Hot spot analysis of the crash locations at the roundabouts through the application of GIS

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Abstract:

Intersection safety is a critical issue as it accounts high percent of the total fatal and injury crashes combined. One of the safe alternatives is to convert the typical intersections into roundabouts to enhance the capacity and reduce crashes. Despite the advantages in the roundabout geometric design, there is a clear gap in understanding the relationship among crash types, injury severity, and roundabout configurations. As such, this research used five years (2011 to 2015) of traffic crash data collected from Oregon's Department of Transportation (ODOT). In this study, the Geographic information system tool (GIS) and the incident analysis tools have been used to identify hazardous location occurrence areas, hot spots, and factors that lead to roundabout accidents and decide how, when, and where accident countermeasures can be performed. The results indicated many cities with high crashes are not considered a hot spot area and the reverse. Besides, more driver injury crashes when the driver enters the roundabout at an angle, and more crashes are in four legs roundabout and three legs roundabout types. Several factors lead to roundabout crashes resulting in an injury, like drivers who did not yield right of way is the dominant crash, an improper change of traffic lanes, and followed too closely. Female drivers have more likelihood to involve in roundabout crashes than male drivers. With these findings, the current study would be useful for safety practitioners to select effective safety measures to avoid and minimize the incidence of accidents at the highest crash site.