

Contribution of Local Safety Schemes to Casualty Reduction

Abstract

Road casualty reduction targets are due to be reviewed and consulted upon in 2009. Road safety engineering schemes have played an important part in reducing casualties in the last decade. This study examines the performance of a large sample (408 in number) of the schemes from 2004/05 and quantifies what contribution these schemes made to casualty reduction. The study employed quantitative techniques to assess data from 22 local authorities. Programmes for 2007/08 were also analysed to assess potential changes in performance and constitution. This summary report presents the findings of the study, together with recommendations for further improving the value for money offered by road safety engineering programmes.

Main findings

- During the three years after implementation the sample of schemes saved a total estimated by this research of 8 fatalities, 55 serious injuries and 274 slight injuries per year. This is equivalent to around 4 killed or seriously injured (KSI) casualties and 17 other casualties saved per one million pounds spent.
- If these schemes are a typical sample, then the casualty reduction attributable to safety engineering schemes implemented on English local authorities' roads outside London would be 54 fatalities, 361 serious injuries and 1809 slight injuries per year.
- These 408 schemes together definitely (i.e. with more than 99.9% confidence) reduced both the total number of road casualties and the combined number of road deaths and serious injuries at the locations treated at a rate greater than the general national casualty reduction.
- Comparing records before and after implementation, there was a reduction on average of about one collision or 1.6 casualties per year per scheme site. This is equivalent to reducing the collisions at those sites analysed using collision information by about one half and reducing casualties at those sites analysed using casualty information by about one third.
- This programme represents very good value for money.
- Although all types of scheme on average generate very strong returns, the mass action schemes are the type which resulted in the highest returns relative to construction costs, whilst average returns from traffic calming and route action schemes were lower.
- The ratio of average casualty returns to costs declines with increasing scheme cost.
- There was a wide variety of results across the sample of authorities.
- Collectively the sample of schemes cost about £16.6m to build, which is about 15% of the local safety schemes expenditure by local authorities in England (outside London) recorded for 2004/05.

Background

Local authorities are responsible for prioritising how funding is directed towards road safety problems. Local authorities deliver the bulk of engineering interventions via funding provided mainly through Local Transport Plan allocations. Although this study was not geared to assessing individual performance it was commissioned to help understand overall performance amongst peer authorities and across England as a whole.

Research findings

Table 1 reports the various effects on first year rate of return. These could be used to derive combination effects for similar time periods. For example the increase in rate of return by using actual severity values would be counteracted by the decrease that takes national casualty reduction into account over the same three-year period of assessment. The term ‘factor’ in Table 1 refers to the arithmetic factor used in deriving the product of the first year rate of return reported in the top row and the associated analysis adjustment described on each subsequent row.

So, for example, an estimate of the first year rate of return of the programme based on a comparison of before and after casualty/collision numbers, adjusted to consider the reduction in average casualty/collision severity, which also considers all implementation costs and controls for site selection bias and the prevailing national reduction in casualties, would be:

$$173\% \times 1.70 \times 0.87 \times 0.78 \times 0.81 = 162\%$$

The data available are not suitable to perform a full cost–benefit analysis. Nevertheless, it is possible to convert the above first year rates of return into approximate benefit to cost ratios. For example, selecting one of the above results, a 154% first year rate of return is broadly equivalent to a benefit to cost ratio of 7.1, assuming a constant stream of benefits for (and not beyond) five years and a benefit to cost ratio of 13.0, assuming a ten-year constant benefit stream.

Recommendations for the Department for Transport

The DfT should consider the high rates of return when reviewing priority of local safety scheme funding against other budget heads. The DfT should also consider the appropriate allocation of local safety scheme funding between rural and urban roads by taking into account the difference in achievable rates of return. Consideration should also be given to publishing good practice advice to further assist local highway authorities in the delivery of local safety schemes.

Recommendations for local authorities

Local authorities should distinguish between pre-emptive safety schemes and those aimed at tackling proven casualty problems. It should be recognised that pre-emptive schemes are unlikely to offer significant contributions to casualty reduction targets, but may be more justifiable within other programmes of work.

Table 1: Summary results

Analysis	Factor	First year rate of return %
Simple comparison of casualty/collision numbers for three years before and after	–	173
Comparison of casualty/collision numbers for three years before and after taking into account reduction in average severity of crashes/collisions	1.70	294
Comparison of casualty/collision numbers for three years before and after using implementation costs rather than only construction costs	0.87	150
Comparison of forecast casualty/collision savings to actual	1.60	276 (predicted)
Control for site selection bias (longer period: six years)	0.89	154
Control for site selection bias (earlier period 4–6 years)	0.78	135
Control for national reduction in casualty numbers (three year before period)	0.88	152
Control for national reduction in casualty numbers (six year before period)	0.81	140

Local authorities should review the effectiveness of past programmes periodically and feed back this information when selecting forward programmes.

Local authorities should consider setting ‘target’ rates of return for forward programmes. They should critically examine the composition of forward programmes using Value Management techniques to maximise the probability of meeting these targets. The selection of target rates of return could be set by comparing the historical performance of peer authorities.

Local authorities should examine casualty records for a minimum of five years when developing schemes, unless there have been major, material changes locally.

Local authorities should check and if necessary change their local prioritisation processes by:

- ensuring any scheme assessment based on average casualty or collision severities uses the national average severities for built-up and on built-up roads and not the overall national average;
- however, they should also consider checking the local severity record. If, taking into account at least five years’ data, it appears to be significantly different from the national average severity (for built-up or non built-up roads as appropriate), local authorities may wish to consider how different local severity records would affect their priorities for implementing schemes;
- ensuring the initial identification of sites considers collision severity;

- considering the repeatability of first year benefits over longer periods, for example ten years;
- taking account of total costs by assessing the effects on returns by including other costs such as consultation costs and future maintenance costs;
- considering non-safety impacts where these are likely to be significant;
- considering the overall local safety strategy and delivery plan.

Recommendations for joint work

DfT and groups of local authorities should work together in regions or sub regions to:

- better understand fatal collisions and how engineering programmes may best reduce these collisions together with other programmes;
- examine possible variations in rates of return between similar authority types.

About the project

The authorities selected were a representative sample of unitary, metropolitan and county authorities with a geographical spread across England. The data were supplied by authorities in a controlled way using a pro-forma developed specifically for the study. Authorities were visited by the Department’s consultants to explain the study and to ensure that data capture was consistent and thorough. The data supplied were on a ‘whole safety programme’ basis rather than by selection of particular safety schemes.

Further information

The full report, **Contribution of Local Safety Schemes to Casualty Reduction** by Atkins, is published by the Department for Transport ISBN 978 1 906581 94 7, price £12.00

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