|----|---|----|-----|-------|
| | 1 | 2 | 3 | ≥4 | All | |
| Parked | 3 | 94 | 2 | 1 | 100 | 2638 |
| Waiting to go ahead | 3 | 92 | 4 | 2 | 100 | 7603 |
| Stopping | 5 | 91 | 3 | 1 | 100 | 4460 |
| Turning right | 2 | 92 | 5 | 1 | 100 | 13560 |
| Waiting to turn right | 1 | 96 | 2 | 1 | 100 | 3995 |
| Overtaking moving vehicle | 1 | 94 | 4 | 1 | 100 | 7447 |
| Going ahead (left bend) | 12 | 87 | 1 | <½ | 100 | 18306 |
| Going ahead (right bend) | 11 | 88 | 1 | <½ | 100 | 19421 |
| Going ahead (other) | 6 | 91 | 3 | 1 | 100 | 66936 |
| All % | 6 | 91 | 2 | 1 | 100 | |

Table B3 Percentage of accident-involved vehicles — manoeuvre by number of vehicles and pedestrians involved

| Manoeuvre | Number involved | | | | | | No. | |
|--------------------------|-----------------|----|----|-------------|------|----|-----|-------|
| | Vehicles | | | Pedestrians | | | | |
| | 1 | 2 | ≥3 | All | 0 | ≥1 | | All |
| Parked | 1 | 51 | 48 | 100 | 90 | 10 | 100 | 2638 |
| Waiting to go ahead | <½ | 34 | 66 | 100 | >99½ | <½ | 100 | 7603 |
| Stopping | 3 | 44 | 52 | 100 | 99 | 1 | 100 | 4460 |
| Turning right | 1 | 87 | 12 | 100 | >99½ | <½ | 100 | 13560 |
| Waiting to turn right | <½ | 57 | 43 | 100 | >99½ | <½ | 100 | 3995 |
| Overtaking moving veh. | 5 | 65 | 30 | 100 | 99 | 1 | 100 | 7447 |
| Going ahead (left bend) | 31 | 57 | 12 | 100 | 99 | 1 | 100 | 18306 |
| Going ahead (right bend) | 38 | 52 | 10 | 100 | 99 | 1 | 100 | 19421 |
| Going ahead (other) | 17 | 59 | 24 | 100 | 96 | 4 | 100 | 66936 |
| All % | 17 | 59 | 24 | 100 | 98 | 2 | 100 | |

Table B4 Percentage of accident-involved vehicles — manoeuvres by lighting condition

| Manoeuvre | Lighting condition | | | | All | No. |
|---------------------------|--------------------|----------|------------|--------------|-----|-------|
| | Day-light | Dark lit | Dark unlit | Dark unknown | | |
| Parked | 69 | 8 | 22 | 2 | 100 | 2638 |
| Waiting to go ahead | 87 | 5 | 7 | 1 | 100 | 7603 |
| Stopping | 86 | 4 | 9 | 1 | 100 | 4460 |
| Turning right | 79 | 8 | 11 | 1 | 100 | 13560 |
| Waiting to turn right | 86 | 4 | 8 | 1 | 100 | 3995 |
| Overtaking moving vehicle | 78 | 5 | 16 | 1 | 100 | 7447 |
| Going ahead (left bend) | 71 | 3 | 24 | 2 | 100 | 18306 |
| Going ahead (right bend) | 70 | 4 | 25 | 2 | 100 | 19421 |
| Going ahead (other) | 73 | 6 | 19 | 2 | 100 | 66936 |
| All % | 75 | 6 | 18 | 2 | 100 | |

