



U.S. Department
of Transportation
**Federal Highway
Administration**

1200 New Jersey Avenue, SE
Washington, D.C. 20590

July 17, 2009

In Reply Refer To:
HSSD/B-42B

Mr. Michael Budd
Rockingham Precast
P.O. Box 1347
Harrisonburg, VA 22801

Dear Mr. Budd:

This letter is in response to your request for the Federal Highway Administration (FHWA) acceptance of a roadside safety device for use on the National Highway System (NHS).

Name of device: 12-Foot T-LOC F-Shape Portable Concrete Barrier
Type of device: Temporary Concrete Barrier
Test Level: AASHTO Manual for Assessing Safety Hardware (MASH) Test Level-3
Testing conducted by: Texas Transportation Institute (TTI) on May 5, 2009
Date of request: February 10, 2009
Initial response by email sent February 23, 2009

You subsequently requested that we formally find this device acceptable for use on the NHS under the provisions of the AASHTO Manual for Assessing Safety Hardware (MASH) Test Level-3 (TL-3).

Requirements

Roadside safety devices should meet the guidelines contained in the AASHTO Manual for Assessing Safety Hardware (MASH). The FHWA Memorandum "[ACTION: Identifying Acceptable Highway Safety Features](#)" of July 25, 1997, provides further guidance on crash testing requirements of longitudinal barriers.

Description

The Rockingham Precast T-LOC barrier was originally accepted on October 20, 1997, in our Acceptance Letter B-42. The barrier tested was composed of 32-inch high, 12-foot long concrete F-Shape segments using a connection detail specifying 32-inch long slotted tube (4 inches x 4 inches x 1/2 inches) and mating fabricating 'T' made of 1/2-inch thick steel.



Your present request is for formal acceptance of 32-inch high, 12-foot long concrete F-Shape barrier segments using a connection detail specifying 12-inch long slotted tube connection (HSS4 x 4 x 1/2) anchored to the end of barrier segments using four #6 dowel bars 24 inches in length welded to the sides of the slotted tube (two on each side). The width of the slot in the tube was 1 inch. The interlocking mating "T" connection was fabricated using 1/2-inch thick steel plate. The width and length of the "T" connection was 2 inches and 12 inches respectively. The "T" connection was anchored to the ends of the barrier units using three #6 bars, 36 inches in length, and welded to the "T" connection steel. These bars, along with the bars welded to the slotted tube connection, were cast within the barrier concrete for each unit. Both the slotted tube and the "T" connection were located 10 inches from the base of the barrier unit. Each barrier unit was reinforced using three #5 longitudinal reinforcing bars, 11 feet, 8 inches in length. These bars were lapped with the three bars anchoring the "T" connection. The longitudinal reinforcing bars were skewed to lap with the dowel bars used to anchor the slotted tube connection.

The Office of Safety questioned the strength of the 12-inch long connection detail and requested that you conduct MASH Test 3-11, which you did. The vehicle was redirected and remained upright, and the occupant risk values were within the limits set by MASH. The test data summary sheet is attached for reference.

Findings

We concur in your request that the modified T-LOC concrete barrier segments that have been successfully crash tested to AASHTO MASH TL-3 conditions at a segment length of 12 feet will be considered acceptable for use on the NHS connection details when the segments are manufactured to a length of 12 feet. Please note the following standard provisions that apply to the FHWA letters of acceptance:

