

# Road Safety Auditing

Any change to the highway network, whether new roads or improvements to existing ones, will involve a change in user behaviour. This leads to increased risk and potential accidents.

A formal road safety audit process is now employed to give an independent assessment of a scheme. It ensures, at key stages, that safety aspects of design and implementation have been scrutinised and addressed. This benefits both the road user and community alike.

The photos in this article all highlight particular issues that would be reported in a road safety audit. See if you can spot them! Answers are given at the end.



The Road Safety Audit process is a formal, independent assessment of the operational safety of a section of road. They are undertaken during the design and implementation of a new scheme or improvements to an existing road, but the process can equally be used to assess other transport projects, such as junction improvements, public transport interchanges and pedestrianisation schemes. While all road schemes are designed and built to the highest safety standards at the time, road safety can never be taken for granted. The aim of the audit is to minimise the number and severity of situations in which road users are injured whilst using the streets and roads.



Road safety audits are undertaken by an independent team not involved with scheme design. They provide fresh eyes not influenced by design considerations and which can spot aspects of a scheme that could be made safer. This is a low cost process with potential to produce significant benefits if carried out in a formal and co-ordinated manner, throughout the planning, design and implementation stages of a road project. It requires strong management commitment, skilled auditors, cooperation from design teams, and an on-going training programme.

Development of road safety checking or auditing in the UK started in the 1970s, specifically the Road Traffic Act 1974. Section 8 of the Act requires that Highway Authorities:

*“...in constructing new roads, shall take such measures as appear to the authority to be appropriate to reduce the possibilities of such accidents when the roads come into use”.*

In meeting the requirements of the Act, highway authorities were able to determine themselves what were ‘appropriate measures’. However, with many local authorities lacking the capability and experience, the initial response was limited.

This changed following local government reorganisation in 1974. Many smaller authorities were merged into the municipal county councils and, prompted by the legislation and pooling of resources, began to set up dedicated engineering safety teams. Tyne and Wear, Durham and Northumberland County Councils were all pro-active from the start, enabling them to be at the forefront of developing data-led approaches to accident reduction, of which road safety audits are now a key element.

Development of assessment techniques continued over the years, culminating in road safety audits being formalised into the UK highway design process. It is now a formal requirement for them to be carried out on all schemes on the trunk road network, under the Highways Agency,

and recommended as good practice, for local schemes. Consequently the majority of highway authorities have their own procedures for safety audits on most highway works.

The purpose of a road safety audit is to review a scheme's ongoing design, ensuring, wherever possible, any potential hazards are eliminated or minimised before construction begins. It follows the principle that "prevention is better than cure" and that it's far easier (and cheaper) to change design elements on a page than to make alterations to a new piece of highway.



The following stages (or types) of audit are commonly recognised:

- Stage 1 - Preliminary Design
- Stage 2 - Detailed Design
- Stage 3 - Pre-Opening (on completion of construction)
- Stage 4 - Post-Opening and existing roads
- Audit of Traffic Management Schemes
- Audit of Building Development (e.g. shopping malls, sports stadia)

Audits are required even when professional highway designers are expected to use the latest design standards. This is because each scheme is a unique design and, generally, a balance between operational efficiency, cost, environmental factors and the priorities of the client. Even when full compliance with the latest standards is achieved:

- compliance does not guarantee safety – there will be situations not covered by the standards and, sometimes, individual elements, which are all designed to standard, when combined, may be deemed unsafe
- safety can be compromised in the trade-off between conflicting requirements – it is difficult to produce a highway design that meets all objectives, and safety is not always given adequate priority
- highway designers may lack the skills to spot potential safety hazards, especially the knowledge of human-vehicle-road interaction





Road safety audits check that a scheme meets the safety needs of all road users – drivers, pedestrians and cyclists. Special attention is given to whether the needs of vulnerable road users are being met, as experience indicates that highway designs focus largely on motor vehicles. In this case, vulnerable would mean anyone not in control of a vehicle, such as pedestrians, passengers waiting for transport, and roadside vendors. However that may also include motorcyclists and bicycle users. The audit process ensures the scheme design takes account of all road users but also factors in other considerations, such as the local climate and weather, road user indiscipline, difficulties of law enforcement and whether the proportion of vulnerable road users is higher than average.

Safety audits involve three parties, each with a defined role:

- **the Audit Team** is composed of safety specialists (at least 2) who are commissioned by the client to perform the audit and produce a report that identifies potential safety problems and offers solutions
- **the Scheme Design Team** will be asked to comment on the audit report and will, if necessary, be instructed by the client to alter the design in response to the audit; these duties should be included in their terms of reference
- **the Client** usually represents the highway authority (Highways Agency or local government) who commissions the audit and decides whether its recommendations should be accepted or rejected





The audit team should be independent of the design team and be instructed to carry out the audit directly from the client. As the process, by its very nature, is subjective, more than one person is usually required to increase the chances of spotting safety problems. In any event, discussion amongst team members generates fresh observations and ideas, and usually enhances the assessment.

Road safety audits at different stages call for different skills. For example, at the Detailed Design stage, knowledge of design standards is fundamental, along with the experience to check specific elements like signs, safety barriers and street lighting. For a Pre-Opening audit it is not uncommon to include a traffic police officer with knowledge of local travel patterns, congestion and accident hot-spots, as part of the team.

