



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

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

Refer to: HSA-1\WZ-67

Mr. Herman O. Brown, Jr.
Bone Safety Signs
1761 McCoba Drive, Suite A
Smyrna, GA 30080

Dear Mr. Brown, Jr.:

Thank you for your letters of November 22, 2000, requesting Federal Highway Administration (FHWA) acceptance of your company's portable sign stands as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your first letter was a report from the Texas Transportation Institute (TTI) and videos of the crash test on your Model SZ-460 Portable Sign Stand with 1500 mm mounting height. The second letter requested acceptance of your SZ-412, SZ-412/S, SZ-312 and SZ-312/S compact stands because of successful results of other similar sign stands that have no metal mast above the base of the sign. You requested that we find the stands acceptable for use on the NHS under the provisions of 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 were those lightweight devices which could be self-certified by the vendor, Category II devices were other lightweight devices which needed individual crash testing, Category III devices were barriers and other fixed or massive devices also needing crash testing, and Category IV devices were trailer mounted lighted signs, arrow panels, etc. 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 for which you are requesting acceptance follows:

SZ-460 (Tested sign): A portable work zone sign fabricated with square steel tubing is used to support a 1220 x 1220 mm vinyl roll-up sign panel that is stiffened with 32 mm by 8 mm rectangular cross section fiberglass straps. The mast consists of a 1500 mm long, 32 mm square, 2.5 mm thick steel tube with a 150 mm long, 38 mm square, 2.5 mm thick tube section at the top for sign attachment. Four telescoping legs were fabricated from 25 mm and 30 mm square tubing. The inner legs were 470 mm long while the outer legs were 1168 mm long. The bottom of the roll-up sign was mounted approximately 1.5 m above the ground level. Details of the roll-up sign and stand (in English units) are shown in the enclosed drawing.

You also requested acceptance of the **SZ-460/S** which is a spring-loaded version of the same stand, and the **SZ-484** and **SZ-484/S** stands which are similar to the tested stand except that the sign is mounted 2130 mm above the pavement.

You also provided drawings for the model **SZ-412** and **SZ-312** stands. These are four-legged and three-legged stands, respectively, that support a roll-up sign at 305 mm above the pavement. The metal structure of the stand rises no higher than that necessary to secure the bottom of the fiberglass ribs supporting the roll-up sign, as shown on the enclosed drawings.

Testing

Full-scale automobile testing was conducted on your company's **SZ-460** sign stand. Two stand-alone examples of the device were tested in tandem, one head-on and the next placed 6 meters downstream turned at 90 degrees, as called for in our guidance memoranda. The complete devices as tested are shown in the Enclosure 1.

The crash test is summarized in the table below:

Test Article	Bone Safety Sign
Height to Top of Sign	3225 mm
Height to Bottom of Sign	1500 mm (60 inches)
Flags or lights	None
Test Article Mass (each)	17.7 kg
Vehicle Inertial Mass	820 kg
Impact Speed, Head-on	100.3 km/hr
Impact Speed, 90 Deg.	95.4 km/hr
Velocity Change, Head on	1.33 m/sec
Velocity Change, 90 Degrees	0.58 m/sec
Vehicle Damage	Minor scrapes to bumper and hood
Occupant Compart. Intrusion	None
Windshield Damage Head-on	Very little cracking
Windshield Damage 90 Deg.	Minor cracking

Findings

Damage to the vehicle was limited to scrapes on the bumper and hood and minor cracking to the windshield, and the test articles did not show potential for penetrating the occupant compartment. The results of this testing met the FHWA requirements and, therefore, the Bone Safety Sign **SZ-460** described above and shown in the enclosed drawing is acceptable for use as test level 3 (TL-3) devices on the NHS under the range of conditions tested, when proposed by a State. We also find the following stands acceptable for use when used with roll-up signs:

SZ-460/S (1500 mm, 60 inch mounting height, Spring Loaded version)

SZ-484 (2130 mm, 84 inch mounting height)

SZ-484/S (2130 mm, 84 inch mounting height, Spring loaded version)

Because of the similarity of the following signs to other “compact” portable sign stands that have met the FHWA requirements, the devices listed below are acceptable for use on the NHS under the range of conditions temporary work zone traffic control devices are typically tested, when proposed by a State:

SZ-412 (Four legged stand, 305 mm, 12 inch mounting height)

SZ-412/S (Four legged stand, 305 mm, 12 inch mounting height, spring loaded)

SZ-312 (Three legged stand, 305 mm, 12 inch mounting height)

SZ-312/S (Three legged stand, 305 mm, 12 inch mounting height, spring loaded)

The following conditions apply to all of the signs listed above:

1. Sign panel must be plastic/fabric “roll-up” type material
2. Vertical support above base is 7.94-mm thick x 31.75-mm wide (5/16-inch thick x 1 1/4-inch wide) fiberglass,
3. Horizontal brace is 4.76-mm thick x 31.75-mm wide (3/16-inch thick x 1 1/4-inch wide) fiberglass, and
4. Sign mounting height is 305 mm (12 inches) above the ground for the compact sign stands, and 1500 mm (60 inches) or 2130 mm (84 inches) for the larger stands, as noted.

