



September 2012

Road Safety Engineering: Cost Effective Local Safety Schemes

Great Britain has one of the best road safety records in Europe and the world. Despite massive increases in traffic over the last few decades, the number of people killed on our roads has fallen from around 5,500 per year in the mid 1980s to well under 2,000 in 2011.¹ Over the same period, road casualties have decreased from 240,000 (including 75,000 serious injuries) to just over 200,000 (including 23,000 serious injuries).²

Reported Road Casualties in Great Britain, 2011¹

Killed	1,901
Seriously Injured	23,122
Slightly Injured	178,927
All	203,950

However, the number of deaths rose in 2011, from 1,850 the previous year to 1,901, which is worrying sign that the long term reduction in road deaths may be slowing, or even beginning to reverse.

These figures are for road accidents in which someone was injured on a public road and which were reported to the police. Although virtually all fatal road accidents are reported to the police, it is known that many involving injury are not reported, even when some of those involved required medical or hospital treatment. It is estimated that the total number of road casualties in Great Britain is between 660,000 and 880,000 per year, with a best estimate of around 730,000. This includes an estimated 80,000 people who are seriously injured.³

The municipal engineer has an important role to play in providing a 'safer' infrastructure for all road users. The level of human suffering caused is immense and engineers are well placed to help reduce the numbers of accidents, casualties and the impact on society.

In addition to the terrible human cost of road accidents, they also impose a massive financial burden on the country, including lost production, health-care, social benefits and in personal pain, grief and suffering. Reported road accidents are estimated to cost the country around £15 billion per year. If unreported accidents are taken into account, the cost rises to around £32 billion.⁴

Average Value of Prevention per Casualty and per Accident, June 2009⁴

	Cost Per Casualty	Cost Per Accident
Fatal	£1,585,510	£1,790,200
Serious	£ 178,160	£ 205,060
Slight	£ 13,740	£ 21,370
All	£ 47,740	£ 68,320
Damage Only	N/A	£ 1,880

This information is an essential point of reference for engineers when assessing the cost/benefit ratio of casualty reduction or accident prevention schemes.



What Can Engineers Do About The Road Accident Problem?

All civil engineers working within the highway and transportation environments are ideally placed to make a significant impact in helping to reduce the numbers and severity of road traffic casualties.

There are two complementary approaches to this work - accident reduction and accident prevention.

Accident Reduction

Accident reduction involves measures designed to reduce the number and severity of accidents based on an existing known pattern.

- Accident analysis and remedial engineering measures.
- An effective road safety strategy and reduction plan.

Accident Prevention

Accident prevention relates to the application of measures to prevent accidents taking place in the future.

- Road Safety and User Audits on all new infrastructure or alterations.
- Periodic Road Safety Audits on existing infrastructure as an element of the total risk assessment philosophy.
- Training engineers in up to date accident investigation & prevention (AIP)⁵

This factsheet focuses on remedial engineering measures, primarily because there is a greater potential for engineers to deliver effective accident prevention. The numbers of accidents (and their severity) are still too high and engineers must address this problem by implementing cost effective remedial engineering measures.

In parallel with the increase in engineering remedial measures, a greater emphasis needs to be placed on accident prevention, which is in essence even more cost effective.

Using Low Cost Remedial Engineering Measures to Reduce Accidents

Road safety engineers and urban designers use a wide range of measures to improve the safety of the road environment for all road users and to encourage increased use of streets as places that meet the needs of pedestrians, cyclists and public transport users, and not just the movement of motor vehicles, as outlined in "[Manual for Streets](#)"⁶ and "[Manual for Streets 2](#)"⁷. These measures can range from improvements to road signs and markings, road surface improvements, applying 'naked streets' principles to street clutter, junction re-design, traffic calming schemes, 20-mph limits and zones, improved walking or cycling facilities to major road improvement schemes or Shared Space schemes.