Table B5 Percentage of accident-involved vehicles — manoeuvre by weather and road surface conditions

| Manoeuvre | Weather/road surface condition | | | | | | No. |
|--------------------------|--------------------------------|-----|-----------|-----------|-----------|-----|-------|
| | Fine & dry | Wet | Ice/ snow | Fog/ mist | Not known | All | |
| Parked | 52 | 37 | 5 | 2 | 4 | 100 | 2638 |
| Waiting to go ahead | 54 | 39 | 2 | 2 | 3 | 100 | 7603 |
| Stopping | 52 | 38 | 4 | 2 | 3 | 100 | 4460 |
| Turning right | 65 | 30 | 1 | 1 | 2 | 100 | 13560 |
| Waiting to turn right | 53 | 42 | 1 | 1 | 3 | 100 | 3995 |
| Overtaking moving veh. | 63 | 32 | 2 | 1 | 3 | 100 | 7447 |
| Going ahead (left bend) | 44 | 45 | 6 | 2 | 4 | 100 | 18306 |
| Going ahead (right bend) | 45 | 43 | 6 | 2 | 4 | 100 | 19421 |
| Going ahead (other) | 55 | 34 | 5 | 2 | 3 | 100 | 66936 |
| All % | 54 | 37 | 4 | 2 | 3 | 100 | |

Table B6 Percentage of accident-involved vehicles — manoeuvre by vehicle type

| Manoeuvre | Vehicle type | | | | | | No. |
|--------------------------|--------------|------|-----|-----|----------|-----|-------|
| | Pedal cycle | TWMV | Car | LGV | PSV/ HGV | All | |
| Parked | <1/2 | 1 | 68 | 11 | 15 | 100 | 2638 |
| Waiting to go ahead | <1/2 | 1 | 90 | 4 | 4 | 100 | 7603 |
| Stopping | <1/2 | 3 | 84 | 5 | 8 | 100 | 4460 |
| Turning right | 3 | 2 | 81 | 6 | 5 | 100 | 13560 |
| Waiting to turn right | 1 | 1 | 88 | 5 | 2 | 100 | 3995 |
| Overtaking moving veh. | <1/2 | 13 | 76 | 5 | 4 | 100 | 7447 |
| Going ahead (left bend) | 1 | 9 | 79 | 5 | 5 | 100 | 18306 |
| Going ahead (right bend) | 1 | 8 | 77 | 5 | 8 | 100 | 19421 |
| Going ahead (other) | 3 | 6 | 78 | 5 | 7 | 100 | 66936 |
| All % | 2 | 6 | 79 | 5 | 6 | 100 | |

Table B7 Percentage of accident-involved vehicles — manoeuvre by driver/rider age and sex

| Manoeuvre | Driver age (years) | | | | Age un- | | No. |
|----------------------------------|--------------------|--------|--------|-----|---------|-----|--------|
| | ≤24 | 25 -39 | 40 -59 | ≥60 | known | All | |
| Male | | | | | | | |
| Parked | 14 | 34 | 37 | 9 | 6 | 100 | 1760 |
| Waiting to go ahead | 14 | 37 | 37 | 10 | 2 | 100 | 4981 |
| Stopping | 17 | 36 | 34 | 10 | 3 | 100 | 3070 |
| Turning right | 22 | 29 | 27 | 20 | 2 | 100 | 9010 |
| Waiting to turn right | 17 | 37 | 33 | 11 | 2 | 100 | 2374 |
| Overtaking moving vehicle | 31 | 39 | 21 | 6 | 2 | 100 | 5746 |
| Going ahead (left bend) | 35 | 36 | 22 | 6 | 1 | 100 | 13724 |
| Going ahead (right bend) | 31 | 35 | 25 | 7 | 1 | 100 | 14553 |
| Going ahead (other) | 24 | 35 | 28 | 10 | 2 | 100 | 48047 |
| All males/ all manoeuvres % | 26 | 35 | 27 | 10 | 2 | 100 | 108389 |
| Female | | | | | | | |
| Parked | 18 | 36 | 32 | 8 | 7 | 100 | 519 |
| Waiting to go ahead | 21 | 40 | 31 | 6 | 2 | 100 | 2495 |
| Stopping | 24 | 41 | 26 | 6 | 2 | 100 | 1300 |
| Turning right | 24 | 32 | 28 | 14 | 2 | 100 | 4212 |
| Waiting to turn right | 19 | 40 | 34 | 6 | 1 | 100 | 1530 |
| Overtaking moving vehicle | 28 | 37 | 27 | 6 | 1 | 100 | 1099 |
| Going ahead (left bend) | 30 | 38 | 25 | 6 | 1 | 100 | 4037 |
| Going ahead (right bend) | 31 | 36 | 26 | 6 | 1 | 100 | 4492 |
| Going ahead (other) | 26 | 38 | 28 | 7 | 2 | 100 | 16955 |
| All females/ all manoeuvres % | 26 | 37 | 28 | 8 | 2 | 100 | 38484 |

