



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-206

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

Dear Mr. Miller:

Thank you for your letter of March 22, 2005, requesting the Federal Highway Administration (FHWA) acceptance of your company's Little Buster mid-sized spring stand with "Safe Sleeve-350" 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 Little Buster sign stand with "Safe Sleeve-350" is an X-footprint portable sign stand having a steel upright 1.20 inches square, out of which telescopes a 1 inch square upper mast. The lower 18" portion of the outer mast is reinforced by the addition of a 18" length of 1.5" x 1.5" square x 0.100" thick overlapping black powder coated steel tubing with a fixed lower rigid sign bracket. This proprietary feature is known as the Safe Sleeve-350.



The total height of the extended mast is 92 inches, which can support a 48" x 48" diamond sign of 5/8-inch thick plywood at a height of 15 inches above the pavement. The mast is supported on dual springs mounted on 1-inch square folding legs, which measure 79 inches each when extended. Signs are held in place with a set of Traffix Devices rigid sign brackets. The steel legs and mast tubes have a wall thickness of 0.070 inches, while the Safe Sleeve-350 is 0.100 inches. The stand weighs 72 pounds when supporting the plywood sign.

Testing

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

NCHRP Report 350 Test 3-71		
Stand Orientation	Head on	90 degrees
Sign Stand Tested	Little Buster with 48" x 48" x 5/8" plywood sign	
Weight of Tested Stand	72 pounds	
Mounting heights	15 inches	15 inches
Flags? Lights?	None	None
Mass of Test Vehicle	840 kg	
Impact Speed	98.7 km/hr/(61.3 mph)	
Velocity Change	2.77 km/hr, or 0.77 m/sec (max of 5 m/sec allowed)	
Occupant Comp. Def.	none	
Extent of contact	Hit windshield	Rotated over vehicle
Windshield Damage	Moderate cracking	No contact
Other notes	Maximum deformation of roof was 2 inches	

Damage to the upper portion of the windshield was moderate to heavy, 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, which propelled the sign up in the air and over the vehicle

Requests

Request 1: Acceptance of the TDI Little Buster sign stand with Safe Sleeve-350 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 Little Buster sign stand with Safe Sleeve-350 for use with 48" x 48" x 0.100 inch and 0.125 inch solid aluminum and 3 mm aluminum laminate signs and smaller signs of same substrates. The weight of the tested plywood sign was 33 pounds. The weight of 0.080, 0.100, and 0.125 solid aluminum signs is 17.9 pounds, 22.4 pounds, and 28 pounds, respectively. As these panels each weigh less than the tested plywood panel, they should perform in a similar manner.

Request 3: Acceptance of the TDI Little Buster sign stands with Safe Sleeve-350 for use with additional sign shapes and sizes at the tested 15” mounting height. The following sizes (and smaller) and substrates are requested:

- 48”w x 24”h
- 60”w x 24”h
- 60”w x 30”h
- 48”w x 60”h
- 48”w x 72”h
- 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*

* Previously accepted substrates

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 stand had been previously tested with 0.080 solid aluminum - the requested 0.100 and 0.125 aluminum are heavier but still weigh approximately 15% less than the tested 5/8-inch thick plywood substrate. The 3 mm aluminum laminate is heavier than the previously tested 2 mm aluminum laminate but much lighter and more flexible than either the plywood or solid aluminum substrates.

We concur in Request 3 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.

The 48” x 60” and 48” x 72” vertical signs are larger in area and mass than the tested sign and may be used under the FHWA’s extrapolation policy that avoids testing of all sign shapes and sizes. These tall vertical signs are in common use today, and are likely to impact the roofline under head-on impact conditions. Their use in 90 degree orientations ought to be discouraged, however.

In summary, the Little Buster stand, shown in the enclosed drawings for reference, supporting signs of the sizes and materials detailed above are 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 FHWA and NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-206 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,

