



FY 2017 Research Problem Statement

ODOT Research Section
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I. TITLE

17-022 Preventing Wrong-Way Driving in Oregon

II. PROBLEM

During the period of 2004-2011, there were an average of 261 fatal crashes/year nationally that can be attributed to wrong-way driving (WWD) on high-speed divided highways, which resulted in approximately 360 fatalities per year (Zhou and Rouholamin, 2014). In Oregon, the number of WWD related fatal crashes during the same time period was 4 crashes per year. WWD describes a driver, inadvertently or deliberately, driving in the opposite direction of traffic along a physically divided highway or its access ramps (Baratian-Ghorghi et al., 2014). The outcomes of these crashes almost always severe, resulting in fatalities or serious injuries, since the crashes are predominantly head-on or opposite direction sideswipes. Previous studies have found that certain driver age groups (over the age of 70 and under the age of 25) are over-represented in these crash types; the majority of the crashes that result in a fatality occur at night; and a substantial percentage of these crashes involve drivers impaired by alcohol (FHWA, 2013).

In the past, many studies have been conducted on WWD nationally and at the state level. These studies have provided valuable information regarding the countermeasures that can be implemented to mitigate WWD crashes. While some of these countermeasures are low-cost (such as enhanced signing and pavement marking), some are expensive (such as modification of existing geometry). FHWA encourages states to use systemic approach along with traditional 'hotspot' methods for their safety programs. FHWA states that "The systemic approach to safety involves widely implemented improvements based on high-risk features correlated with severe crash types. The approach provides a more comprehensive method for safety planning and implementation that supplements and compliments traditional site analysis" (FHWA, 2014). Under the federally-funded Highway Safety Improvement Program (HSIP), ODOT's new All Road Transportation Safety (ARTS) program will use at least half of the funds for a systemic approach. This approach implements a few proven low-cost countermeasures widely to mitigate certain crash types. Currently ODOT's systemic approach includes three areas: roadway departure, intersection, and bicycle/pedestrian. ***By taking a systemic approach to WWD, ODOT can identify higher risk factors associated with WWD, identify locations on divided highways and access ramps where this type of crash happened in the past or may happen in the future, and apply appropriate countermeasures to reduce WWD crashes and fatalities.***

III. PROPOSED RESEARCH, DEVELOPMENT, OR TECHNICAL TRANSFER ACTIVITY

The proposed research will include the following tasks:

- A comprehensive literature review to identify high risk driver, roadway, and traffic related factors that contribute to WWD and available low-cost countermeasures that can be implemented to mitigate WWD crashes.
- Review Oregon crash data, police narratives, and other reports as they relate to WWD crashes.
- Identify locations along divided highways and associated access ramps throughout the state where currently there might be WWD related problem or locations with high risk factors that might be susceptible to WWD crashes.
- Conduct human factors (simulator) and/or pilot testing of WWD countermeasures to evaluate what types of beacons should be used, what height they should be placed at, and other relevant design factors.

IV. POTENTIAL BENEFITS

It is expected that the outcome of the research will benefit ODOT and the state of Oregon in the area of highway safety. Highway safety will be improved by reducing WWD crashes and associated fatalities and injuries. Since a systemic approach uses low-cost countermeasures, it is expected that benefits resulted from the implementation of these countermeasures would far outweigh the cost of implementation. The results of this research could be used to prioritize locations to implement low-cost countermeasures systemically

V. IMPLEMENTATION

A successful research product will help ODOT enhance its current Highway Safety Program by producing a systemic plan (similar to the current ODOT Roadway Departure Plan, Intersection Improvement Plan, and Ped/Bike Safety Implementation Plan) to reduce WWD crashes and their associated fatalities and injuries. This plan will be used as part of the ARTS program to target WWD crashes. ODOT Traffic-Roadway Section staff and Region Traffic Engineers will be involved in implementing this plan.

VI. LIST OF REFERENCES (optional)

1. Zhou, H., and M. Rouholamin. *Guidelines for Reducing Wrong-Way Crashes on Freeways*. Report No. ICT-14-010, Illinois Department of Transportation, Springfield, IL, May 2014.
2. Baratian-Ghorgghi, F., H. Zhou, and J. Shaw. *Overview of Wrong-Way Driving Fatal Crashes in the United States*, ITE Journal, Institute of Transportation Engineers, Washington, D.C., August 2014.
3. Federal Highway Administration. *Wrong Way Driving: Road Safety Audit Prompt List*, Publication No.: FHWA-SA-13-032, U.S. Department of Transportation, Washington, D.C., 2014.
4. Federal Highway Administration. *A Systemic Approach to Safety – Using Risk to Drive Action*, Web, U.S. Department of Transportation, Washington, D.C., October 2014.

VII. CONTACT INFORMATION

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