Safety of raised platforms on urban roads

Tariro Makwasha and Blair Turner

ARRB Group Limited

Abstract

A recently concluded Austroads study identified effective countermeasures for improving safety outcomes on urban arterial roads. Included in the study were raised platforms at intersections (raised intersections), midblock and pedestrian crossings (wombat crossings). While these treatments have been widely applied overseas and to an extent, across Australia and New Zealand (especially wombat crossings and at midblock sections on local and collector roads), a measure of effectiveness in mixed use and high volume environments in an Australian context was required. To determine the effectiveness of these measures in terms of crash frequency and severity as well as vehicle speeds, a retrospective matched control analysis was conducted. This paper presents the estimated crash and speed effects of raised platforms.

Background

Urban arterial roads are characterised by a high number of crashes, including those that result in fatalities and serious injuries. At particular risk on these roads are vulnerable road users (pedestrians, cyclists and other non-motorised road users). Intersections are also typically high risk locations on the urban road networks. Raised platforms were identified as a potential measure for managing speeds and crashes on urban arterials for different road environments, functions and road users while maintaining efficiency. The key aim of this evaluation was to determine the safety effectiveness of this treatment.

Method

A quasi-experimental retrospective matched-comparison approach was used in this evaluation. To determine whether changes in crashes at treatment sites were significantly different from those at comparison sites, Poisson regression with a log-link function was applied. The assumption was that crashes follow a Poisson distribution. Overall, the evaluation included 47 treatment sites, 10 raised intersections, 14 raised midblocks and 23 wombat crossings. Hypotheses tests were also undertaken to determine the significance of the crash and speed changes.

Results and Conclusions

The evaluation showed a statistically significant casualty crash reduction of 53% for all sites regardless of platform type. There was a net reduction of 47% in casualty crashes at raised platforms at midblock and 63% at wombat crossings as shown in Table 1. These reductions were statistically significant. However, the casualty crash changes were not statistically significant for raised intersection. This is attributable to the small sample size and the number of crashes at both treatment and comparison sites.

Table 1. Estimated casualty crash changes

Raised platform treatment	Before	After	Estimated casualty crash reduction (%)	Significance	Lower 95% confidence level (%)	Upper 95% Confidence limit (%)
Intersection	13	7	55.4	0.1059	-18.7	83.2
Midblock	91	49	46.9	0.0011	22.1	63.8
Wombat	42	18	62.6	0.0012	32.5	79.3
Overall	146	74	52.6	0.0000	35.7	65.1

While the crash reductions at wombat crossings were statistically significant, the relatively small number of crashes at the treatment sites required further review of the treatment's effectiveness. The casualty crash reduction at wombat crossings and raised intersections were regarded as indicative and combined with leading international literature to determine the likely effectiveness.

A paired t-test was used to evaluate the changes in 85th percentile speeds and traffic volumes at raised platform treatment sites before and after the countermeasure installation. The analysis of all sites by treatment type showed statistically significant reductions in 85th percentile speeds ($p < 0.01$) for raised intersections. The speed reductions at treated sites ranged from 2 km/h to 8.8 km/h. On average, there was a 1.5 km/h net increase in 85th percentile speeds at 50 km/h intersections and a 2.1 km/h reduction at 60 km/h sites.

Overall, raised platforms were found to lead to safety improvements, regardless of location or treatment type.