Development of a Statewide Horizontal Curve Database for Crash Analysis

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ABSTRACT

Lane departure crashes represent the single highest category of fatal and major injury crashes in Iowa, including 60% of all fatal crashes (Iowa CHSP). While horizontal curves represent only a small portion of the public roadways in Iowa, 15% of all fatal single-vehicle run-off-road crashes (25% of the major injury crashes) and 11% of all fatal multiple-vehicle cross-centerline/cross-median crashes (18% of the major injury crashes) occur on curves (Iowa CHSP). Therefore, a great opportunity exists to reduce death and serious injuries if the safety of problem curves can be improved. Particularly promising is that the many of the possible improvements at horizontal curves are relatively low cost, such as paved shoulders, rumble strips and stripes, and improved signing and delineation. However, the State of Iowa does not maintain a database of horizontal curves. The objective of this project was to create a comprehensive curve database for use in crash analysis, with emphasis on high-speed rural two-lane roadways. Secondary objectives were to create the database in a systematic manner, without requiring additional field data collection, and extract curve parameters, such as length, radius, and degree of curvature where possible. Ultimately, a database of possible curve locations on all paved high-speed rural two-lane roadways (primary and secondary) in the state was created using GPS data collected as part of Iowa’s Pavement Management Program (IPMP). A statewide crash analysis was also performed to identify the top 200 high crash frequency curves and curvilinear sections of roadway based on total crash frequency and total fatal and major injury crash frequency. This analysis was limited to crashes most likely to be curve-related. Site maps, including crash data and aerial images, site descriptions, and summary crash statistics were also prepared as part of the analysis.

Key words: crash—curve database—horizontal curves