

## 0-7052: Evaluation of Surface Mounted Median Guardrail

### Background

Median barriers are commonly used in areas that have high average daily traffic or where there is a higher chance of a vehicle intruding into opposing lanes due to curves or other geometric features. Most median barriers are concrete barriers, which are generally expensive to construct. A metal-rail median guardrail has the potential to reduce construction costs. In many urban and high-traffic-volume roadways, a median with soil is not available. This limits the use of existing median guardrail systems since they require metal posts to be embedded in soil.

The goal of this project was to develop a metal-rail median guardrail that can be mounted directly on concrete pavement. Such a design will allow the Texas Department of Transportation (TxDOT) to protect opposing traffic in many areas where it was previously cost prohibitive to do so with concrete median barriers.

### What the Researchers Did

The research team developed several concepts of the surface-mounted median guardrail for TxDOT's review. One of these concepts was selected for further development through a series of component-level dynamic impact testing and finite element simulations. The research team developed a full-system model of the guardrail and performed vehicle impact simulations to determine the likelihood of the

design to meet *Manual for Assessing Safety Hardware (MASH)* testing requirements. Once this full-system design was reviewed and approved by TxDOT, the research team conducted *MASH* Test 3-11 and Test 3-10 with a pickup truck and a small passenger car, respectively, to verify the performance of the new surface-mounted guardrail design.

The surface-mounted guardrail system was comprised of two W-beam guardrail sections supported by S3×5.7 weak posts that were welded onto baseplates. The baseplates were anchored to the underlying concrete pavement using epoxy anchors.

### What They Found

In both tests, the surface-mounted median guardrail system successfully contained and redirected the test vehicle in a stable manner. The guardrail had a maximum dynamic deflection of 18.7 inches in Test 3-10 with the small car and 37.8 inches in Test 3-11 with the pickup truck. In both tests, no cracks or concrete damage was observed around the post baseplates. The baseplates and their epoxy anchors were also undamaged.

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The results of the full-scale crash tests were assessed for compliance with the *MASH* TL-3 evaluation criteria for longitudinal barriers. The surface-mounted median guardrail met the performance evaluation criteria of *MASH* TL-3 for longitudinal barriers.

### What This Means

The newly developed surface-mounted median guardrail system is ready for implementation by TxDOT as a crashworthy median guardrail that can be mounted on concrete pavement or bridge decks.



**Figure 1. Surface-Mounted Median Guardrail.**

#### For More Information

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