

Improving Safety of Vulnerable Road Users: Effectiveness of Environment and In-Vehicle Warning Systems at Intermodal Interchanges

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Project Description

In the United States in the year 2009, there were over 114,000 fatalities and injuries among vulnerable road users (VRUs; pedestrians and pedal cyclists; NHTSA, 2010). 4,092 pedestrians were killed in pedestrian-vehicle crashes. 630 pedal cyclists were killed in cyclist-vehicle crashes.

Previous research has identified many factors that affect risk of injury and fatality for vulnerable road users. Inappropriate pedestrian behavior, poor driver behavior, and structural issues contribute to the risk to vulnerable road users. Pedestrian risk at intermodal interchanges such as schools and bus stops may be due to factors such as the greatly increased number of pedestrians, the increased likelihood of poor pedestrian behavior, and the lack of separation between pedestrians and vehicles (Clifton & Kreamer-Fults, 2007; Zegeer & Bushell, 2012). While research has identified or proposed behavioral and engineering interventions to reduce risk, much of this research is based on macro-scale statistical models and not on actual analysis of human behavior in response to the interventions.

The objective of the proposed research effort is to investigate the effectiveness of structural and in-vehicle interventions for modifying driver behavior in order to increase the safety of vulnerable road users as drivers approach, pass through, and depart from intermodal interchanges. We will evaluate the impact of facility structural elements (traffic signals, marked crosswalks, and sidewalks) and of an in-vehicle pedestrian warning system on driver behavior in the Mississippi State University Center for Advanced Vehicular Systems driving simulator.

This research will provide a micro-scale understanding of how drivers respond to specific environmental changes that are designed to improve safety. We are particularly interested in the possibility that some interventions may actually increase risk to pedestrians. For example, presence of marked crosswalks may create an expectation in the driver that all pedestrians will cross at the marked location and increase the risk of collision with a pedestrian that chooses to dart across mid-block.