Table B8 Percentage of accident-involved drivers/riders breath testing positive (of those tested) by manoeuvre

| Manoeuvre | Breath tests | |
|--------------------------|--------------|-------------------------------|
| | Positive | No. tested (+ve and -ve only) |
| Parked | 1 | 563 |
| Waiting to go ahead | 1 | 2079 |
| Stopping | 1 | 1365 |
| Turning right | 2 | 5067 |
| Waiting to turn right | 1 | 1317 |
| Overtaking moving veh. | 4 | 2797 |
| Going ahead (left bend) | 8 | 6979 |
| Going ahead (right bend) | 9 | 7801 |
| Going ahead (other) | 5 | 24573 |
| All % | 5 | |

B2 Selected accident types (by vehicle manoeuvre and junction type)

As described in section 4, the analysis below shows (a) the most frequent situations, and (b) characteristics disproportionately associated with the selected manoeuvre at the selected junction type. The latter were defined as those associated with a percentage of accident-involved vehicles more than about 15% greater than the average percentage for all manoeuvres at that junction type, provided there were at least 100 accident-involved vehicles in the sub-group.

The number of vehicles involved in the selected accidents is shown in brackets alongside the sub-headings, together with the percentage of all RSCR accidents represented. The figures below in round brackets are the percentages of all vehicles involved in the accident sub-group which have the particular characteristic shown. The figures in square brackets are the equivalent percentages for *all* RSCR accidents.

i No junction - going ahead other (39478; 26%)

Most frequent situations:

| | |
|------------------|------|
| — A roads | (55) |
| — 2-lane roads | (90) |
| — daylight | (71) |
| — fine/dry | (52) |
| — 2 vehicles | (50) |
| — no pedestrians | (95) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|----------------------------------------------------------------------|-----|-----|
| — involve a pedestrian | (5) | [3] |
| — involve a pedal cycle | (4) | [2] |
| — be in darkness (lit) | (5) | [5] |
| — involve a fatality | (5) | [4] |
| — involve a vehicle hitting an unspecified object in the carriageway | (1) | [1] |

ii No junction - going ahead on a right/left hand bend (31392; 21%)

Most frequent situations:

| | |
|------------------------|------|
| — C/unclassified roads | (42) |
| — 2-lane roads | (87) |
| — daylight | (69) |
| — fine/dry | (43) |
| — 2 vehicles | (53) |
| — no pedestrians | (99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|---------------------------------------------|----------|----------|
| — involve only one vehicle | (36) | [25] |
| — involve a TWMV | (8) | [6] |
| — be in wet conditions | (44) | [39] |
| — occur on single-lane roads | (12) | [9] |
| — occur on B; C/unclassified roads | (20; 42) | [17; 31] |
| — involve the youngest (under 25) drivers | (31) | [27] |
| — (particularly males) | (25) | [20] |
| — be associated with a positive breath test | (4) | [2] |
| — be in darkness (unlit) | (25) | [22] |

| | | |
|-----------------------------------------------------------|------|------|
| — involve leaving the carriageway | (44) | [31] |
| — involve skidding/& or overturning | (49) | [35] |
| — involve a vehicle hitting an object off the carriageway | (33) | [21] |

iii Unsignalised T/Y/staggered-junction - going ahead other (14124; 9%)

