Virginia Tech Transportation Institute
DRIVING TRANSPORTATION WITH TECHNOLOGY

Enhanced Rear Signaling for Heavy Trucks: Phase III – Development of Field Operational Test

The Enhanced Rear Signaling for Heavy Trucks project is directed at investigating methods to reduce or mitigate crashes where a heavy truck has been struck in the rear by another vehicle

Project Background

The Enhanced Rear Signaling (ERS) for Heavy Trucks project is directed at investigating methods to reduce or mitigate those crashes where a heavy truck has been struck in the rear by another vehicle. In 2006 there were approximately 23,500 rear-end crashes involving heavy trucks, which resulted in 135 fatalities and 1,603 incapacitating injuries. This particular collision type results in higher-than-usual rates of fatalities and injuries compared to types of rear-end crashes in which the lead vehicle is a light vehicle. These crashes occur with such sufficient frequency that they are a cause of concern within regulatory agencies. As part of the Federal Motor Carrier Safety Administration's (FMCSA) goal of reducing the overall number of truck crashes, this crash configuration is one that is important to the agency.

Prior to the current effort, two phases of work had been completed on this project by General Dynamics and Freese Enterprises. Phase I entailed a crash data analysis to determine causal factors of these crashes and the development or identification of countermeasures to aid in reducing them. Phase II entailed the development of a prototype system that incorporated the countermeasures from Phase I.

One of many rear warning-light configurations that will be tested in static and dynamic experiments

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Enhanced Rear Signaling for Heavy Trucks: Phase III – Development of Field Operational Test (cont)

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Collision avoidance algorithms will be used largely based on data from a rear-facing radar

Project Objective

The purpose of the current Phase III effort, conducted by the Virginia Tech Transportation Institute (VTTI), is threefold: (1) conduct a General Estimates System (GES) database analysis using the most recent data available to report various break-outs/ characterizations of rear-end truck crashes, (2) explore the benefits of the countermeasures developed in Phases I and II, and (3) design a plan for a large-scale Field Operational Test (FOT) to assess countermeasures for rear-end truck crashes.

GES Database Analysis

Using the most recent data available (2006), VTTI will conduct a GES database analysis following a similar strategy employed by General Dynamics in Phase I that used GES data from 2001 to report various break-outs/ characterizations of rear-end truck crashes.

Static and Dynamic Testing of Countermeasures

A series of static and dynamic empirical data collection efforts will be performed to test and evaluate potential countermeasures. This will include static and dynamic (Virginia Smart Road) tests. Potential countermeasures to be tested will include external auditory signals, rear warning-light signals, and passive conspicuity octagonal markings. In addition to the dynamic Smart Road testing, VTTI will conduct another dynamic evaluation of the final ERS candidate and the associated activation algorithms. This dynamic evaluation will be conducted on public roadways in order to observe and measure the reaction of the driving public.

Design a Large-scale FOT Plan

Although much will be learned in Phase III of this project, a requirement prior to regulation is the conduct of a large-scale data collection effort in a real-world, naturalistic environment. Although Phase III does not involve collection of any data to address this requirement, work will include development of a detailed FOT plan to test the most promising countermeasure(s) in a fleet environment. Phase III is a two-year project and was awarded on September 19, 2008.

A pair of retro-reflective octagons at the back of a trailer will be investigated in order to test the concept of passive conspicuity

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