



# UNIVERSITY TRANSPORTATION CENTER RESEARCH BRIEF

**PROJECT TITLE:** Confounding Factors of Commercial Motor Vehicles in Safety Critical Events

**PRINCIPAL INVESTIGATOR:** Sal Hernandez (OSU), Eric Jessup (WSU)

**INSTITUTION:** MULTI-INSTITUTION PROJECT

**ESTIMATED COMPLETION DATE:** JANUARY 2018

**SPONSORS:** THE PACIFIC NORTHWEST TRANSPORTATION CONSORTIUM, ODOT, WSU



## **Background**

Recent quasi-experimental Commercial Motor Vehicle (CMV) driver Hours-of-Service (HOS) studies published through the Federal Motor Carrier Safety Administration (FMCSA) in 2011 readily identify consistent increases in crash odds as driving time increases. These are observed by Jovanis et al. as gradual increases from 1-10 hours, followed by a marked jump after 10 hours. Blanco et al. similarly identified that time-on-task was a significant indicator of the potential for a safety critical event (SCE) (crash, near crash, or crash-relevant event). However, while these studies may provide indication of a relationship between HOS and the probability of a SCE, they largely fail to account for many potential confounding factors. The HOS relationship is frequently attributable to the fatigue of the driver. Confounding factors however, are those factors which may also contribute to the likelihood of an incident and potentially create a systematic bias or contribute to measured error. Such factors include time-of-day (TOD), circadian status, time on task, total time awake, roadway infrastructure attributes, weather, as well as other driver behavior and traffic density factors related to both the driver and the external conditions experienced by the driver.

The Transportation Research Board's Committee on Truck and Bus Safety (ANB70) has identified Driver Performance and Other Causal Mechanisms in Quasi-Experimental Hours-of-Service (HOS) Studies as a key research need. In their needs statement, ANB70 suggests the need to validate and elucidate the findings from the above cited quasi-experimental studies. They identify limitations of the studies as stemming from their lack of controls for likely co-varying, confounding factors and

failure to analyze underlying causal mechanisms. This proposed study seeks to correct several components of the omissions and validate their findings.

## **Research Project**

The proposed study will seek to uncover existing relationships between observed HOS on likelihood of safety critical events (SCE) and a set of potential confounding factors related to Time-of-Day (TOD). This will be accomplished through (1) a comprehensive existing state-of-the-art and state-of-the-practice as it relates to CMV parking behavior and choice and heterogeneity based methods, (2) perform commercial motor vehicle operator and shipper surveys, (3) conduct statistical analyses and mine current data collected from a stated preference survey, and Oregon and Washington crash data to determine potential factors, (4) conduct factor analyses and estimate and validate heterogeneity based models using the 2/3rd of data prepared and identified in (2) and (3) using advanced econometric software. Once the models have been estimated the stability of the coefficient estimates of the models will be validated using 1/3rd of set aside data. It's envisaged that two journal manuscripts will result from this work, and (5) prepare a final report.