Most frequent situations:

| | |
|------------------|------|
| — A roads | (65) |
| — 2-lane roads | (93) |
| — daylight | (78) |
| — fine/dry | (58) |
| — 2 vehicles | (70) |
| — no pedestrians | (98) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|----------------------------------------------|--------|--------|
| — involve a pedestrian | (2) | [1] |
| — involve a TWMV; a pedal cycle | (7; 3) | [6; 2] |
| — involve a fatality | (3) | [2] |
| — involve a vehicle located on the main road | (92) | [72] |
| — involve skidding | (31) | [22] |

iv Unsignalised T/Y/staggered-junction - turning right (7885; 5%)

Most frequent situations:

| | |
|------------------|--------|
| — A roads | (62) |
| — 2-lane roads | (92) |
| — daylight | (78) |
| — fine/dry | (64) |
| — 2 vehicles | (87) |
| — no pedestrians | (> 99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|-------------------------------------------------------|------|------|
| — involve 2 vehicles | (87) | [70] |
| — involve a pedal cycle | (3) | [2] |
| — be on a 3-lane road | (5) | [4] |
| — involve female drivers | (32) | [28] |
| — involve the oldest (60 or over) drivers | (19) | [11] |
| — involve impact for a vehicle leaving the main road | (24) | [7] |
| — involve impact for a vehicle entering the main road | (48) | [14] |
| — involve impact for a vehicle in mid-junction | (85) | [57] |

v No junction - overtaking a moving vehicle on its offside (5128; 3%)

11% of all fatal accidents on RSCRs involved a vehicle in this sub-group.

Most frequent situations:

| | |
|------------------|------|
| — A roads | (68) |
| — 2-lane roads | (94) |
| — daylight | (75) |
| — fine/dry | (59) |
| — 2 vehicles | (58) |
| — no pedestrians | (99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|------------------------------------------------------------|------|------|
| — be on a 3-lane road | (4) | [2] |
| — involve more than 2 vehicles | (36) | [24] |
| — involve a TWMV | (10) | [6] |
| — be in fine, dry conditions | (59) | [50] |
| — be on A roads | (68) | [51] |
| — involve a fatality | (5) | [4] |
| — involve a vehicle leaving the carriageway to its offside | (15) | [12] |

vi Unsignalised crossroads - going ahead other (5604; 4%)

18% of these vehicles were entering the main road.

Most frequent situations:

| | |
|------------------|------|
| — A roads | (53) |
| — 2-lane roads | (93) |
| — daylight | (80) |
| — fine/dry | (64) |
| — 2 vehicles | (82) |
| — no pedestrians | (99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|-------------------------------------------------|------|------|
| — involve skidding | (26) | [21] |
| — involve a vehicle leaving the carriageway | (13) | [12] |
| — involve impact for a vehicle in the main road | (77) | [67] |

vii Unsignalised T/Y/staggered junctions - going ahead on a right/left hand bend (4377; 3%)

Most frequent situations:

| | |
|------------------|------|
| — A roads | (43) |
| — 2-lane roads | (93) |
| — daylight | (73) |
| — fine/dry | (50) |
| — 2 vehicles | (62) |
| — no pedestrians | (99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|----------------------------------------------------------|----------|----------|
| — involve only one vehicle | (26) | [7] |
| — involve a TWMV | (10) | [6] |
| — be in wet conditions | (40) | [35] |
| — be on single-lane roads | (5) | [2] |
| — be on B; C/unclassified roads | (25; 33) | [18; 20] |
| — involve the youngest (under 25) drivers | (30) | [23] |
| — (particularly males) | (23) | [16] |
| — involve a positive breath test | (3) | [1] |
| — be in darkness (unlit) | (21) | [13] |
| — involve a fatal or serious injury | (27) | [23] |
| — involve impact for a vehicle in the main road | (89) | [72] |
| — or off the carriageway | (2) | [1] |
| — involve skidding | (41) | [22] |
| — involve a vehicle leaving the carriageway | (33) | [15] |
| — involve a vehicle hitting an object on the carriageway | (5) | [2] |

| | | |
|-----------------------------------------------------------|------|-----|
| — involve a vehicle hitting an object off the carriageway | (25) | [9] |
| — involve impact for a vehicle exiting the junction | (20) | [8] |

viii Private drive - going ahead other (4953; 3%)

