TRANSPORTATION CENTER

OPREP RESEARCH PROJECT

Principle Investigator: Professor Nancy Grugle
Grant Amount:
Time Period:

The objectives of this research are 1) to use a macroergonomic approach to study the causes of work zone crashes, near crashes, and incidents to determine the primary causal factors and 2) to validate a high-fidelity driving simulator (DriveSafety's DS-600c) based on the findings of the naturalistic data. To address the crash causation portion of the research, CSU will use a macroergonomic approach to analyze naturalistic work zone driving data collected from 100 cars over a one-year period and ODOT historical crash data to identify the subsystem factors (driver, vehicle, organizational, and environmental) that influence work zone safety. In addition, CSU will determine what subsystem interactions play a critical role in work zone safety. To accomplish the second research objective, the pre-crash, near-crash and incident conditions will be replicated in a high-fidelity, fully-immersive simulator and then drivers will be tested under these conditions to determine whether the naturalistic data analysis results can be replicated using the simulator. Finally, an experimental pilot study will be conducted using the CSU driving simulator to evaluate the effects of experimental factors/conditions on driver behavior in work zones. The scope, content, and experimental design of the pilot study will be determined in cooperation with ODOT after the initial results from the naturalistic data have been evaluated.

This research project fulfills one of the main tenets of the OPREP program—to demonstrate the viability of innovative concepts and their potential to address long-range transportation needs. This research is innovative in terms of its macroergonomic approach to analyzing work zone safety and because data from a large-scale naturalistic driving study has not yet been used to investigate work zone driving behavior. A simulator validated with naturalistic data has significant potential to address long-range transportation needs. These include but are not limited to: configuring potentially dangerous work zones prior to construction to identify unknown dangers and testing the effectiveness of safety countermeasures for any driving domain.