/original signed by/

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

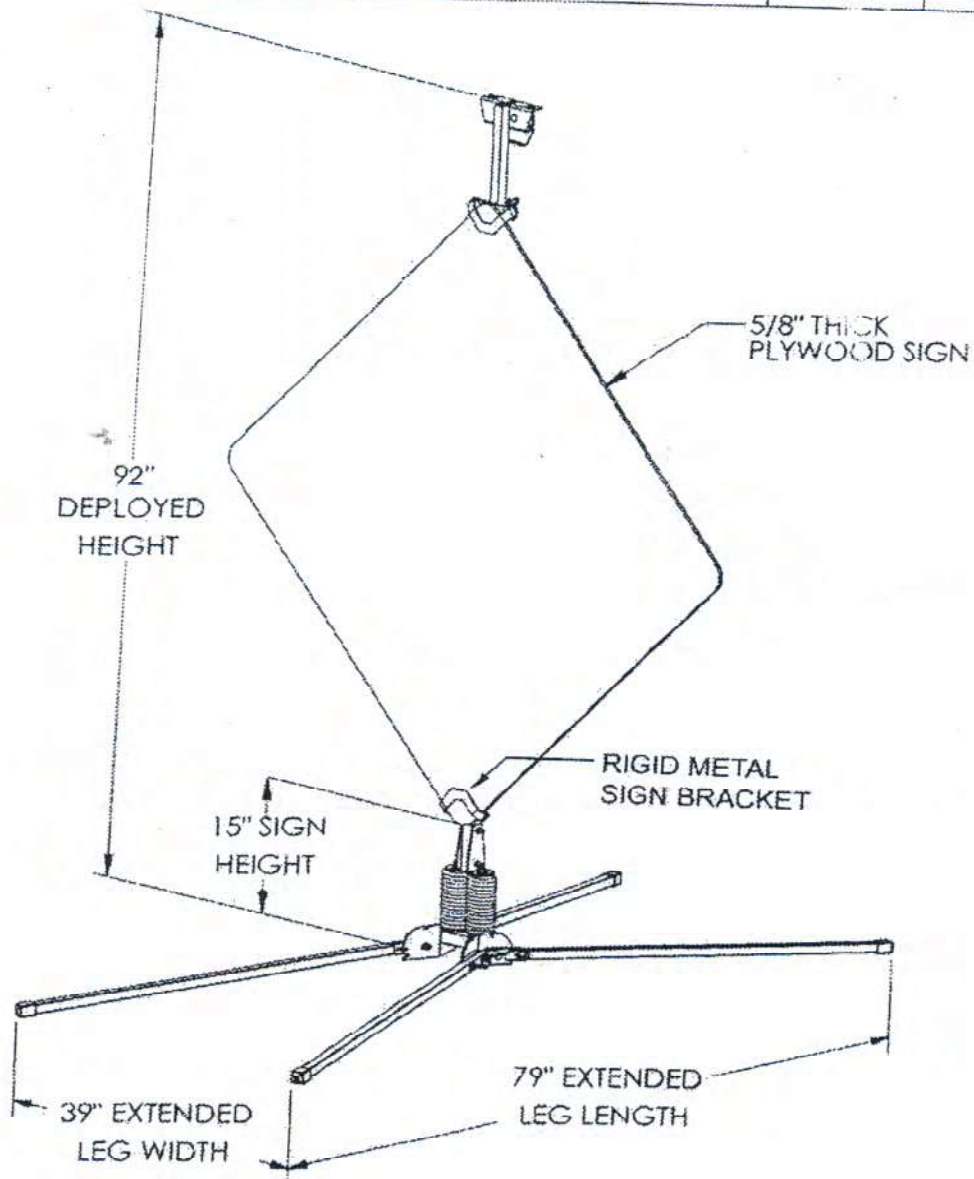
Enclosures

FHWA:HSA-10:NArtimovich:tb:x61331:4/19/05

File: h://directory folder/artimovich/WZ206-TrafFixFIN

cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
 N.Artimovich, HSA-10)

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



TRAFFIX LITTLE BUSTER DUAL-SPRING, FOLDING LEG SIGN STAND WITH RIGID METAL SIGN BRACKETS HOLDING PLYWOOD SIGN

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES.		Traffix Devices Inc. 		220 Calle Pintoresco San Clemente, CA 92672 (949) 381-5653 FAX (949) 381-3208 www.traffixdevices.com	
DRAWN BY: Felipe Almanzo		DATE: 2-8-05		TRAFFIX LITTLE BUSTER WITH DUAL SPRINGS AND FOLDING LEG STAND	
CHECKED BY:		DATE:		SIZE A	DWG NO. 24000 SERIES
APPROVED BY:		DATE:		SCALE 1/1	REV -
				SHEET 1 OF 1	

FIGURE 1: MANUFACTURER'S DRAWING OF TEST ARTICLE