

Development Department Research Programme

Motorcycle Accidents and Casualties in Scotland 1992-2002

TRL Ltd.

The Scottish Executive and the Scottish Road Safety Campaign commissioned TRL Ltd. to undertake research into motorcycle accidents in Scotland. The research provided a quantitative and qualitative analysis of motorcycle accidents between 1992 and 2002 in order to highlight trends and identify measures that could be taken to reduce the number and severity of motorcycle accidents in Scotland.

Main Findings

- The number of motorcycle accidents in Scotland is increasing. The rate of increase from 1996 to 2002 is approaching 9% per year for killed and serious (KSI) casualties and just over 6% per year for all casualties.
- The observed increase in motorcycle casualties is closely associated with the increased number of licensed motorcycles. The casualty rate per million kilometres and per 1,000 licensed bikes is not increasing.
- The number of accidents involving younger riders has fallen. The number of accidents involving 31-45 year olds has increased.
- Most fatal and serious accidents occur on non built-up major roads. Built-up minor roads carry the greatest risk per million kilometres travelled.
- A higher percentage of motorcycle accidents are occurring on non built-up left hand bends than in previous years.
- In general the average number of casualties increases steadily through the day, peaks early evening and then tails off. Accidents on non built-up roads are most likely to occur at the weekend and in the summer months, reflecting recreational motorcycling. Accidents on built-up roads closely correspond to commuting periods.
- Accidents on non built-up roads tend to be mostly the fault of the motorcyclist, result from a 'loss of control' on the part of the motorcyclist, involve 'sports bikes' and occur on single carriageways with 60mph speed limits.
- Accidents on built-up roads tend to be the fault of the motorist. A large proportion of these accidents result from a loss of rider control or cars turning or u-turning in front of motorcyclists. Accidents on built-up roads typically occur on roads with 30mph speed limits and involve motorcycles with low engine capacities.

Background

The Government's road safety strategy 'Tomorrow's roads: safer for everyone' sets out casualty reduction targets for 2010. The targets include achieving a '40% reduction in the number of people killed or seriously injured'; and a '10% reduction in the slight casualty rate' compared with the average 1994 to 1998 benchmark.

In general, progress towards these targets in Scotland is excellent. However over recent years the number of motorcycle casualties in Scotland has been increasing.

Motorcyclists contribute the largest number of killed and injured casualties to the overall figures after car drivers and occupants. At the same time, increasing numbers of people are using motorcycles for travel and recreation. Motorcyclists are more at risk of being killed or injured in a road traffic accident than any other type of vehicle user.

Aims and Objectives

The aim of this study was to explore differing data sources on motorcycle accidents in Scotland in order to investigate the surrounding circumstances, and identify behaviours or circumstances that increase the accident risk.

More specifically, the objectives of this research were to obtain an understanding of the trends, patterns and changes in the circumstances of motorcycle accidents over the past decade. With this understanding, it may be possible to reduce the number of road accidents involving motorcyclists through appropriate road safety strategies. Recommendations are provided on measures that could be taken to help reduce the number and severity of motorcycle accidents.

Findings

Accident Rates

The number of motorcycle accidents in Scotland is increasing. The rate of increase in motorcycle casualties from 1996 to 2002 is approaching 9% per year for killed and serious casualties (KSI) and just over 6% per year for all casualties. In 2002, there were 46 fatal, 411 serious and 709 slight accidents.

The number of licensed motorcycles in Scotland has increased from 28,000 in 1992 to 46,000 in 2002.

The estimated motorcycle traffic in Scotland rose from just over 200 million vehicle kilometres in 1992 to nearly 300 million vehicle kilometres in 2002.

The increase in motorcycle casualties referenced to the increase in the number of licensed motorcycles on the roads shows a steady decline in the casualty rate per thousand licensed motorcycles. 2002 had the lowest casualty rate for the previous 11 years.

The casualty rate per million kilometres shows a gradual decrease from 1992 to 1996. The rate then fluctuates, with no overall pattern of increase or decrease for the next 6 years. This suggests that the casualty rate per million kilometres has not changed significantly in the past 5-6 years.

Casualty data was examined separately by built-up and non built-up roads. The road where an accident occurred was defined as being built-up if the speed limit was 40mph or less and as non built-up if the speed limit was greater than 40mph.

The majority of fatal and serious casualties occur on non built-up roads. Non built-up roads are faster roads and the outcome of any accident is more likely to result in a fatal or serious casualty.

There has been a higher growth in non built-up road KSI casualties than in built-up road KSI casualties. In 2002, the percentage growth over the 1994 to 1998 baseline for built-up and for non built-up road KSI casualties was 124% and 132% respectively.

Built-up minor roads carry the highest accident casualty risk per million kilometres travelled. Accidents occurring on built-up roads are more likely to result in slight injuries.

Overtaking moving and stationary traffic, right-hand bends and left-hand bends account for nearly 30% of recorded manoeuvres prior to an accident.

Accidents occurring on left-hand bend manoeuvres have been increasing from 1994 to 2002. A higher percentage of motorcycle accidents are happening on left-hand bends than were seven or eight years ago.

Overall, 4.5% of riders involved in accidents were not from Scotland, and in bend accidents nearly 9% were not from Scotland.

