



0-6640: State of the Practice for Workers in Very Short Duration Work Zone Operations

Background

Texas has the most roadway mileage of any state in the nation, and maintenance is a major function of the Texas Department of Transportation (TxDOT). The safety of workers and motorists is a major concern, and the Federal Highway Administration recognizes this challenge and makes provisions for work zone safety in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Setting up sufficient traffic control devices without severely interrupting traffic and sacrificing safety is a challenging task for traffic engineers, researchers, and maintenance workers.

According to the *Manual on Uniform Traffic Control Devices* (MUTCD), work duration is a major factor in determining the number and types of devices used in temporary traffic control (TTC) zones, and the duration of a TTC zone is defined relative to the length of time a work operation occupies a spot.

Of the five categories of work zone operations defined in the MUTCD (long-term stationary, intermediate-term stationary, short-term stationary, short duration, and mobile), none of them clearly address operations, which typically last for a few minutes. The challenge with such operations is that the time it takes for workers to employ adequate traffic control treatment, such as installing and disassembling traffic control devices, is much longer than the work activity to be performed. Previous studies observed that workers are reluctant to utilize extensive traffic control for activities that only take a few minutes to complete. In addition, the setup and removal of traffic control devices increase the workers' exposure to traffic, and adequate safety is therefore a concern for both workers and motorists.

These types of operations are therefore categorized as very short duration operations.

What the Researchers Did

The study team performed a literature review of the state of the practice in very short duration operations to determine if any prior guidelines for such operations existed. Since none were found, the team developed a set of recommendations through field observations of maintenance operations, expert panel discussions, and a scenario-based risk assessment methodology. The research team previously envisioned a decision matrix describing very short duration work zone conditions and safety recommendations, but this approach was found to be impractical and inefficient to implement based on findings from the field observations and expert panel discussions. A scenario-based risk assessment approach was therefore proposed to streamline the risk assessment process and enhance judgment of maintenance workers during very short duration operations (VSDOs). An educational module and a safety guidebook for TxDOT maintenance workers were also developed.

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What They Found

Safety guidelines for very short duration operations are not clearly defined by the MUTCD and other state department of transportation guidebooks. With the assistance of the expert panel, very short duration operation was defined as *“A planned or urgent activity, to be executed in 15 minutes or less by a crew of at least one man and one truck, in which the hazard of not executing the work as a very short duration operation is greater than executing it.”* Activities categorized as VSDOs include debris removal, pothole patching, edge patching, delineator maintenance, warning sign placement, supervisor markings for future work, taking photographs, data collection/surveys, and signal light replacement. Activities not considered under this new category of maintenance operations include short duration and mobile maintenance operations such as crack sealing, herbicide application, mowing/brush cutting, raised pavement marker replacement, snow and ice control, striping, sweeping, guardrail work, lighting maintenance, paving operations, signal work, and sign repair and installation.

Based on field observations done by the research team, VSDOs can be characterized into three different categories, each defined by the location of the operation:

- Operations on or beyond the shoulder
- Operations within a traveled way with a shoulder
- Operations within a traveled way without a shoulder, e.g., bridges

With the assistance of an expert panel made up of past and present maintenance supervisors, the research team identified factors that impact risk to maintenance workers and motorists during VSDOs.

Identified influencing factors include traffic volume, traffic speed, time of day, type of road, weather conditions, vision-blocking objects, location of work, roadway geometry, pavement surface condition, and availability of refuge.

A scenario-based risk management process was designed to elicit risk mitigation strategies. The objective of the scenario-based hazard analysis is to stimulate thinking about possible dangerous conditions, possible accident occurrences, assumptions relating to these occurrences, possible opportunities and risks, and courses of action. The results introduced the risky scenarios under which accidents are likely to occur and provided recommendations of additional safety precautions to the maintenance workers performing VSDOs in a limited set of scenarios. To evaluate the proposed scenario-based risk management, a pilot workshop was held for TxDOT safety, maintenance, and operation supervisors from multiple districts. Results of the pre- and post-workshop evaluations revealed that the workshop was successful in drawing the attention of participants to risks during VSDOs. Participants mentioned more risk factors for each scenario in the post-workshop assessment than the pre-workshop assessment. Traffic volume, traffic speed, weather condition, size of objects to be removed, and visibility were the most mentioned risk factors, and these factors were stated in the post-workshop assessment 32 percent times more than in the pre-workshop assessment. Workshop participants recommended that supervisors should empower field workers in identifying risks during VSDOs and be able to request additional help when activities are considered life threatening as stated in the proposed definition of VSDOs.

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