June 5, 2008

In Reply Refer To: HSSD/B-178

Mr. Kevin K. Groeneweg  
Mobile Barriers LLC  
24918 Genesee Trail Road  
Golden, CO 80401

Dear Mr. Groeneweg:

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

Name of device: Mobile Barrier Trailer  
Type of device: Portable Work Zone Barrier  
Test Level: NCHRP Report 350 Test Level 2 (TL-2) or TL-3  
Testing conducted by: Southwest Research Institute  
Date of request: April 28, 2008  


Requirements  
Roadside safety devices should meet the guidelines contained in the NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features". FHWA Memorandum "ACTION: Identifying Acceptable Highway Safety Features" of July 25, 1997, provides further guidance on crash testing requirements of longitudinal barriers. You have also chosen to anticipate the adoption of MASH-08, an option that FHWA has offered with the understanding that additional testing may need to be done if changes to the test criteria are made before MASH-08 is formally adopted.

Description  
The Mobile Barrier Trailer (MBT) is an integrated, rigid wall, semi-trailer that is used in conjunction with standard semi-tractors to provide mobile, improved, safety, and work environments for personnel at applicable maintenance, construction, and security sites. It is an extended, mobile, longitudinal barrier that provides a physical and visual wall between passing...
traffic and the maintenance and construction personnel. With an integrated crash attenuator at the rear, a semi-tractor at the front, and a rigid wall on the side toward passing traffic, the MBT will provide approximately 30.5 m (100 ft) of barrier and protected work area.

The basic trailer is comprised of two platforms and up to three wall sections. The platforms are each 6.4 m (21 ft) in overall length, 2.54 m (100 in) wide and 1.22 m (4 ft) high (riding approximately 1.52 m (5 ft) high with 305 mm (12 in) of ground clearance). The wall sections are each 6.10 m (20 ft) long, 610 mm (24 in) wide, and 1.22 m (4 ft) high (riding approximately 1.52 m (5 ft) high with 305 mm (12 in) of ground clearance). A homogenous 6.4 mm (0.25 in) steel plate is welded to cover the outer side of each wall section. Each wall section abuts up against another of the platforms and is built the same to take an impact from either direction. There are no snag points at the seams. The outer 6.4 mm (0.25 in) plate and associated welds are ground beveled to transition from one to the other.

Dimensioned illustrations of the trailer are enclosed for reference as "Appendix A."

Crash Testing
One full-scale crash test was conducted using a 2329 kg Dodge Ram quad cab pickup truck impacting at 23.5 degrees at 102.3 km/hr. The MBT deflected 0.61 m (2 ft) during the impact. As seen in the enclosed test data summary sheet the evaluation criteria were within the limits specified in MASH-08.

Findings
Therefore, the MBT described above and detailed in the enclosed dimensioned photographs is acceptable for use on the NHS under the range of conditions tested, when allowed by a highway agency. It will be acceptable for TL-2 or TL-3 usage depending on the test level of the Truck Mounted Attenuator that is affixed to the rear.

You subsequently requested that FHWA accept the MASH-08 Test 3-11 as indicative of the NCHRP Report 350 acceptance as well. Because the nature of the MBT device and the impact performance of the MASH-08 pickup truck we can conclude that the MASH-08 Test 10 and the NCHRP Report 350 Tests 10 and 11 can be waived. (The MBT is a semi-rigid vertical wall with relatively low friction characteristics that can be favorably compared to vertical concrete barrier walls that passed prior full-scale testing).

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 NCHRP Report 350.

• To prevent misunderstanding by others, this letter of acceptance is designated as number B-178 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.

• The MBT is a patented product and considered proprietary. If proprietary devices are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, they: (a) 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

Enclosures
APPENDIX A

Test Article
(Contents of Appendix A submitted by Mobile Barriers LLC)
Overview

View as assembled with three wall sections

Shortened configuration prepared for transport w/ wall sections atop combined platforms.

Overall trailer length (with 3 wall sections): 102'
Overall length (with platforms only as shown above – no wall sections installed): 42'
(lengths exclusive of tractor & TMA assembly, not shown)
Width: 100"
Approx Weight: 65,000 lbs with tractor and misc accompaniments
Breakdown:
Platforms and rear axle assembly (“caboose”) – 20,000 lbs
Wall sections – 5,000 lbs (ea)
Counterweight – 5,000 lbs per wall section
Tractor and accompaniments – 20,000 lbs

Clearance: 9-12” (+/- 1”) depending on configuration
Height to top of platforms (as taped): approx. 5’ (58” with 12” of clearance)
Height to top of visual barrier (netting) or wall sections as stored above: approx 9’
Overview (cont)...

Length of platforms (2 shown attached): 21' ea
("caboose" or rear axel assembly under platform opposite tractor)
Length of wall sections (2 shown facing/1 on opposite side): 20' ea.
Configuration options: Platform and caboose with 0-3 wall sections
Must be used with an NCHRP Report 350 compliant TMA that has been tested and accepted at TL-3 or such other level as appropriate for applicable traffic speeds and deployment conditions (TMA not shown).
Dimensions...

Overall length with 3 wall sections: 102'

2 Platforms (21' ea)

3 Wall sections (20' ea)
Dimensions (cont)...

Trailer & Caboose (rear axle assembly) as seen from rear traffic side - wheel cover panel and TMA not shown. (license plate and splashguards blacked out)

- 100” Width
- 55-58” Overall height
- 46” Wall/Platform height
- 9-12” Clearance

Caboose (rear axle assembly)
Wall sections 1, 2, 3

Assembled

Top, mid, and lower beams with lower channel – 46” height (55-58” overall height w/ 9-12” clearance)

Preassembly as seen on end
Platform Construction...

Platforms connected and loaded for transport, shown open from work side.

Skeletal view.
Table 4.1 – Summary of Test Results and Conditions

General Information
- Test Agency: Southwest Research Institute
- Test Number: MBT-1
- Test Date: 04/03/2008
- Test Category: 3-11 “Update”

Test Article
- Type: Longitudinal Barrier
- Installation Length: 30.5 m (100 ft)
- Top-of-Barrier Height: 1.52 m (5 ft)
- Type of Primary Barrier: Mobile longitudinal barrier

Soil
- Test performed on concrete

Test Vehicle
- Type: 3/4 Ton Quad Cab Pickup
- Designation: 2270P
- Model: 2002 Dodge Ram 1500 Quad Cab
- Mass (kg): 2329
- Inertial Mass (kg): 2329
- Dummy Mass (kg): NA
- Gross Static Mass (kg): 2329

Impact Conditions
- Speed (km/hr): 102.3
- Angle (degrees): 23.5

Exit Conditions
- Speed (km/hr): 80 (calculated)
- Angle (degrees): 0

Occupant Risk Values
- Impact Velocity (m/s)
  - x-direction: 4.0
  - y-direction: -6.4
- Ridedown Accelerations (g's)
  - x-direction: 7.9
  - y-direction: 11.1

Test Article Deflection
- Dynamic: 0.61 m (2.0 ft)
- Static: 9.5 cm (3.8 in)

Vehicle Damage
- Exterior
  - CDC: 11LFEW5
  - VDS: 11-LPQ-4
- Interior
  - OCDI: LFD000000
  - Max. Deform. (mm): 0

Post Impact Vehicular Behavior (limited to events <1,000 seconds)
- Maximum Roll Angle (degrees): -7.8 @ 0.107 sec.
- Maximum Pitch Angle (degrees): 2.3 @ 0.447 sec.
- Maximum Yaw Angle (degrees): 29.3 @ 0.374 sec.

[Diagram showing the test setup with distances and angles]