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When collating, sifting and sorting data, and diagnosing accident problems, it is essential to focus on the many factors which led to them happening in considerable detail. The four main approaches adopted to reduce accidents by highway engineering measures are:

- Single site
- Mass action
- Route action
- Area-wide action

Local Safety Schemes

Local safety schemes can provide excellent value for money in places with existing accident problems. By focusing on sites and areas with poor accident records, road safety engineers concentrate their efforts on places where it is known that people are actually being killed or injured, rather than on perceived risks. Safety engineers usually have an even greater impact on accident reduction by undertaking area-wide safety schemes rather than focusing only on selected individual sites.

Collision Reduction Schemes in Oxfordshire⁸

Treatment	Reduction in collisions	No. of sites
Urban – pelican crossing	25%	39
Urban – traffic signals	50%	12
Urban – mini-roundabout	40%	34
Urban – road humps	50%	49
Urban – speed cameras	25%	46
Rural – right turn lanes	60%	10
Rural – signing treatments	30%	103
Rural – anti-skid junction treatment	30%	11
Rural – visibility improvement at junction	20%	18
Rural - visibility improvement on bend	40%	13
Rural – bend signing	30%	140
Rural – anti-skid bend treatment	50%	13
Rural – 30 mph village speed limits	25%	180
Rural – speed cameras	15%	16



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These schemes, in comparison with other construction projects, are relatively low-cost (<£100,000), yet the level of funding earmarked for such works across Great Britain does not even equal 1% of the true cost to the economy of all the road traffic accidents.

A greater level of funding should be allocated to local safety schemes, and far greater importance needs to be placed upon them. Their contribution to the creation of a safer environment cannot be understated

In many cases, especially new developments, financial contributions may be made available from the private sector.

Road safety engineers also conduct road safety audits of existing roads and planned developments to identify road safety problems and solutions.

For many road engineering schemes, the prime purpose may be to improve congestion or to encourage more people to cycle or to walk. However, safety improvements are an integral part of such schemes.

Maintenance

Road maintenance is a fundamental feature of safe roads, and factors such as surface condition, road alignment, drainage, signs, road markings and traffic signals can reduce the chance of a crash.

Sustainable Travel

Local authorities are seeking to create sustainable local transport systems that support their economy and reduce carbon emissions in their areas (central government funding is available for this, including through the Local Sustainable Transport Fund). A key way of achieving these goals is to encourage walking and cycling by introducing measures to make them a safer, convenient and more practical alternative to driving, especially for shorter journeys. There are many aspects of this in which your local authority can play an important role.

Cycling

Local authorities are seeking to encourage more people to cycle more safely and more often by making the roads safer for cyclists, providing cyclist training, providing cycle parking and safer routes to school projects.

Walking

Local authorities are also promoting walking as a healthy and better alternative to driving for short journeys and are working to make walking safer, and more convenient and enjoyable.



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References

- ¹ "Reported Road Casualties Great Britain: Main Results 2011", Department for Transport, 2012.
- ² Reported Road Casualty Reports, published annually by the Department for Transport
- ³ "Hospital Admission Data on Road casualties" in "Reported Road Casualties Great Britain 2010", Department for Transport, 2011
- ⁴ "A valuation of road accidents and casualties in Great Britain in 2010" " in "Reported Road Casualties Great Britain 2010", Department for Transport, 2011
- ⁵ RoSPA - Road Safety Engineering (AIP). Training courses evolved since 1971
- ⁶ "Manual for Streets", Department for Transport, Department for Communities and Local Government and Welsh Assembly Government, 2007, <http://assets.dft.gov.uk/publications/manual-for-streets/pdfmanforstreets.pdf>
- ⁷ Manual for Streets 2 - Wider Application of the Principles (2010), Chartered Institution of Highways and Transportation (CIHT), 2010) , www.ciht.org.uk/en/publications/index.cfm/manual-for-streets-2--wider-application-of-the-principles-2010
- ⁸ "Road Safety Engineering Manual", RoSPA, with TMS Consultancy, 2007

The original version of this factsheet was produced in collaboration with the AME Board of the Institution of Civil Engineers, 1 Great George Street, London SW1P 3AA.