



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

400 Seventh St., S.W.  
Washington, D.C. 20590

April 22, 2005

In Reply Refer To: HSA-10/WZ-207

Mr. Jan Miller  
TrafFix Devices  
220 Calle Pintoresco  
San Clemente, California 92672

Dear Mr. Miller:

Thank you for your letter of March 23, 2005, requesting the Federal Highway Administration (FHWA) acceptance of your company's Tri-Buster Safety Tripod stand supporting a plywood sign as a crashworthy traffic control device for use in work zones on the National Highway System (NHS). Accompanying your letter were reports of crash testing conducted by Karco Engineering and video of the test. You requested that we find this stand acceptable for use on the NHS under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

### **Introduction**

The FHWA guidance on crash testing of work zone traffic control devices is contained in two memoranda. The first, dated July 25, 1997, titled "INFORMATION: Identifying Acceptable Highway Safety Features," established four categories of work zone devices: Category I devices are those lightweight devices which are to be self-certified by the vendor, Category II devices are other lightweight devices which need individual crash testing but with reduced instrumentation, Category III devices are barriers and other fixed or heavy devices also needing crash testing with normal instrumentation, and Category IV devices are trailer mounted lighted signs, arrow panels, etc. for which crash testing requirements have not yet been established. The second guidance memorandum was issued on August 28, 1998, and is titled "INFORMATION: Crash Tested Work Zone Traffic Control Devices." This later memorandum lists devices that are acceptable under Categories I, II, and III.

A brief description of the devices follows:

The Tri-Buster is a "triangular footprint" or "tripod" portable sign stand with a galvanized steel upright support measuring 1.25 inches square with a wall thickness of 0.070 inches. A 1 inch steel inner mast extends out to a total height of 73 inches supporting a 48" x 48" diamond sign at approximately 13 inches above the pavement. The mast is supported on three



1.25 inch square steel folding legs which form an upper joining “heart-plate” which is attached to the telescoping inner mast. The inner mast is adjusted to the top section of the diamond sign that pushes the bottom of the sign against two lower steel mounts. The weight of the tested Tri-Buster sign stand with plywood diamond sign is 48 pounds.

### Testing

Full-scale automobile testing was conducted on your company’s devices. Two stand-alone examples of the device were tested in tandem, one edge-on and the next placed six meters downstream turned at 90 degrees for a head-on impact, as called for in our guidance memoranda. The test is summarized in the table below.

NCHRP Report 350 Test 3-71	
Stand Orientation	90 degrees      Head on
Sign Stand Tested	Tri-Buster with 48” x 48” x 5/8” plywood sign
Weight of Tested Stand	72 pounds
Mounting heights	13 inches      13 inches
Flags? Lights?	None      None
Mass of Test Vehicle	905 kg
Impact Speed	98.2 km/hr/ (61.1 mph)
Velocity Change	2.1 km/hr, or 0.6 m/sec (max of 5 m/sec allowed)
Occupant Comp. Def.	1 inch windshield deformation
Extent of contact	Minor contact damage to bumper, grille, hood, roof, glass
Windshield Damage	None, sign went over      Moderate cracking
Other notes	Head-on: Sign broke into pieces and cracked windshield.

Damage to the windshield was moderate but there was no penetration of the glass, and the driver’s view was not obscured. The damage resulted from the head-on impact. In the 90 degree impact the front of the car contacted the lower leading edge of the sign causing it to rotate. The leading corner of the sign contacted the hood and base of the windshield, which propelled the sign up in the air and over the vehicle.

### Requests

Request 1: Acceptance of the TDI Tri-Buster sign stand for use with the tested 48” x 48” x 5/8” plywood signs, including signs of smaller size and thinner/lighter plywood materials.

Request 2: Acceptance of the TDI Tri-Buster sign stands for use with additional sign sizes at the tested 13” mounting height. The following substrates and sizes are requested:

- 48” x 48” and smaller
- 5/8” thick plywood and thinner/lighter
- 0.080, 0.100, and 0.125 inch thick solid aluminum
- 2mm and 3 mm aluminum laminates such as Alpolic, Dibond, and Reynolite
- 10 mm to 16 mm corrugated plastic
- Roll-up signs with fiberglass braces

## Findings

The results of the testing met the FHWA requirements and, therefore, the devices described in Request 1 are acceptable.

We concur in Request 2 as the proposed shaped signs would also engage the vehicle front end early in the crash event and are likely to perform in a similar manner to the tested signs.

In summary, the Tri-Buster stand, shown in the enclosed drawings for reference, supporting signs of the sizes and materials detailed above, is acceptable for use on the NHS under the range of conditions tested, when proposed by a State.

