

Investigating the Impacts on Cyclist Casualty Severity at Roundabouts: A UK Case Study

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Abstract : Cycling has gained a great attention with comparable speeds, low cost, health benefits and reducing the impact on the environment. The main challenge associated with cycling is the provision of safety for the people choosing to cycle as their main means of transport. From the road safety point of view, cyclists are considered as vulnerable road users because they are at higher risk of serious casualty in the urban network but more specifically at roundabouts. This research addresses the development of an enhanced mathematical model by including a broad spectrum of casualty related variables. These variables were geometric design measures (approach number of lanes and entry path radius), speed limit, meteorological condition variables (light, weather, road surface) and socio-demographic characteristics (age and gender), as well as contributory factors. Contributory factors included driver's behavior related variables such as failed to look properly, sudden braking, a vehicle passing too close to a cyclist, junction overshoot, failed to judge other person's path, restart moving off at the junction, poor turn or manoeuvre and disobeyed give-way. Tyne and Wear in the UK were selected as a case study area. The cyclist casualty data was obtained from UK STATS19 National dataset. The reference categories for the regression model were set to slight and serious cyclist casualties. Therefore, binary logistic regression was applied. Binary logistic regression analysis showed that approach number of lanes was statistically significant at the 95% level of confidence. A higher number of approach lanes increased the probability of severity of cyclist casualty occurrence. In addition, sudden braking statistically significantly increased the cyclist casualty severity at the 95% level of confidence. The result concluded that cyclist casualty severity was highly related to approach a number of lanes and sudden braking. Further research should be carried out an in-depth analysis to explore connectivity of sudden braking and approach number of lanes in order to investigate the driver's behavior at approach locations. The output of this research will inform investment in measure to improve the safety of cyclists at roundabouts.

Keywords : binary logistic regression, casualty severity, cyclist safety, roundabout

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