Texas A&M Transportation Institute

PROJECT SUMMARY

Texas Department of Transportation

0-6913: Development of *MASH* Test Level 2 (TL-2) Short Radius Guardrail Treatment on Texas Roadways

Background

Crashworthy design for installation on short radius sites has eluded the roadside safety community for over two decades. Texas A&M Transportation Institute (TTI) researchers have developed an innovative short radius guardrail system for implementation on high-speed roadways. However, there are many roadways with restrictive roadside clearances that cannot accommodate the new short radius guardrail treatment. Many of these sites exist along low-speed roadways that have a speed limit of 45 mph or less. Researchers developed a short radius guardrail system to meet American Association of State Highway and Transportation Officials *Manual for Assessing Safety Hardware* (*MASH*) Test Level 2 (TL-2) performance criteria for use on low-speed roadways.

What the Researchers Did

Researchers established design requirements and site constraints that influence the design of the *MASH* TL-2 short radius guardrail system. Emphasis was given to the site requirements and constraints identified by the Texas Department of Transportation (TxDOT) for practical implementation on the low-speed roadways. Researchers conceptualized new designs for a *MASH* TL-2 short radius guardrail system. The initial design concepts were developed using knowledge gleaned from engineering reviews of previous tests including those conducted under TxDOT Project 0-6711, Short Radius *MASH* TL-3 Guardrail Treatment.

TTI conducted a full-scale crash in compliance with *MASH* TL-2 test conditions, with modification of some test conditions by increasing the impact angle from 15° to 25°. These five tests are *MASH* Tests 2-33, 2-32, 2-31, 2-35, and 2-34. All of these tests were successful according to *MASH* test evaluation criteria.

What They Found

TTI developed and successfully tested a 31-inch-tall short radius system per *MASH* TL-2 modified conditions. This new short radius system requires a thrie-beam guardrail system constructed along the primary roadway that transitions to a section of bridge parapet. The thrie-beam is curved at the nose section and then is attached to the secondary roadway w-beam rail via an asymmetric thrie to w-beam connector. This short radius system has six plastic sand drums and a 3H:1V sloped ditch behind it. Figure 1 shows the system installation, and Figure 2 shows the test outcome of the pickup impact on the nose.

Research Performed by:
Texas A&M Transportation Institute

Research Supervisor:
Akram Abu-Odeh, TTI

Researchers:
Nataly de la Fuente, TTI
D. Lance Bullard, Jr., TTI

Project Completed:
2-28-2018

What This Means

TxDOT has a crashworthy short radius design that can be implemented on low-speed roadways. This system implementation in the field requires a minimum of 3 ft of flat ground available behind it to accommodate the placement of the six 700-lb sand-filled drums. A slope of 3H:1V or flatter can be placed after the 3-ft flat area to accommodate ditches on the field side.

Figure 1. Test Installation of the New TL-2 Short Radius Design.

Figure 2. Pickup Truck Resting Position after Impacting the Nose of the New TL-2 Short Radius Design.

For More Information

Project Manager:
Wade Odell, TxDOT, (512) 416-4737

Research Supervisor:
Akram Abu-Odeh, TTI, (979) 862-3379

Technical reports when published are available at **http://library.ctr.utexas.edu.**

Research and Technology Implementation Office
Texas Department of Transportation
125 E. 11th Street
Austin, TX 78701-2483

www.txdot.gov
Keyword: Research