

Study of the Impact on Road Safety on Arterial Roads due to Close Distance Access Roads

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Abstract

Arterial roads are high capacity urban roads, which get fed by the collectors and delivers that traffic to expressways. These are the main roads connecting city centres. Access roads connecting to the arterial road in close distances can cause road crashes as speeding traffic on arterials to get disturbed by the entering vehicles. Access Management Guidelines are available in other countries such as the USA and UK. According to the Access management manual of Texas DOT, the minimum gap allowed between two access roads ranges from 61m and 110 m when the posted speed limit is 48 km/h and 72 km/h respectively. Because there is no access management guideline for Sri Lanka, close distance access points may impose a road safety issue. Therefore, it is necessary to identify any effect on existing arterial roads and give optimum distance among two access roads to reduce intersection related crashes on arterials. This study evaluated how access point density affects the number of crashes per kilometre on arterial roads. Even though this issue can be significant for any road classification, only the arterial roads were selected to this study. Road crash data from 2014 to 2017 were obtained from Sri Lanka Traffic Police through the University of Moratuwa. Four segments of roads from (Galle road, Batticaloa Road, Kandy Road and Baudhaloka Mawatha) without centre medians were selected and the crashes that occurred on those stretches of road were plotted using Google My Maps. Only the intersection related crashes were plotted, and their significance was identified by converting them to EPDO values. A regression analysis, correlation analysis and generalized linear model were run as statistical analysis to identify any relationship between the number of access points per km and the number of intersection related crashes per km. From the gathered crash data in Sri Lanka from 2014 to 2017, nearly 4% from all recorded crashes are related to access roads. Out of that, 59% have happened on T junctions. When the crash rates were plotted in a histogram three groups of rates were identified: equal or less than 16 crashes/km, between 17 and 24 crashes/km and equal or greater than 26 crashes/km. The composition of gap categories was compared with these crash rate groups by graphical illustrations as well. On average, there have been 51 crashes per kilometre when the access road density is 6 per km or higher. A strong relationship between the access point density and the crash rates were not observed from the linear regression, but the gap₁ (50-100m), gap₂ (100-200m) and gap₇ (≥ 500 m) found to be significantly affecting the crash rate with 95% confidence interval in the generalized linear model. It could

also be recognized that the crash rate is limited to a maximum of 24 when the gap between access roads was greater than 400m. When there were high proportions of gap_1(50-100m) to gap_4 (200-300m) segments, the crash rate was increased to 26 or more crashes per km. So, it can be concluded that the cut off range should be gap_5 (300-400m) gap between roads and anything closer to that will increase the crash rate.

Keywords: *Access point density, Road safety on arterials, Intersection related crashes*

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