Most frequent situations:

| | |
|------------------|------|
| — A roads | (65) |
| — 2-lane roads | (95) |
| — daylight | (80) |
| — fine/dry | (58) |
| — 2 vehicles | (63) |
| — no pedestrians | (99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|-------------------------------------------|------|------|
| — involve a pedestrian | (1) | [1] |
| — involve a TWMV | (8) | [7] |
| — involve an impact in the main road | (96) | [74] |
| — involve a fatality | (3) | [2] |
| — involve skidding | (36) | [22] |
| — involve a vehicle entering the junction | (40) | [32] |

ix No junction - waiting to go ahead (4363; 3%)

Most frequent situations:

| | |
|------------------------|--------|
| — A roads | (76) |
| — 2-lane roads | (90) |
| — daylight | (86) |
| — fine/dry | (51) |
| — more than 2 vehicles | (67) |
| — no pedestrians | (> 99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|--------------------------------|------|------|
| — involve more than 2 vehicles | (67) | [24] |
| — be in fog/mist | (3) | [2] |
| — be on A roads | (76) | [51] |
| — involve female drivers | (31) | [24] |
| — be in daylight | (86) | [72] |

x Private drive - turning right (2818; 2%)

Most frequent situations:

| | |
|------------------|--------|
| — A roads | (59) |
| — 2-lane roads | (95) |
| — daylight | (82) |
| — fine/dry | (67) |
| — 2 vehicles | (87) |
| — no pedestrians | (> 99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|------------------------------------------------|--------|--------|
| — involve 2 vehicles | (87) | [66] |
| — involve a pedal cycle; a LGV | (3; 7) | [2; 5] |
| — involve female drivers | (28) | [26] |
| — involve the oldest (60 or over) drivers | (15) | [10] |
| — involve impact for a vehicle | | |
| - leaving the main road | (43) | [12] |
| - entering the main road | (35) | [11] |
| — involve impact for a vehicle in mid-junction | (81) | [57] |

xi No junction - parked (2099; 1%)

Most frequent situations:

| | |
|------------------|------|
| — A roads | (51) |
| — 2-lane roads | (93) |
| — daylight | (68) |
| — fine/dry | (51) |
| — 2 vehicles | (53) |
| — no pedestrians | (90) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|------------------------------------------------|------|-------|
| — involve a pedestrian | (10) | [3] |
| — involve more than 2 vehicles | (46) | [24] |
| — involve a LGV/PSV/HGV | (26) | [12] |
| — be in darkness | (32) | [28] |
| — involve a vehicle impact off the carriageway | (7) | [2] |
| — or on a layby or hard shoulder | (8) | [< ½] |

xii No junction - stopping (2835; 2%)

Most frequent situations:

| | |
|------------------------|------|
| — A roads | (74) |
| — 2-lanes | (90) |
| — daylight | (86) |
| — fine/dry | (51) |
| — more than 2 vehicles | (53) |
| — no pedestrians | (99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|--------------------------------|------|------|
| — be on A roads | (74) | [51] |
| — involve more than 2 vehicles | (54) | [24] |
| — involve a PSV/HGV | (7) | [7] |
| — involve female drivers | (29) | [24] |
| — be in daylight | (86) | [72] |

xiii Unsignalised T/Y/staggered-junction - waiting to turn right (2038; 1%)

Most frequent situations:

| | |
|------------------|--------|
| — A roads | (73) |
| — 2-lanes | (96) |
| — daylight | (86) |
| — fine/dry | (53) |
| — 2 vehicles | (58) |
| — no pedestrians | (> 99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|-----------------------------------------|------|------|
| — involve more than 2 vehicles | (42) | [22] |
| — be on A roads | (73) | [62] |
| — be in wet conditions | (42) | [35] |
| — involve female drivers | (41) | [28] |
| — involve middle-aged (25 - 60) drivers | (71) | [62] |

xiv Unsignalised crossroads - turning right (1351; 1%)