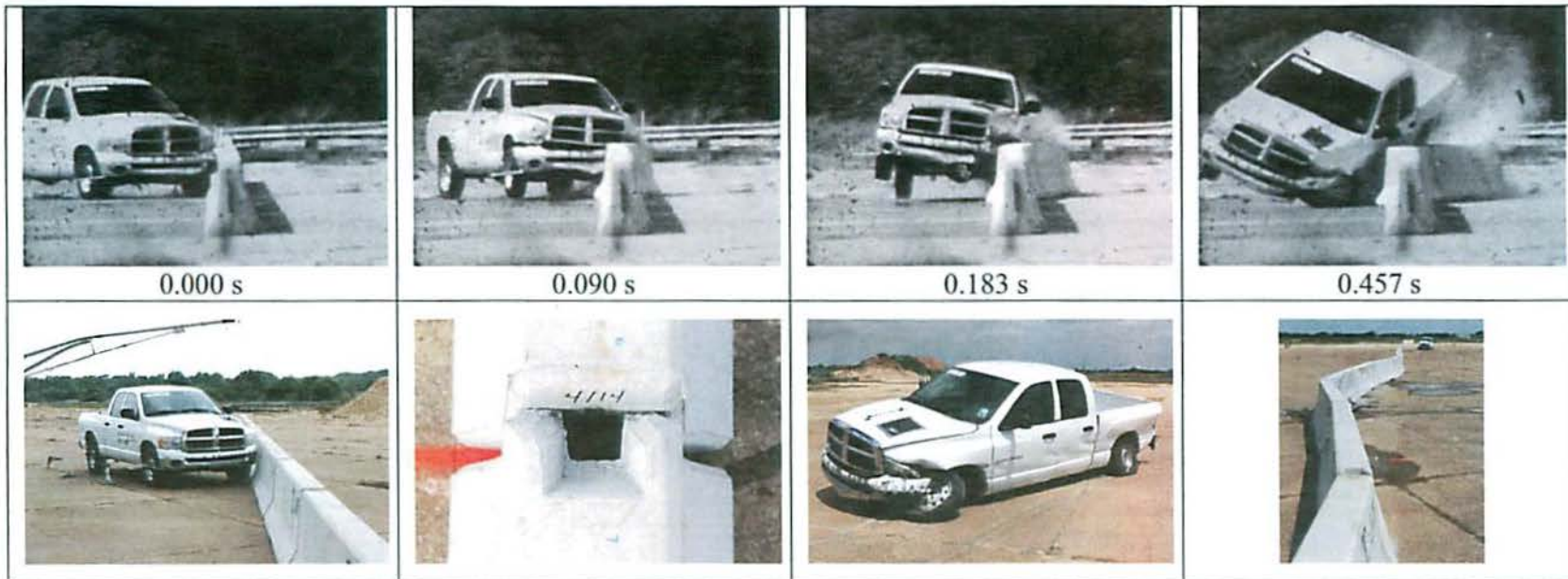
- This acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, we reserve the right to modify or revoke our acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that it will meet the crashworthiness requirements of the FHWA and the AASHTO MASH.
- To prevent misunderstanding by others, this letter of acceptance is designated as number B-42B and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.

- T-LOC concrete barriers are patented products and considered proprietary. If proprietary devices are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

Sincerely yours,



David A. Nicol, P.E.
Director, Office of Safety Design
Office of Safety

**General Information**

Test Agency..... Texas Transportation Institute
 Test No. 400001-RPC4
 Date 2009-05-05

Test Article

Type..... Portable Concrete Median Barrier
 Name Rockingham Precast Barrier
 Installation Length 192 ft
 Material or Key Elements 12 ft segments of F-shaped portable concrete median barriers with T-LOK connection

Soil Type and Condition..... Concrete surface, dry

Test Vehicle

Type/Designation..... 2270P
 Make and Model 2003 Dodge Ram Quad-Cab
 Curb 4782
 Test Inertial..... 4986
 Dummy No dummy
 Gross Static..... 4986

Impact Conditions

Speed 62.8 mi/h
 Angle 25.4 degrees
 Location/Orientation 4 ft upstream

Exit Conditions

Speed N/A
 Angle N/A

Occupant Risk Values

Impact Velocity
 Longitudinal 10.2 ft/s
 Lateral 22.3 ft/s
 Ridedown Accelerations
 Longitudinal -4.0 G
 Lateral 15.9 G
 THIV 26.3 km/h
 PHD 15.9 G
 Max. 0.050-s Average
 Longitudinal -4.6 G
 Lateral 10.6 G
 Vertical -3.2 G

Post-Impact Trajectory

Stopping Distance 182 ft dwnstrm
 21 ft twd traffic

Vehicle Stability

Maximum Yaw Angle 48 degrees
 Maximum Pitch Angle -12 degrees
 Maximum Roll Angle -33 degrees
 Vehicle Snagging No
 Vehicle Pocketing No

Test Article Deflections

Dynamic 50.0 inches
 Permanent 49.4 inches
 Working Width 71.7 inches

Vehicle Damage

VDS 11LFQ4
 CDC 11FLEW4
 Max. Exterior Deformation 16.0 inches
 Max. Occupant Compartment Deformation 0.38 inches

Figure 5.7. Summary of results for *MASH08* test 3-11 on Rockingham precast concrete median barrier.