A good auditor will be able to read engineering drawings and visualise what the scheme will look like. They should be capable of putting themselves in the shoes of each road user and imagining what it would be like, for example, to be a pedestrian crossing the road at night, or a motorist turning right at a junction.



Typical things that auditors will look for include:

- Mistakes or misunderstandings in the design
- Departure from design standards
- How all types of road user would react to the scheme, at all times and conditions
- Interaction between design elements
- Opportunities to include accident-reducing elements

In organising road safety audits, highway authorities have three options:

- **In-house audit teams** – this has the advantage of being quick and easy to arrange and means auditors can see the scheme through to completion; there has to be a degree of caution in keeping the team independent, and members from outside an authority are often recruited to prevent ‘in-house complacency’ developing
- **Design consultant carries out the audit** – if this option is used, the client must instruct the consultant to use auditors not involved in the design work; it may be difficult for auditors to be completely objective if there is a conflict of interest when assessing colleagues’ work but, for the avoidance of doubt, a member from the client’s engineering team, or other independent party, are usually involved
- **Independent consultant** - this option ensures the audit is completely independent but, in a competitive market, the appropriate checks and balances will assist in assessing the consultant’s credentials for the work

It is important to understand that road safety audits:

- are not technical audits or checks for design standard compliance - they are only concerned with road safety
- are not informal checks or design reviews - these may still be useful
- will not involve redesigning aspects of a scheme considered to be unsafe - this is the responsibility of the design team
- are not just for large schemes - even small projects can give rise to serious safety problems
- help sensitise road engineers to safety issues, and feedback from audits lead to improved design standards
- cannot demand changes to the design – that final responsibility rests with the client, and it is not necessary for them to have the agreement of the auditor or the designer



Audits are relatively inexpensive and typically take no more than a few weeks to complete. Many of the recommendations from audits cost little or even nothing to implement and evidence from countries that have adopted safety auditing suggest the costs of any changes are significantly outweighed by the safety benefits. These may include avoiding expensive reconstruction to remedy safety deficiencies, less damage to road furniture and lower liability claims. Lifecycle costs may also drop, as safer designs tend to carry lower maintenance costs. Benefits to road users are lower risks of injury.

Road safety audits are undoubtedly of benefit but the auditor is not superhuman and may not always be fully aware of the constraints placed on a project and its designers. While safety is important it is not the only factor and improvements cannot be highlighted without regard for cost or potential adverse impact in other areas of the scheme. It is a level of diplomacy that comes with continuous training and awareness of an auditor's role by all parties involved in the scheme.

The Chartered Institution of Highways and Transportation (CIHT) play a prominent role in supporting the road safety audit process. They have published a number of detailed guides, not least of which is the 'Safety Audit of Highways', issued in 1996. In 2003 the Highways Agency issued the standard 'Road Safety Audit HD19/03' guidelines, using feedback and experience to bring their audit process up-to-date. The CIHT responded in kind with an update to 'Road Safety Audit', published on 1st October 2008. HD19/03 must be used on trunk road schemes but the CIHT guidelines are more expansive and aimed at local authorities, for more minor road improvements.

Not least, the CIHT has formed the **Society of Road Safety Auditors (SoRSA)**, representing an exciting initiative for developing professional highways safety auditing best practice. SoRSA was established as a response to growing calls from UK safety auditors and

safety practice engineers, for a forum to exchange knowledge, ideas and, importantly, provide advice and routes to professional recognition.

*Thanks to John Barrell of TRL, for preparing this article. John has many years experience as a road safety auditor and is a member of SoRSA.*

- Page 2 - **Lack of foresight or co-operation** – which came first, the sign or the tree growth? Even on new road schemes, it is not uncommon for the traffic signs designer and landscape designer to work oblivious to each other's plans.
- Page 4 - **Lack of attention to detail or co-operation** – an out of control vehicle will be guided along the bridge parapet to hit the lamp column. Was the lamp column location and safety fence on different drawings? If so, the two were not co-ordinated to make it clear the column should be behind the fence.
- Page 6 - **Lack of awareness and oversight** – the pedestrian is apparently guided along the footway by the guardrail but there is nowhere to go. It is not uncommon for highway work, in this case, a bridge replacement, to compound an already existing problem, rather than resolving it.
- Page 7 - **Lack of understanding and oversight** – there appears to be little empathy for visually impaired pedestrians. They are guided into an object that is not lined up with the route of the footway. Was the designer concerned only with the exit from the building? Could a continuous footway have been provided with exiting vehicles giving way to pedestrians?
- Page 8 - **The very purpose of audits** – sometimes it is difficult to foresee the actual impact of road furniture (signs in this case) until they are already in place. While traffic signs sometimes block a motorist's view momentarily, in this case, the auditor established the view of the road was blocked for a considerable length to emerging motorists by road signs too close to the edge of the road.
- Page 10 - **Some situations can be difficult to resolve** – there are many constraints on design, not least the land available to a scheme and the topography. In this case, the road curves sharply into a roundabout, slowing approaching vehicles. Awareness of the roundabout is vital as the line of sight goes off to the horizon, meaning the position of the warning chevron boards is crucial. In this case however, the safety signs actually obscure the boards.