

# Collisions Involving Cyclists on Britain's Roads: Establishing the Causes

## Abstract

The reported number of cyclists killed or seriously injured (KSI) in road collisions in Great Britain has steadily increased in recent years, with the number injured in 2008 being 11% higher than in 2004. The Department for Transport commissioned this research to provide a comprehensive understanding of collisions involving cyclists, with the objective of establishing the key causes. The programme of work involved an international literature review and a detailed analysis of cyclist casualties in Great Britain, drawing on both national and in-depth databases of road collisions and cycling.

## Main findings

- A high proportion of collisions occurred at junctions; almost two-thirds of cyclists reported killed or seriously injured at or near junctions. In collisions involving a bicycle and another vehicle, the driver's having 'failed to look properly' was reported to be a key contributory factor for drivers and riders at junctions (reported in almost 60% of serious collisions at junctions).
- The study found that rural roads present particular challenges for cyclists, as the risk of being killed is much higher than for other roads. Almost half of cyclist fatalities occurred on rural roads, and the proportion of collisions on these roads increases for those aged 40+ years. Casualty severity was found to increase with the posted speed limit, and so measures to reduce traffic speeds in rural areas may benefit cyclists.
- Collisions at night/in the dark were more likely to result in a fatality, and rural roads present particular difficulties, as not only are the speed limits generally higher but the roads are often unlit. A detailed examination of these accidents found that the bicycle was commonly impacted in the rear by the vehicle.
- HGVs present particular challenges for cyclists and are over-represented in cyclist fatalities (18% of fatal cycle accidents involved an HGV, compared with 4% of serious accidents). These accidents were more common at junctions where the main collision configuration was the HGV driver making a left turn while the cyclist was going ahead. 'Vehicle blind spot' and 'passing too close to the cyclist' were judged by the police to be key contributory factors.

## Background

In 2008, 115 pedal cyclists were killed and 2,450 reported as seriously injured on Britain's roads, accounting for 9% of all killed or seriously injured (KSI) road casualties. The Government is committed to reducing road casualties for all road users, including cyclists, and has a national casualty target of reducing by 40% the number of people killed or seriously injured in road collisions by 2010, compared with the baseline average for 1994–98. Whilst there is no specific target relating to cyclists, in 2004 the number of reported KSIs had fallen to 38% below the baseline average. However, the number of reported KSIs has increased steadily since then and in 2007 and 2008 was 31% below the baseline average. It should be noted, though, that the number of cyclists killed and injured makes no allowance for the number of people cycling or the distance travelled. The number of KSIs per 100 million kilometres travelled (as measured by the National Road Traffic Survey) was fairly constant between 2002 and 2006 but increased in 2007.

The Department for Transport commissioned research to provide a comprehensive understanding of collisions involving cyclists, with the objective of establishing the key causes. The work involved an international literature review and a detailed analysis of cyclist casualties in Great Britain, drawing on both national and in-depth databases of road collisions and cycling. The main source of the casualty data was the national STATS19 injury accident data for 1994–2007. Contributory factor data have been recorded nationally as part of the STATS19 system from 2005 and are also reported. The main source of cycling activity data was the National Travel Survey (NTS).

## Research findings

The report identified four distinct groups of cyclists that have different collision characteristics.

### Children aged 0–15 years

- Children accounted for almost a quarter of KSI, with the majority aged 10–15 years. They were injured predominantly between 3pm and 6pm on minor roads in urban areas.
- Cyclists aged 10–15 years were more at risk (per km cycled) than other age groups. The reasons for this increased risk are unclear and could relate to a number of factors, such as risk taking, lack of skills in particular areas or inexperience. Older children may also be at increased risk because of changing patterns of

exposure, such as increasing levels of cycling with less supervision.

- The police are required to assign 'contributory factors' to road collisions, i.e. the main reasons, in their judgement, for the collision. In over three-quarters of collisions in which a child cyclist was seriously injured, the child's behaviour was reported as the primary contributory factor for the collision. It is not clear whether this means children are more likely than adults to behave in ways that result in a collision or whether the police are simply more likely to attribute contributory factors to a child. The main contributory factors assigned to child cyclists involved in collisions were that the child 'failed to look properly' and 'entered the road from the pavement'.
- The in-depth databases were able to provide a more detailed insight into the main collision configurations involving children on a bicycle and a motorised vehicle. 'Cyclist crossing or entering road into path of vehicle' was a frequent collision type for children. This was also supported by evidence from an international review of the literature, which found that a common crash manoeuvre by child cyclists in the Netherlands was 'crossing the road' or when a child cyclist went straight ahead while crossing other traffic flows (DfT, 2003).

### Younger adults aged 16–29 years

- Cyclists aged 16 to 29 years were more at risk of injury per km cycled than any other adult group. This is a large age group and so the reasons for the increased risk are likely to vary.
- This age group was almost twice as likely as the other age groups to be killed or seriously injured at night (9pm–3am), when the risk of a fatality is higher.

### Adults aged 30–49 years

- Reported KSIs have increased sharply for the 30–49 year age group since the year 2000.
- The 30–49 year age group were injured predominately on roads in urban areas, on week days between 6–9am and 3–6pm. KSIs for this group also had a less pronounced summer peak compared with the other age groups. This suggests that a large proportion of this age group are likely to be commuters.
- Exposure data on people cycling to work were compared with the numbers of collisions

involving cyclists. This analysis suggested that there is not a straightforward relationship between levels of cycling to work and collision risk.

