Department for Transport

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Cyclists at Road Works

Introduction and objectives

The safety of cyclists at road works was examined as part of a wider research study of cycling schemes by the Transport Research Laboratory (TRL) on behalf of the Department of the Environment, Transport and the Regions (DETR). Existing cycling related accidents were reviewed. Where appropriate, engineering techniques were recommended to help make cycling safer.

Background

There are around three million road works carried out in Great Britain every year. Put another way, there is an average of 8.3 road works per year per kilometre of road. These range from minor openings in the footway lasting less than an hour, to major works such as structural maintenance of the carriageway, or bridge strengthening. Larger road works often involve road closures and lengthy diversions, and can last weeks or months.

About 200 cyclists are reported injured at road works in Great Britain every year. Approximately 40 of these are serious or fatal injuries. This represents 5% of all accidents that occur at road works. There has been little research conducted into this specific topic until now.

In this TAL, the term 'road works' refers to all types of works on the highway, including those by statutory undertakers and resurfacing works, repairs and alterations to the road layout by highway authorities.

Bus lane suspended during roadworks

Narrow lanes should be avoided, particularly where there are solid boundaries

Cones, signs and other items should not be placed so as to cause problems for cyclists

Legal framework

The planning and execution of road works is governed by the New Roads and Streetworks Act 1991 (Parts III and IV), and the regulations and codes of practice made under the Act. The legislation refers to 'streetworks' in England and Wales and to 'roadworks' in Scotland. The layout and safety procedures for all road works are contained in 'Safety at streetworks and road works - A code of practice' (DOT, 1992), which is currently being revised. Chapter 8 of the Traffic Signs Manual (DOT, 1991) provides additional complementary signing guidance.

Methodology

The research comprised 3 main stages, as follows:-

- Analysis of accidents involving cyclists at road works, using STATS 19 road accident data for 5 years between 1992-96. Relevant factors looked at included accident type, accident severity, road type, junction type, and daylight/darkness.
- Video filming of five road work sites to observe cyclist and driver behaviour. Sites were chosen to represent a range of conditions encountered by cyclists. Site selection was made with the co-operation of the local highway authority. All sites complied with Chapter 8 regulations.
- Highway inspectors from 2 local authorities were asked to complete special survey forms in the course of their routine inspection work. Information on the layout of the road works, lane widths, methods of controlling traffic, etc was recorded.

Accident data

During the 5 year period there was a total of 1,162,306 personal injury accidents recorded in the STATS 19 database, of which 18,276 (1.6%) occurred at roadworks. Over the same period there were 124,221 accidents involving a cyclist and, of these, 950 (0.8%) occurred at road works. Accidents at road works, therefore, make up a higher proportion of accidents for all road users than for cyclists. Some of this difference can probably be explained by the relatively high incidence of accidents at road works on motorways, which do not involve cyclists.

It should be remembered that the road works were not always a causation factor in the accident. Given the very large number of road works and the random nature of many accidents, it is likely that a proportion of accidents would occur at road works by statistical chance alone.

The severity of cyclist injuries at roadworks was generally greater than that suffered by cyclists elsewhere. Accidents involving cyclists at roadworks were similar, in most respects, to cyclists accidents away from roadworks except that they were more likely to involve adults, to involve no other vehicle, to occur on dual carriageways and A roads and on roads with speed limits over 30mph. They were also more likely to involve a motor vehicle overtaking the cyclists and striking the rear or offside of the cycle.

Accidents involving cyclists are under-recorded in official STATS 19 records, particularly those where no other vehicle is involved and also for accidents that occur in rural areas. Given that accidents at road works involving cyclists are likely to be of this type, the degree of under-reporting may be higher than average.

