



A glow

Darkness presents drivers with a significant hazard on unlit roads. But active road markers are reducing this risk, as **Tim Lane** reports.

In the four years since the first pilot installations, solar-powered, self-illuminating road studs have become a familiar sight. They are now installed in one or more locations on more than 85% of the UK's county and Highways Agency networks.

Among those councils investing in these 'studs' is Surrey County Council, where a series of placements has created the largest installation of its kind in the UK. The county's latest scheme involves the application of active road markers (ARMs) on the A24, a busy commuter road that dissects the county between Leatherhead and Horsham.

This latest installation covers a well-trafficked section of road immediately to the south of Dorking between North Holmwood and Beare Green. In the previous five years, 72 injury accidents have been recorded along this three-mile section of dual carriageway.

'The road is a commuter route and at weekends, hundreds of motorcyclists turn the A24 into a race track en route to "Ryk-ers", a bikers' haunt near Boxhill,' explains Sergeant Mark Devlin of Surrey Police. 'Each year we record between 10 and 15 fatalities involving motorcyclists on the A24.'

Local residents had already expressed concern at the dangers of trying to join the flow on the A24 and also of the problems of reducing speed prior to turning off the road to join minor local roads. The road has a twisting and undulating alignment that may conceal slow-moving, emerging traffic or braking traffic.

The three-mile unlit section carries a statutory speed limit of 60mph, but also has more than 50 points that traffic might emerge or turn into from the dual carriageway. The dangers are increased at the junction of Mill Road where greater numbers of vehicles travelling in both directions attempt to cross to the opposite carriageway.

Incident reports indicate that this dual carriageway has an unusually high level of

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darkness-only accidents. Following a complete analysis by Surrey of all the night-time accidents along the A24, it became clear that drivers were failing to account for the limited view afforded by vehicle headlight beams and over estimating their ability to respond in time to this changing view.

Driving in daylight might enable the driver to see hazards along the route up to 10 times further than at night, making the speed to visibility ratio more forgiving.

But the statistics show a considerable history of single-vehicle incidents. One cause of drivers losing control of vehicles and leaving the road at night may have been their inability to properly 'read' the road layout ahead and adjust speed accordingly.

In deciding to address the problem, Simon Hall, a senior engineer at Surrey, identified this section of the A24 as potentially suitable for treatment with ARMs following a similar installation on the nearby A29. Accordingly, the council commissioned Reflecto of York to manage and deliver a major safety scheme on the A24.

'Surrey County Council is very pleased with the visual performance of the Reflectolite active road marker,' Hall says. 'Use of the Reflectolite is particularly effective when used on the nearside edge as a warning measure. Surrey Police have also participated. Patrol car officers travelling the route suggest the A29 improvements should have a significant effect in reducing night-time accidents.'

Representatives from the council and Reflecto carried out a site visit to the A24 at night to consider how best to apply the LED technology of the ARMs to aid driver awareness.

It was apparent that the surface was renewed recently and that the white lining was of a high standard, so Reflecto's design team proposed an installation that would minimise the disruption to existing road studs and any reinstated patches along the centre line.

The scheme highlights the numerous minor roads off the A24 with concentrations of red or amber studs before the junctions, while uni-directional green markers add greater definition to the junctions and central gaps along the route.

These uni-directional studs are adjusted to suit the geometry of a bend. The studs can be rotated from 10° to 25° to suit the curve, 'training' the LEDs toward approaching drivers. As the studs can be viewed from several hundred metres away, this is of particular benefit, allowing motorists to adjust their approach speed.

Most bends on the route present a gentle curve through which the driver is able to

see the active road markers defining the road ahead. But on bends where the curve is more severe, and drivers have no forward view into the bend, the ARMs are positioned to represent a hazard warning – placed along the nearside and offside edge lines prior to the start of the bend.

The visual effect of this is achieved far beyond the reach of motorists' headlight beams and creates a 'gateway' or 'tram-lines', helping drivers to improve lane discipline and approach speed.

On approach to a blind summit, stud spacing has been reduced to 9m to accentuate the hazard. The drivers' view is of the studs disappearing over the summit, providing early warning of the potential hidden dangers.

Throughout the scheme, ARMs are installed at a typical road stud spacing of 9m or 18m, according to conventional lining modules already in place.

'Proper installation technique and strict traffic management discipline ensure the safety of the public and drilling crews,' explains Diamond Drilling operations manager, Archie Harris. 'This also ensures that studs are not exposed to live traffic until the grout is fully cured. This is essential to prevent any possible depression or twisting of the stud while the bitumen remains hot.'

Harris says that installation involves semi-static operation along a length of road with periodic stops for a short duration. 'Movement of the traffic management along the route behind the drilling rig allows for a minimum 30-minute curing of the bitumen adhesive,' he adds.

'Installation requires a 115mm-diameter cored cavity that is partially filled with bituminous adhesive grout,' he continues. 'The Reflectolite is placed within the cavity and the LED is aligned for optimum visibility. The remaining void round the stud is then topped up to road level with additional grout.'

Maintenance of these Reflectolite ARMs is now not expected for up to five years, at which point the manufacturer may refurbish the stud.

In the meantime, the improved visibility should give drivers more time to react, hopefully reducing the accident statistics. Preventing just one KSI (killed or seriously injured) accident would recoup the entire cost of this installation.

Of course, there is an argument against lighting the road further ahead as motorists will just drive faster. But for the motorist who drives quickly anyway, keeping them in the dark is not really a responsible solution. ■

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Tim Lane is sales manager at Reflecto. Following the introduction last year of BS EN1463 to replace the outgoing BS 873 part 4, solar-powered road stud manufacturers were required to re-trial their products to new European standards. Redefined in the latest DTLR (TD26 and TSRGD) publications, 'active road markers' has become the new name for intelligent road studs.