Most frequent situations:

| | |
|-----------|------|
| — A roads | (65) |
| — 2-lanes | (93) |

| | |
|------------------|-------|
| — daylight | (83) |
| — fine/dry | (68) |
| — 2 vehicles | (86) |
| — no pedestrians | (>99) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|------------------------------------------------|------|------|
| — be in darkness (lit) | (5) | [5] |
| — involve the oldest (60 or over) drivers | (20) | [15] |
| — involve female drivers | (31) | [29] |
| — particularly the youngest - under 25) | (7) | [6] |
| — involve impact for a vehicle | | |
| - leaving the main road | (31) | [6] |
| - entering the main road | (42) | [19] |
| — involve impact for a vehicle in mid-junction | (89) | [75] |

xv Signalised junctions - going ahead other (681; < ½%)

Most frequent situations:

| | |
|------------------|------|
| — A roads | (82) |
| — 2-lane roads | (73) |
| — daylight | (69) |
| — fine/dry | (63) |
| — 2 vehicles | (82) |
| — no pedestrians | (96) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|-------------------------------------------------|------|------|
| — involve skidding | (18) | [12] |
| — involve impact for a vehicle in the main road | (89) | [76] |

xvi Signalised junctions - turning right (323; < ½%)

Most frequent situations:

| | |
|------------------|------|
| — A roads | (85) |
| — 2-lane roads | (71) |
| — daylight | (62) |
| — fine/dry | (62) |
| — 2 vehicles | (92) |
| — no pedestrians | (98) |

More likely than all other manoeuvres taken together at this junction type to:

| | | |
|------------------------------------------------------|------|------|
| — involve 2 vehicles | (92) | [80] |
| — involve the youngest (under 25) drivers | (31) | [25] |
| — involve female drivers | (38) | [28] |
| — involve impact for a vehicle leaving the main road | (42) | [11] |
| — involve impact for a vehicle in mid-junction | (90) | [60] |

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Abstract

59% of road accident fatalities and 43% of road accident costs in Great Britain result from rural (speed limit ≥ 50 mph) roads. The report presents the results of an analysis of STATS19 injury accident data for rural single-carriageway roads for the years 1994 and 1995 (updating a previous study which used 1988 and 1989 data, Taylor and Barker, 1992). This latest study was undertaken to compare accident data between the two periods and determine whether there have been any changes in rural single-carriageway accident characteristics.

The statistics are based on 81515 accidents which involved 151787 vehicles and 130312 casualties. They are presented with respect to accident severity, road type, carriageway type, junction type, numbers of vehicles and pedestrians involved, lighting and weather conditions, time of day, vehicle type, vehicle manoeuvre, vehicle performance, driver age and sex, alcohol involvement, and for various combinations of these factors. Comparisons are also made with corresponding results for built-up roads. The analysis highlights some of the most commonly occurring groups of accidents, which are examined in greater detail.

Related publications

- TRL202 *Trials of rural road safety engineering measures* by J Barker. 1997 (price code H, £30)
- RR263 *Urban safety project: 3. Overall evaluation of area wide schemes* by A M Mackie, H A Ward and R T Walker. 1990 (price code B, £15)
- RR65 *Accidents at rural T-junctions* by D Pickering, R D Hall and M Grimmer. 1986 (price code C, £15)
- RR365 *Injury accidents on rural single-carriageway roads - an analysis of STATS19 data* by M C Taylor and J K Barker. 1992 (price code H, £30)
- RR320 *A car accident injury database: overview and analyses of entrapment and ejection* by M A Renouf. 1991 (price code B, £15)
- SR718 *Ages of car drivers involved in accidents, with special references to junctions* by R L Moore, I P Sedgley and B E Sabey. (price code AA, £10)

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Microcomputer accident analysis package (MAAP) Version 5.0. 1994. (Enquiries for this version and for MAAP for Windows to TRL Traffic and Transport (Mrs Julie Flack Tel 770018, Fax 770864))