

0-6646: Safety and Integrity of Median Barrier-Mounted Hardware

Background

Concrete median barriers have been used throughout the state as permanent and temporary barriers for providing separation of traffic. Due to space restrictions, a sign or a light pole is placed on top of such barriers. Typically, these barriers are tested and considered crashworthy through crash testing according to the National Cooperative Highway Research Program *Report 350* or the American Association of State Highway and Transportation Officials *Manual for Assessment of Safety Hardware (MASH)*. However, when signs or light poles are mounted on top of barriers, the crashworthiness of the system is not necessarily guaranteed.

What the Researchers Did

In this project, a survey of the practice of mounting hardware on top of barriers was performed. Analytical, computer simulation, and testing tasks were conducted to define crashworthy hardware and placement guidelines. This research developed a design guideline and a standard that could be incorporated into Texas Department of Transportation (TxDOT) standards and specifications.

What They Found

Researchers crash-tested the following sign support designs mounted on a concrete median barrier and evaluated according to *MASH* guidelines for longitudinal barriers:

- Spread tube sign support system.
- Bracket and sacrificial pin sign support system.

- Chute channel sign support system.
- Slotted 10 BWG sign support system.

None of the above sign support systems interfered with the ability of the concrete median barrier to contain and redirect the 2270P vehicles. Each of the systems performed successfully according to the *MASH* criteria for longitudinal barriers.

What This Means

Researchers developed, tested, and recommended these designs for implementation:

- Concept 1: Sliding base and chute design (Figure 1).
- Concept 8: Slotted 10 BWG post with 3-inch-long slots (Figure 2).
- Concept 4: Hinge and sacrificial pin design (Figure 3).

The sliding base and chute design (Concept 1) is the preferred design for implementation among the three listed above. The sign/post assembly

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would move along the chute once impacted by an errant pickup. The sign for the slotted 10 BWG post (Concept 8) leaned down downstream and had 89.0 inches of maximum permanent deflection on the field side. So, Concept 8 will need enough clearance (i.e., wide shoulder width on the other side). Ideally, Concept 8 would be used more practically on roadside barriers or bridge rails. As for the hinge and sacrificial pin design (Concept 4), it did not activate in the crash test. Thus, it is not expected to activate for less severe impacts (nuisance hits). However, if it had activated, and the sign had lain down on the face of the barrier, then a clearance of 2 ft minimum is needed for the shoulder side on each side of the barrier.



Figure 1. Concept 1: Sliding Base and Chute Channel.



Figure 2. Concept 8: Slotted 10 BWG Post (3-Inch Slots).



Figure 3. Concept 4: Hinge and Sacrificial Pin.

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