Cyclist and driver behaviour

A total of 2,272 cyclists were recorded during 86 hours of filming at the following sites:-

- A30 London Road, Camberley, Surrey
- A245 Stoke Road, Cobham, Surrey
- Old Wokingham Road, Crowthorne, Berkshire
- Hollow Way, Oxford

- Hythe Bridge Street, Oxford

Most of the cyclists observed (81%) remained on the carriageway, but some chose to use the footway (12%) or other routes (7%), eg cycling within the cones. There were 173 cases of a cyclist, or other road user interacting with the cyclist, taking evasive action by stopping, waiting, braking or swerving. Most of these cases were judged as being due to the roadworks. Sixteen of the cases were interpreted as having the potential to cause an accident, although no accidents were observed.

Traffic signals should give cyclists sufficient time to pass safely through roadworks

Lane widths should be wide enough for other vehicles to safely pass cyclists

The layout of road works

Highway inspectors from two local authorities collected data from 49 road works sites, including information on lane widths, temporary road surfaces, methods of controlling traffic, and any other features likely to have an effect on the safety of cyclists.

The road work sites included 60mph rural roads and 30mph urban roads. A variety of methods were used to control opposing vehicle flows, ie temporary traffic signals, 'give and take', stop-go boards, or in one case, priority signs. The lane widths at the sites ranged from 2.5 to 6 metres, with an average of 3.5 metres. The lengths of the schemes ranged from 4 to 300 metres, with an average of 58 metres.

None of the sites had any special provision for cyclists. Features of the sites that were felt to be a particular problem for cyclists were noted by the inspectors. Specific common problems included a lack of time for cyclists to clear signal-controlled sites, insufficient lane widths, and rough road surfaces (caused by temporary surfaces, metal plates, sloping filets and/or cable protectors).


Cyclists will not often dismount when the carriageway remains open to other vehicles

Use of rough temporary road surfaces should be minimised as they can be particularly rough

Conclusion

The problem of cyclist safety at roadworks should be kept in proportion. Less than 1% of cyclist accidents occur at roadworks and this percentage is significantly lower than the percentage for other road users. Nevertheless, around 1 in 20 accidents at road works

involves a cyclist and these incidents tend to have certain special characteristics. By giving more attention to specific details it should be possible to reduce these types of accident.

Case study - The importance of advanced signing

At a major bridge strengthening project in Norwich all motorised traffic was diverted on to a temporary route around the road works. However, the bridge was kept open for pedestrians and cyclists to enable them to avoid the long detour. Unfortunately, as a result of a lack of advanced signing conveying this arrangement, many cyclists diverted along with the other traffic. This shows a need for more explicit consideration of signing at road works for non-motorised road users.

Lane widths at road works

The study found that the main safety concern for cyclists at road works was drivers overtaking within narrow lanes and leaving inadequate passing distances. This is also a problem for cyclists at other locations, but is particularly critical at road works because there is often only one lane of the carriageway operating, and there can be other complicating factors such as cones, bad surfaces and tidal flows.

A car is typically 1.7 - 2.0 metres wide (excluding door mirrors; a light van up to 2.1 metres; and a lorry or bus around 2.5 metres. As cyclists need at least 1.25 metres of space to travel safely, and drivers should allow at least 0.25 metres between their car and any offside cones or lane markings, then a minimum lane width of 3.25 metres is required to allow a typical car to safely overtake a cyclist. Similar calculations can be carried out to estimate the lane width required for vans, HGVs and buses (see Table 1). On roads with high speed limits (40mph and above), these lane widths may need to be increased accordingly.

'Safety at streetworks and road works - A code of practice' (page 25) states that where traffic is expected to consist of cars and light vehicles the lane width may be reduced to 2.75 metres (minimum desirable) or 2.5 metres (absolute minimum). However, it also states that long sections of narrow lanes can cause difficulties for cyclists. Indeed, it may be safer to have lanes that are too narrow for cars to overtake, rather than lanes where passing is possible but unsafe. This theory was borne out at one of the video sites in Oxford where a lane width of 3 metres led to a number of conflicts caused by drivers attempting to overtake cyclists with very little clearance.

