

Number: 25-28

Proposed Title: Work Zone Modification Factors for Safety, Quality, and Mobility

1. Concisely describe the **transportation issue** (including problems, improvements, or untested solutions) that Oregon needs to research.

Work zone crash modification factors (CMFs) can be used to quantitatively represent the added or reduced risk of crashes associated with specific conditions and features present in a roadway work zone. CMFs for some work zone conditions and features have been developed (Edara et al. 2016; AASHTO 2010; FHWA 2016; Ullman et al. 2008). In addition to preventing crashes and enhancing safety, the design of temporary traffic control and work operations takes into consideration the impacts of the work zone conditions and features on motorist mobility through the work zone and on work quality. Mobility and quality modification factors enable assessing the impacts of work zone conditions and features on mobility and quality, and can be implemented along with CMFs to ensure an appropriate balance between safety, mobility, and quality in the design of the traffic control and work operations. While CMFs are available, research is needed to develop rigorous mobility modification factors and quality modification factors based on empirical data and quantitative analyses. Research is also needed to determine the combined influence that the safety, mobility, and quality modification factors have on each other.

2. Document how this **transportation issue** is important to Oregon and will meet the [Oregon Research Advisory Committee Priorities](#)

Designing optimal traffic control and work operations for temporary work zones requires in-depth understanding of the relative influence of work zone conditions and features on safety and mobility in the work zone and the quality of the work. The transportation issues associated with the proposed research are: (1) the need to ensure the safety of drivers and workers in active work zones, (2) the mobility of public vehicles through active work zones, and (3) the quality of the work performed in the work zone. Safety of the travelling public, ODOT employees, and contractor personnel in roadway work zones are addressed. The issues directly relate to transportation network safety, a topic that is a priority for both the ODOT Research Advisory Committee (RAC) and the ODOT Research Construction and Maintenance (CM) Expert Task Group (ETG). The proposed project is applied research that is expected to create practical guidance for those in ODOT who are involved in planning, designing, and implementing temporary traffic control and conducting the construction and maintenance work. The guidance has a high likelihood of implementation in practice and potential impact on ODOT and contractor work practices. Successful implementation of the research results is not only expected to help prevent worker and motorist injuries and fatalities in work zones, but also improve mobility on Oregon's roadway network as a result of fewer crashes in work zones. Mobility is one of the topics contained within the Oregon Transportation Plan (OTP) and a priority for research problem statements.

3. What **final product or information** needs to be produced to enable this research to be implemented?

Implementation of the expected research outputs requires detailed information related to the extent to which work zone conditions and work operations influence safety, mobility, and quality. Specifically, information is needed regarding the worker behaviors, site conditions and operations, driver behaviors, traffic conditions (volume, speed, trajectory, etc.), and other impacting factors which are associated with the three performance criteria. This information could be developed through data collection, analysis, and development efforts that include:

- Review of literature on CMFs and factors that influence mobility and work quality.

- Analysis of crash and injury incidents, vehicle speed and volume within work zones, and QA/QC reports to determine factors that impact safety, mobility, and quality.
- Development of modification factors that can be used in the design of traffic control and work operations.
- Confirmation of the modification factors using past projects, including assessment of their relative and combined influence.
- Prepare final guidance documents for implementation in practice.

Implementation of the results requires that traffic control engineers are aware of the modification factors, understand when and how to apply the factors (individually and in combination), and understand the expected impacts of their application. The information needs to be provided to those ODOT traffic control and construction/maintenance personnel who plan, design, and conduct work operations on active roadways, including those on the Safety and Mobility Advisory Committee. An implementation guide that provides the information mentioned above to educate ODOT staff and improve their ability to apply the modification factors would be useful final products for practical implementation of the research results.

4. (Optional) Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.

| Name | Title | Email | Phone |
|-------------|--------------------------|--|----------------|
| Justin King | State Work Zone Engineer | Justin.S.King@odot.state.or.us | (503) 986-3584 |

5. Other comments:

AASHTO (2010). *Highway Safety Manual*. American Association of State Highway and Transportation Officials (AASHTO), Washington, DC.

Edara, P., Sun, C., Brown, H., Rahmani, R., and Datta, T. (2016). “Development and Application of Work Zone Crash Modification Factors.” University of Missouri, Columbia and Wayne State University, Aug. 2016.

FHWA (2016). “National Work Zone Awareness Week: Don’t be that Driver.” U.S. Department of Transportation, Federal Highway Administration (FHWA).

Ullman, G.L., Finley, M.D., and Theiss, L. (2010). “Work Zone Intrusion Countermeasure Identification, Assessment, and Implementation Guidelines.” Texas Transportation Institute (TTI), Report FHWA/CA10-1102, May 2010.

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