Please note the following standard provisions that apply to the FHWA letters of acceptance:

- Our 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, it reserves the right to modify or revoke its 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 they will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-207 shall not be reproduced except in full. This letter, and the test documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.
- Traffix Devices portable sign stands are patented devices and are considered "proprietary." The use of proprietary work zone traffic control devices in Federal-aid projects is generally of a temporary nature. They are *selected by the contractor* for use as needed and removed upon completion of the project. Under such conditions they can be presumed to meet requirement "a" given below for the use of proprietary products on Federal-aid projects. On the other hand, if proprietary devices are *specified by a highway agency* for use on Federal-aid 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 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. These provisions do not apply to exempt non-NHS projects. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

- 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.

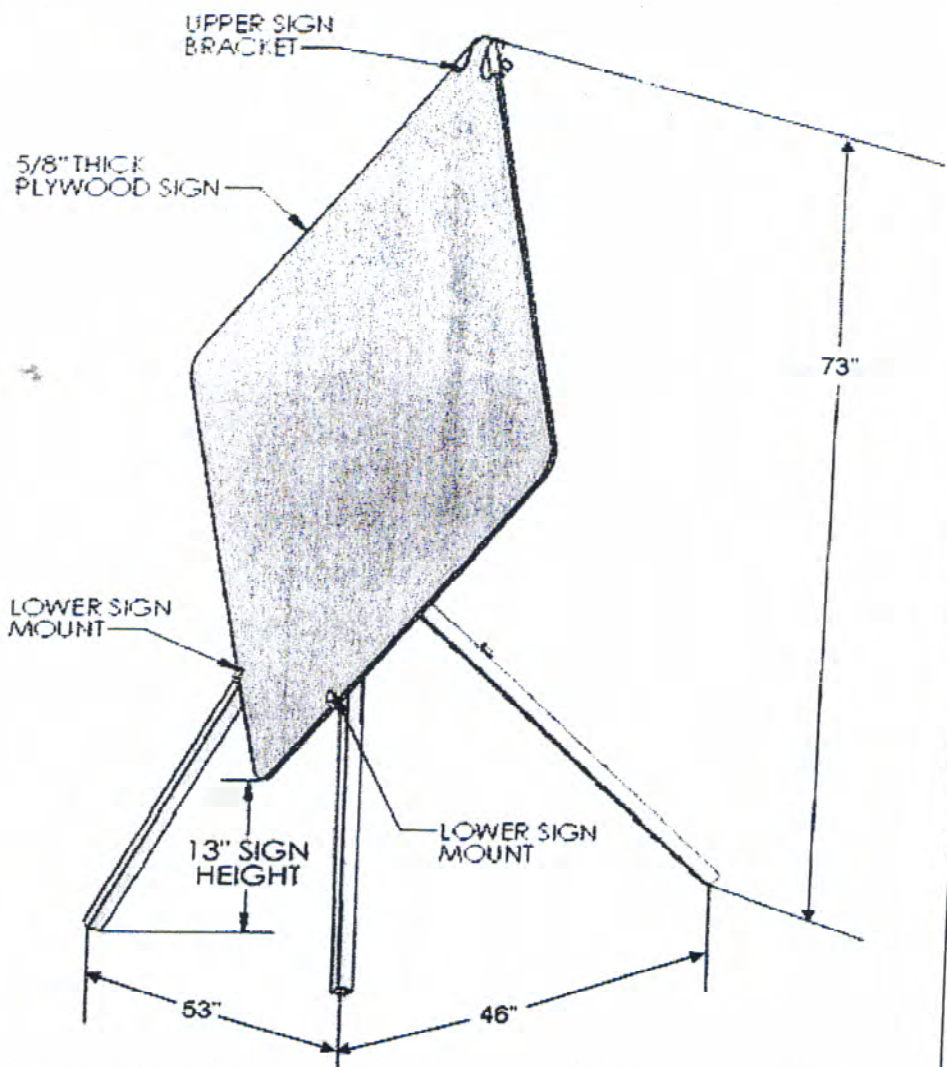
Sincerely yours,

John R. Baxter, P.E.  
Director, Office of Safety Design  
Office of Safety

Enclosure

FHWA:HSA-10:NArtimovich:tb:x61331:4/19/05  
File: h://directory folder/artimovich/WZ207-TrafFixFIN1  
cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;  
N.Artimovich, HSA-10)

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



**TRAFFIX TRI-BUSTER FOLDING LEG SIGN STAND**


UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES.		<b>Traffix Devices Inc.</b> 		220 Calle Pintoresco San Clemente, CA 92672 (949) 361-5693 FAX (949) 361-8215 www.traffixdevices.com	
		<b>TRAFFIX DEVICES TRI-BUSTER SIGN STAND</b>			
DRAWN BY: Felipe Almenza	DATE: 3-4-05	SIZE <b>A</b>	DWG NO. 93012	REV —	
CHECKED BY:	DATE:	SCALE NTS	SHEET 1 OF 1		
APPROVED BY:	DATE:				

FIGURE 1: MANUFACTURER'S DRAWING OF TEST ARTICLE