Engineering recommendations

Temporary Speed Limits: More use should be made of temporary speed limits, especially where motor vehicles are unable to pass cyclists safely, eg where the effective lane width is less than 3.5 metres. These should be backed by appropriate enforcement measures, where feasible.

Lane Widths: Subject to the type of traffic expected to pass through the road works, lane widths should be maximised wherever possible (see Table 1 for guidance). Lane widths between 2.75 and 3.25 metres should be avoided in most cases.

Signal Timings: Traffic signals should give cyclists sufficient opportunity to pass safely through road works, particularly where oncoming motor vehicles cannot pass without conflict.

Maintaining Access: Wherever possible, access should be maintained for cyclists in both directions throughout the period of road works, avoiding more hazardous diversions. Cyclists are unlikely to accept lengthy detours or long delays. In such conditions some cyclists will be tempted to ride contra-flow or use the footway.

Route Signing: Routes and other facilities for the exclusive use of cyclists (and pedestrians) should be clearly signed well in advance of the road works.

Existing Cycle Facilities: Where there is cycle provision, such as cycle lanes or tracks, efforts should be made to keep these open or to provide an acceptable alternative during the road works. They should not be blocked by signs, debris, plant, etc.

Special Provision: Cyclists will often ride contra-flow or use the footway to avoid

potential hazards or lengthy diversions. This can be avoided by, for instance, providing a segregated cycle lane or route away from the carriageway. This kind of provision is likely to be desirable or even essential on dual carriageways or multi-lane roads.

Road Surfacing: It should be borne in mind that cyclists are particularly vulnerable to rough surfaces (temporary or otherwise). Therefore, wearing courses should be kept as level as possible, especially at locations where cycling demand is known to exist.

Equipment and Materials: Care should be taken not to place cones, signs and other items in locations likely to cause hazards to cyclists.

TABLE 1
LANE WIDTHS AND OVERTAKING SAFETY

EFFECTIVE LANE WIDTH (METRES)	OVERTAKING A CYCLIST
<2.75	Cars: very few can overtake HGVs: cannot overtake
2.75-3.25	Cars: most can overtake but without adequate safety HGVs: cannot overtake
3.25-3.50	Cars: most can overtake with adequate safety HGVs: cannot overtake
3.50-3.75	Cars: can overtake with adequate safety HGVs: overtaking possible but without adequate safety
>4.00	Cars: can overtake with adequate safety HGVs: can overtake with adequate safety

Some cyclists will choose to dismount when faced with lengthy delays

Cycle audit procedures

Procedures for assessing the impact of highway schemes on cycling activity are now well established and contained in `Guidelines for Cycle Audit and Cycle Review' (IHT, 1998). The DETR recommends the use of Cycle Audit procedures for all types of highway schemes, including maintenance schemes and major `temporary' traffic management arrangements, but not work by statutory undertakers. This will help to ensure that conditions are not made worse for cyclists. It should be borne in mind that the cycle audit process includes a `sieving' system for prioritising certain schemes for early

attention. This ensures that sites where cycling is known to be popular are targeted for audit.

Cyclist dismount and footway cycling

Where access is permitted for motor vehicles, "Cyclist Dismount" signs should not be used. The hazards to cyclists at roadworks are rarely great enough to justify this measure. In any case, cyclists are likely to ignore such instructions. The only situation where cyclists should be advised to dismount is where the carriageway is closed off but the footway remains open. In such cases a white-on-red temporary sign "CYCLISTS DISMOUNT AND USE FOOTWAY" may be used. Under Regulation 41 of the "Transport Signs Regulations And General Directions 1994" this can be done without special authorisation if the sign is not used for longer than 6 months.

Technical enquiries

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References

- TRL Report 370 `Cyclist Safety at Road Works' (TRL 1998)
- 'Safety at Street Works and Road Works' (DOT, 1992)
- 'Guidelines for Cycle Audit and Cycle Review' (IHT, 1998)

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