The results of test met the FHWA requirements and, therefore, the devices described above and shown in the enclosed drawings for reference are acceptable for use as TL-3 devices on the NHS under the range of conditions tested, when proposed by a State.

Please note the following standard provisions which apply to 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-67 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.

! Bone Signs may include patented components and if so 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.

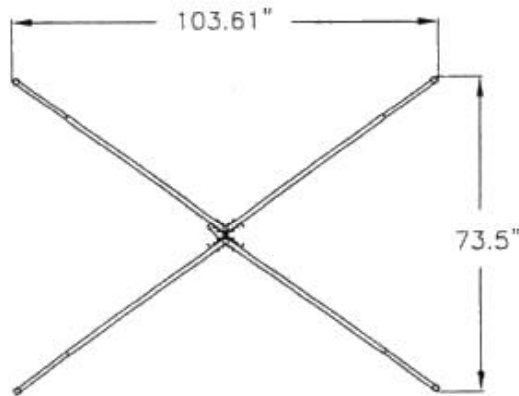
On the other hand, if proprietary devices are specified for use on Federal-aid projects, except exempt, non-NHS projects, they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with 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, a copy of which is enclosed.

Sincerely yours,

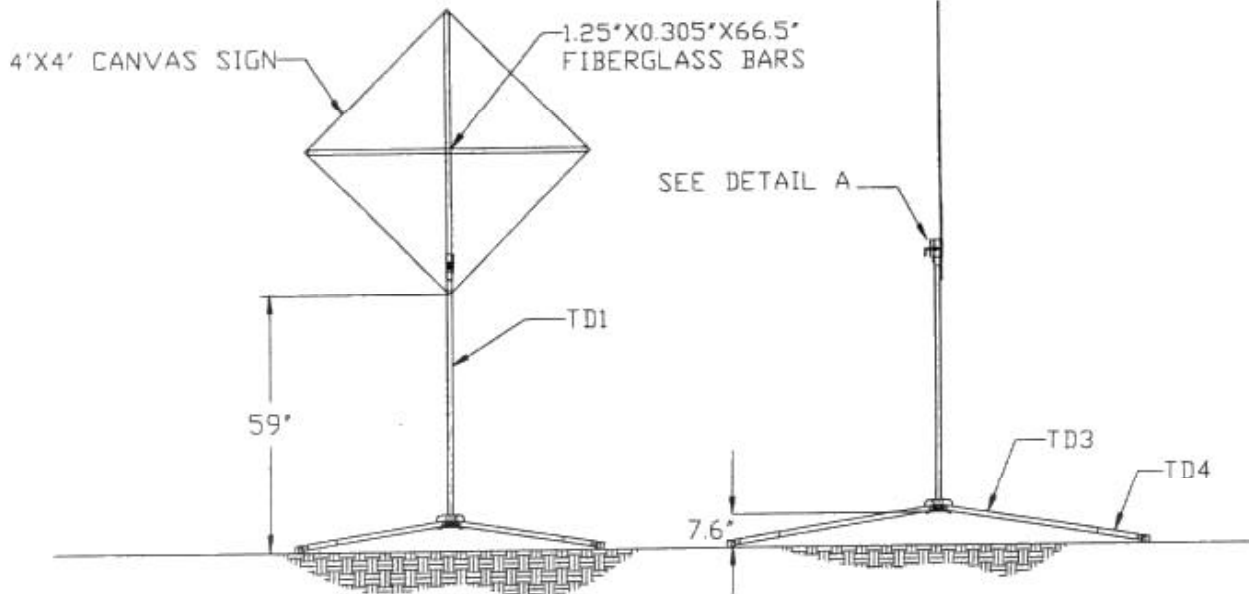
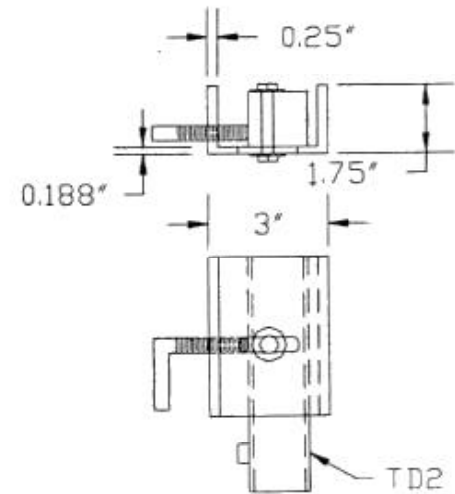
Frederick G. Wright, Jr.
Program Manager, Safety

2 Enclosures

DIMENSIONS FOR STEEL TUBING	
TD1	1.26" SQUARE X 59" & 0.1" THICK
TD2	1.5" SQUARE X 6" & 0.1" THICK
TD3	1.2" SQUARE X 46" & 0.065" THICK
TD4	1" SQUARE X 18.5" & 0.07" THICK



DETAIL A



NOT TO SCALE

The Texas A&M University System						
Revisions			Project No.	Date	Drawn By	Scale
No.	Date	By				
1.			400001	10/00	RTA	
2.						
3.						
						Sheet No.

Model SZ-412

