

2021 – “Safeguarding Motorcyclists: Trialing New PRIME Road Markings for Casualty Reduction” ABSTRACT

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Abstract

Introduction/background

Where only a motorcyclist was involved, the typical causes of incidents are attributed to a poor turn or manoeuvre, exceeding the speed limit, loss of control, travelling too fast for the conditions or sudden braking (Department for Transport 2021).

One of the most common types of motorcycle collision is loss of control on a bend (Bricelj et al., 2016, Clarke et al., 2007, Department for Transport, 2019; Transport Scotland, 2020, Winkelbauer et al., 2021). In these situations, a motorcyclist tends to ‘lean over’ the dividing centre line, or ‘run wide’ on the bend due to inappropriate speed or braking prior to the bend, or inappropriate navigation around the bend itself (Stedmon et al 2021). The result is that the motorcyclist either crosses the centre-line and becomes vulnerable to oncoming traffic, or collides with some form of obstacle (e.g. static object, vegetation, roadside furniture).

Evidence suggests that motorcycle collisions occur on roads that motorcyclists are unfamiliar with, with 65 % of fatalities occurring in rural areas (Department for Transport, 2019, Motorcycle Accidents In Depth Study (MAIDS), 2009; Transport Scotland 2020). Collisions are more likely to happen on sharp bends than on gentle bends (Bissell et al., 1982, Gibreel et al., 1999, Walmsley et al., 1998). While right-hand bends can be problematic (Allen et al., 2016, Allen et al., 2017) evidence suggests that left-hand bends are more dangerous for those riding on the left-hand side of the road (Stewart, 1977, Stewart and Cudworth, 1990). This is thought to be due to a greater difficulty in perceiving curvature of the road when riding on the inside lane of a bend, and problems with maintaining optimum viewpoints, judging correct vanishing points and/or conflicts with identifying safe braking distances (Crundall et al., 2012, Hirsch et al., 2017, Hirsch et al., 2018, Stedmon et al., 2021)

Against this backdrop of motorcycle use and collisions, motorcyclists represent a particularly vulnerable road user group on public roads. Around the world, motorcyclists are identified and targeted as a priority for casualty reduction initiatives (Bricelj et al., 2016, Gardener et al., 2017, Mulvihill et al., 2008; Transport Scotland, 2021, Winkelbauer et al., 2021). Increasingly, this has led to more innovative approaches to support safer riding.

PRIME Markings Intervention

Innovative road markings for motorcyclists, designed as Perceptual Rider Information for Maximising Expertise and Enjoyment (PRIMEs) were installed on the approach to demanding left-hand bends at six trial sites and a comparison site across the West Highlands of Scotland. These road markings were presented as a series of ‘gateways’ to encourage safer riding. Video

data were collected to measure motorcycle speed, lateral position, braking and use of the road markings, before and after the PRIMEs were installed. A total of 9,594 motorcyclists were observed. Across the six trial sites, statistically significant reductions in speed were observed (at three sites). Significant changes in lateral position were observed at the final PRIME gateway marking (at one site), and at the apex of the bend (at three sites). Reduced braking was observed at three sites and there was a statistically significant increase in the use of PRIME road markings across four of the sites. No statistically significant effects were observed at the comparison site. These findings are discussed in relation to sustained effects and aspects of the 'Safe System' approach that are relevant to reducing motorcycle casualties.

Conclusion

The results of this research provide statistically significant evidence for sustained effects of PRIMEs on rider behaviour. Across all three key measures PRIMEs influenced rider behaviour through speed reductions, consistent effects on lane position, and reduced braking. Taken together, these results provide evidence that PRIMEs have a positive effect on rider behaviour for a variety of demanding bends.

In addition, there were no instances of negative behaviours arising from the installation of