

## **0-7020: Studies to Develop Guidelines on Work Zone Barrier Use on Freeways**

### **Background**

Temporary barriers are often used in long-term work zones on Texas freeways to separate opposing traffic flows, protect workers from traffic, and protect traffic from hazards within the work space (pavement edge drop-offs, construction equipment, and materials/debris). Often, the barriers must be placed very near or at the edge of the travel lanes, eliminating emergency shoulders on one or both sides of the travel lanes. The constrained cross section through these freeway work zones can create challenges for motorists whose vehicles become disabled, drivers of large trucks, and efforts by law enforcement and emergency response personnel. Barrier deployment close to the travel lanes can also cause water ponding issues, and deflections from impacts can create safety and operational issues for construction personnel or opposing traffic on the other side of the barrier. Additionally, lane shifts may be overly difficult for drivers of large trucks to negotiate. Guidance was needed on how to best deploy barriers in freeway work zones when the cross section is constrained.

### **What the Researchers Did**

Researchers reviewed work zone barrier use literature and analyzed freeway work zone crash data from a sample of Texas work zones. Researchers surveyed various stakeholders regarding current practices and challenges associated with temporary barrier use in freeway work zones, and conducted field evaluations of barrier deployments in a sample of Texas freeway work zones. Researchers then developed simplified procedures and guidelines to assist work zone designers when making various decisions pertaining to temporary barrier use in work zones.

### **What They Found**

Researchers found that the challenges that temporary barriers close to the travel lanes within work zones present to drivers of large trucks and law enforcement and emergency response personnel have been documented in past research, as have recommendations on ways to limit some of those challenges. However, the effectiveness of those recommendations in terms of reduced safety and mobility impacts has not been quantified.

Despite perceptions to the contrary, analysis of large-truck collisions with barriers in work zones indicates that they occur only slightly more often (as a percentage of all truck crashes in work zones) than do automobile crashes with barriers in work zones. Meanwhile, surveys of law enforcement personnel, emergency response personnel, and truck drivers did not reveal any additional insights regarding temporary barrier challenges within work zones. However, surveys of Texas Department of Transportation (TxDOT) personnel and field reviews revealed issues pertaining to decision making between increasing the barrier offset from travel lanes with narrowed (11-foot) lanes and 12-foot lanes with a smaller barrier offset, unanchored

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#### **Project Completed:**

11-30-2020

barrier “creep” in work zones due to pavement vibrations (Figure 1), and occurrences of unanchored barrier deflections that exceed the current 2-foot deflection criteria in TxDOT barrier anchoring standards (Figure 2).

Researchers identified crash prediction models that can be used to perform trade-off analyses of various alternatives regarding temporary barrier deployment in work zones.

Based on the results of the tasks performed, the researchers developed recommended guidelines for use by work zone designers to help determine:

- When temporary barriers should be used in work zones.
- How to assess the trade-offs in alternative temporary barrier deployment options upon expected work zone crashes, especially when the alternatives result in different project durations and project costs.
- How to assess whether to include emergency turnouts or enforcement pullout areas within a work zone, and what dimensions those areas should be if they are incorporated into the temporary traffic control plan for the project.
- How to assess whether to specify that the temporary barriers that will be required in the work zone should be anchored.

### What This Means

Work zone designers and project engineers now have additional tools and guidance to help them decide when and how to use temporary barriers in freeway work zones in Texas.



**Figure 1. Barrier Creep with Unanchored Temporary Barriers in Freeway Work Zones.**



**Figure 2. Barrier Deflection with Unanchored Temporary Barriers in Freeway Work Zones.**

### For More Information

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Keyword: Research