The average number of casualties during week-days was considerably lower for non built-up roads than for built-up roads. This pattern changed with the week-end, where the average number of built-up casualties decreased but the number of non built-up casualties increased. This was a reflection of the fact that many motorcyclists only use their motorcycles over the weekend and when they do, they are far more likely to be riding on non built-up roads.

An analysis of the number of accidents per year between riders of different ages suggests that the

pattern of age distribution has been changing over the past 11 years. The number of accidents involving younger riders fell, whereas the number in the 31-45 year old age group showed an increase over the past four or five years. These may be the 'born again' bikers who return to riding, but are not used to today's roads nor the performance of today's bikes and so have a high accident liability.

Analysis of clusters

Analysis of extended geographical clusters of KSI accidents found some distinct differences between accidents on built-up and non built-up roads.

Accidents on *built-up* roads tended to be the fault of the motorist rather than the motorcyclist. A significant number of accidents were caused by cars turning right or doing a 'u' turn in front of the motorcyclist. However, motorcyclists were also at fault on some built-up road accidents because riders lost control due to excessive speed, slippery roads, inexperience etc..

Accidents on *non built-up* roads were mostly the fault of the motorcyclist and were often due to 'loss of control'. Over two-thirds of accidents on non-built-up roads involved larger engined 'sports' bikes (i.e. over 500cc). Very few mopeds and scooters were involved in accidents on non built-up roads.

Analysis of *all road* manoeuvres immediately before the accident occurred found significant proportions going ahead on left-hand (10%) and right-hand (10%) bends. Most of the bend accidents involved the rider losing control (79% for left-hand and 63% for right-hand bends).

The other significant motorcyclist manoeuvre was overtaking (9%), with most of these involving the motorcyclist overtaking moving vehicles on the offside. It is worth noting that very few of the motorcyclists were performing turns before the accidents

Sports motorcycles were common on both built-up and non built-up roads accounting for 23% and 53% of bikes respectively.. Sports motorcycles were particularly common among riders in their 30s (although the whole sample is biased around riders in this age group). Mopeds and scooters were much more evident on built-up roads (8%) and mostly ridden by under-21-year-olds.

Analysis of loss of control accidents where the motorcyclist was at fault, found that mopeds and scooters account for 24% of these accidents on built-up roads and sports motorcycles account for 68% of these accidents on non built-up roads.

Most of the 'rider not at fault' accidents were caused by

drivers of other vehicles turning in the path of, or failing to give way to, the motorcyclist. These accidents can be considered together as they generally involve a lack of awareness on the part of the other vehicle driver.

Recommendations

Two target groups for campaigns to reduce motorcycle accidents should be:

- Motorcycle riders.
- 'Other vehicle' drivers

Drivers on built-up road are more likely to cause the accident than the motorcyclist. Drivers do not expect, see, or register that motorcycles may be alongside them when they are stationary or waiting to join (or leave the queue of traffic). **It is necessary to make drivers more aware of motorcycles.**

It is recommended that campaigns targeted at non-motorcyclists should concentrate on the following key messages:

- Do not cut corners.
- Never do 'U-turns' unless you have checked for motorcycles (at least once).
- Never pull out of junctions without looking for motorcycles.
- Never turn right without specifically checking for overtaking motorcycles.

Motorcyclists should be aware of the dangers when filtering through and around traffic. **Motorcyclists must be made more aware of the risks they are taking.** A key group to target with this message is the younger less experienced motorcyclist who is using a small capacity machine.

On non built-up roads, a large proportion of accidents are caused when cornering. **It is important to teach motorcyclists how to ride corners safely.** It is suggested that all riders are a potential 'target' group.

It is recommended that campaigns addressed to motorcyclists should present the following messages:

- When filtering, ride defensively.
- Ride in appropriate and conspicuous clothing with daytime running lights, but never assume that you have been seen by other road users especially in busy traffic.

- Enter corners slowly and gently accelerate through the bend
- Take extra training, especially if you are a new rider or returning to biking.

A good time to introduce campaigns would probably be in Spring when many motorcyclists are returning to riding. These riders, in particular, may be 'rusty' from not having ridden during the Winter months and hence are a potential 'target' group.

It is also suggested that engineering maintenance measures, such as increasing the number of bend warnings, maintenance of road edges and the removal of 'wash-out' after heavy rain should be reviewed.

About this study

A brief literature review of material from the UK and abroad was conducted in order to collate and summarise existing research that investigated recent motorcycle accident trends and the circumstances surrounding such accidents.

Scottish motorcycle accidents as reported in STATS19 (the form used by the police for recording all accidents involving personal injury) were analysed to track trends in motorcycle accidents over the period 1992 -2002

A MAAP (Microcomputer Accident Analysis Package) analysis was used to identify extended geographical clusters of accidents. Detailed police records of 179 fatal and serious accidents occurring within these clusters were analysed

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Scottish Executive Social Research
1F (Dockside)
Victoria Quay
EDINBURGH
EH6 6QQ
Tel: 0131 244-7565
Fax: 0131 244-7573
Email: socialresearch@scotland.gsi.gov.uk
Website: www.scotland.gov.uk/socialresearch

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