### **Older adults aged 50+ years**

- Collisions involving cyclists aged 50 years or more tended to have more serious outcomes. This may be due to the circumstances of where and when they cycle, or be because older people are often more susceptible to injury. Kim, *et al.* (2007) found that cyclists aged 55 years or older have more than double the probability of suffering a fatal injury in a collision, all other items being kept constant.
- This group had the highest proportion of casualties on rural roads (40% compared with the average of 27%), where the risk of a more serious injury is greater.
- Almost half of KSI casualties occurred between 9am–3pm and there was a less pronounced weekday/weekend difference.
- People in this age group were least likely to have been judged by the police to have been ‘careless, reckless or in a hurry’ (5% of KSI accidents compared to 17% for the 16–24 year age group) and were more likely to have ‘loss of control’ prior to the accident (17% of KSI accidents compared to 10% for the 16–24 year age group).

The other areas that the authors consider to be key contributors to collisions involving cyclists were:

### **Junctions**

A high proportion of collisions occurred at junctions: almost two-thirds of cyclist KSIs were injured at or near junctions, which is perhaps not surprising, given the relatively high frequency of junctions on urban roads. The main collision configurations involving a bicycle and car were the car turning right or left while the cyclist was going straight ahead and the cyclist making a right turn while the car was going straight ahead. The factors that lead to these collisions, however, are not clear.

In collisions involving a bicycle and another vehicle, ‘failed to look properly’ was reported to be a key contributory factor for drivers and riders at junctions (reported in almost 60% of serious collisions at junctions). ‘Failed to look properly’ was attributed to the car drivers in 57% of serious collisions.

Available sources fail to show whether drivers are looking but failing to see the cyclist or failing to look for them. Equally, the strategies adopted by cyclists at junctions are also not well understood:

‘cyclist failed to look properly’ was attributed to the cyclist in 43% of all serious collisions.

### **Rural roads**

The study found that rural roads present particular challenges for cyclists, as the risk of being killed is much higher than for other roads. Almost half of cyclist fatalities occurred on rural roads, and the proportion of collisions on these roads increases for those aged 40+. Casualty severity was found to increase with the posted speed limit, and so measures to reduce traffic speeds in rural areas may benefit cyclists.

Collisions at night/in the dark were more likely to result in a fatality, and rural roads present particular difficulties, as not only are the speed limits generally higher but the roads are often unlit. A detailed examination of these accidents found that the bicycle was commonly impacted in the rear by the vehicle. Increased promotion of the use of cycle lights and wearing high-visibility/reflective clothing may help reduce the risk of such collisions in the dark.

### **‘Cyclist entering road from the pavement’**

The second most common contributory factor attributed to cyclists was ‘cyclist entering the road from the pavement’. This was assigned in a fifth of serious collisions and was especially common for children (over a third of serious collisions). This contributory factor includes crossing the road at a pedestrian crossing. Analysis of in-depth investigations from the ‘On The Spot’ project (Cuerden, 2008) found that ‘cyclist crossing or entering the road into the path of a vehicle’ was a frequent collision type for children. More research is required to identify why cyclists are making this manoeuvre and what can be done to reduce such collisions.

### **Heavy goods vehicles (HGVs)**

HGVs present particular challenges for cyclists and are over-represented in cyclist fatalities (18% of fatal cycle accidents involved an HGV, compared with 4% of serious accidents). These accidents were more common at junctions where the main collision configuration was the HGV driver making a left turn while the cyclist was going ahead. ‘Vehicle blind spot’ and ‘passing too close to the cyclist’ were judged by the police to be key contributory factors. From the data, it appears that this is a particular issue for London and it has been the subject of recent research for Transport for London (Keigan *et al.*, 2009). Ongoing work being carried out here will provide important lessons for other authorities.

### Single-cycle non-collision accidents

Hospital data suggest that many 'non-collision' single-cycle accidents (without a preceding collision with another vehicle) are not reported to or by the police. Nevertheless, 16% of cyclist KSI casualties for the period 2005–07 recorded in the STATS19 database did not involve a collision with another vehicle, which is unexpectedly high. The contributory factor most frequently attributed by the police in such accidents was 'loss of control' (67% of fatal single-cycle accidents and 44% of serious). Whether such events result from rider error, lack of skill or defects in the design or maintenance of infrastructure is not clear. After 'loss of control', 'travelling too fast for conditions', 'careless, reckless or in a hurry' and 'impaired by alcohol' were judged to be the main contributory factors for the accidents. This group of accidents warrants further consideration.

### Conclusions

In summary, this report has identified a wide range of factors relating to cyclist safety. Taking measures to reduce vehicle speeds and collisions with HGVs

(particularly in cities) will clearly be important in reducing the number of cyclists who are killed and seriously injured. It is also clear from the report that further work is required to better understand how cyclists and other road users interact on the road.

### About the project

This research forms part of an integrated programme of work commissioned by the DfT assessing road user safety issues in relation to cycling. The programme was developed and is being carried out with the involvement and participation of stakeholders representing a range of perspectives on cycling issues.

Two other reports have been published as part of the programme of work. The first contains the technical details of this research (Knowles *et al.*, 2009) and the second evaluates the effectiveness of cycle helmets from several perspectives, including a review of current test Standards; a biomechanical investigation of their potential limitations; a review of recent literature; and an assessment of the casualties that could be prevented if cycle helmets were more widely used (Hynd *et al.*, 2009).

### Further information

The full report, **Collisions Involving Cyclists on Britain's Roads: Establishing the Causes** by J. Knowles, S. Adams, R. Cuerden, T. Savill, S. Reid and M. Tight, is published by TRL (PPR 445).

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