Exploring the Effect of Visibility Distance on Traffic Safety Using RWIS Data in Ohio

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Abstract

Some research have been conducted regarding the effects of visibility on traffic safety and it has been found that the reduced visibility condition such as fog and smoke is one of the contributing factors to crashes. However, those research defined reduced visibility conditions based on weather types, i.e., fog, heavy rain, snow, smoke, dust or haze. There hasn’t been any attempt to quantify the safety effects of different levels of visibility (or visibility distance), which is mainly due to lack of visibility data in the crash records. This paper aims to study the relationship between roadway crashes and visibility distance, and then derive visibility criteria for safety. With the developed visibility criteria, weather warning system can provide more efficient and reliable responses to counteract reduced visibility conditions at different levels.

In the study, data on a geographic information system (GIS) platform from different sources (including historical traffic crash records, visibility distances from visibility sensors, roadway inventory and traffic count data) in the state of Ohio will be complied and analyzed using a statistical analysis approach to model the relationship between roadway crashes and visibility distances. Meanwhile, two sources of visibility distance records will be explored: one is from 42 airport weather stations in Ohio, and the other is from Ohio Department of Transportation’s (ODOT) Road Weather Information System (RWIS) which has approximately 176 stations. By comparing the visibility data from airport weather stations and RWIS, the possibility and reliability of two visibility data sources in crash analysis will be discussed. The result can provide a guidance to future traffic safety data analysis involving weather related crashes, which is another objective of the paper besides developing visibility criteria.

Keywords: Visibility; Crash; RWIS

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