

Case Study

A720 Sheriffhall Roundabout

IRS2 Intelligent Road Stud Scheme

Award winning Reduction of Inadvertent Lane Transgression

Product: IRS2 Hardwired Intelligent Road Studs

Date of installation: 2015

6 x Award Winner

Background

The A720 Edinburgh City Bypass around the southern fringe of Edinburgh is a strategically important route. Sheriffhall is a six-arm roundabout which connects several important roads including the A7 and the A720, and handles upwards of 42,000 vehicles a day. It is the only at-grade junction on the City Bypass and the high traffic volumes mean it has the potential to become very congested at peak times.

Improvements and efficiencies made to the roundabout in recent years have dramatically increased its capacity yet, despite these measures, it has remained highly prone to accidents with statistics recording the highest number of collisions of any roundabout on the Scottish trunk road network in the 10 years to 2013. Although grade-separation is proposed in the long term, a more immediate, cost-effective alternative solution was urgently required.

On behalf of Police Scotland's Trunk Road Traffic Management team and our road patrol officers, the Intelligent Road Studs have clearly improved the lane discipline and driver behaviour of local and strategic users of Sheriffhall Roundabout. We would certainly advocate their implementation elsewhere.

Sergeant Peter Houston, Police Scotland

In 2014, following a Stage 4 Road Safety Audit which cited poor lane discipline as the prime cause of collisions at the roundabout, BEAR (Scotland), the contracted Operating Company for Transport Scotland at the time, proposed a new, more radical approach to improve the safety record of the roundabout.

The Audit had suggested that lane transgression was likely to be due to the level of difficulty that certain drivers may experience in understanding and reacting to the complexity of the junction. Therefore, an LED-powered, intelligent road stud scheme was proposed. The intention being that the studs would encourage drivers to stay within their lane by drawing drivers' attention to the delineation of the existing lane markings and guide them through the roundabout.

Clearview Intelligence was invited to collaborate in designing a suitable scheme to meet the challenging criteria.

Key Benefits

- Provides drivers with advance awareness of the road layout, giving them more time to react
- Encourages drivers to stay in lane. Reduced lane transgressions resulting in less collisions
- Proven to be effective in all lighting conditions
- Can be configured precisely to the user's requirement as the IRS2 studs are driven via mains power into an integrated controller unit
- Suitable for dynamic lane marking to assist in reducing congestion/increasing highway capacity

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Solution

The key aim of the active road stud scheme was to guide A720 traffic around the roundabout lanes. However, a potential issue became apparent that drivers on the circulatory carriageway from the minor arms would be confused by the studs. As this would be counterproductive, a more innovative solution was sought.

The solution came in the form of a scheme using actively controlled road studs whereby the studs are synchronised in coordination with the A720 traffic signals on the roundabout. With the new system in place, as soon as the traffic signal on the entrance to the roundabout turns green, studs embedded in the road surface immediately illuminate and guide drivers onto the appropriate lanes of the roundabout. As the traffic signal turns red, all of the studs on that section switch off and the studs at the next section illuminate as the corresponding traffic signal turns green. In this way, drivers now get an illuminated green phase to guide them all the way around and off the roundabout, with clear visual definition of the lanes to heighten lane discipline and reduce preventable collisions.

The selection of Clearview's Intelligent Road Stud (IRS2) low profile stud was a major factor in the choice of technology as it minimises the hazard to powered two-wheelers and cyclists.

Independent evaluation by researchers from the Transport Research Institute at Edinburgh Napier University conducted a full 'before and after' study on driver behaviour at the roundabout with over 55,000 individual vehicle movements being analysed.

The research to date has found a reduction in lane transgression activity across nearly all vehicle types and manoeuvres, even during daylight hours, with a significant reduction in transgression rate (>50%) for medium-sized vehicles. Overall, the study has concluded that the intelligent road stud scheme has significant positive impact on collision risk at the roundabout through reduced lane transgressions, meaning less congestion and fewer accidents.

This scheme is the first of its type in the UK and it has won six significant industry Awards in recognition of the road safety benefits and innovative technology:

- CIHT: John Smart Road Safety Award
- Scottish Transport Awards: Excellence in Technology and Innovation
- Highways Magazine Excellence Awards: Road Marking Project of the Year
- National Transport Awards: Most Innovative Transport Project
- ITS (UK) Scheme of the Year Award
- ITS (UK) Forward Thinking Award

