



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

March 2, 2000

WZ - 28

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

Refer to: HSA-1

Mr. John Sarkisian
Marketing Displays International
38271 W. Twelve Mile Road
Farmington Hills, Michigan 48331-3041

Dear Mr. Sarkisian:

Thank you for your letter of November 8, 1999, requesting Federal Highway Administration (FHWA) acceptance of a number of your company's portable sign stands as a crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter was a copy of the crash test report by Safety Quest, Inc., and video documentation of the crash tests. You requested that we find the three tested devices, as well as certain devices of similar design, acceptable for use on the National Highway System under the provisions of National Cooperative Highway Research Program Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features." You provided additional information on January 18, 2000, regarding specific product requests.

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 latest memorandum lists devices that are acceptable under Categories I, II, and III.

Full-scale automobile testing was conducted on a number of your company's portable sign supports. Two examples of each device were tested in tandem, one head-on and the next at 90 degrees, as called for in our guidance memoranda.

All stands have square aluminum legs and aluminum upright masts and were tested with 1219 x 1219-mm roll-up signs. All signs were affixed with warning flags on either fiberglass staffs or wood dowels. The tested stands were: MDI 4814 CS Compact Sign Stand. This is a dual vertical spring mounted support for roll-up signs. The legs telescope to a maximum spread of 1800-mm (71 inches) in the direction of traffic, and the upright mast is 1260-mm (49.5 inches) high. It was tested with a sign mounted 368-mm (14 inches) from the pavement to the bottom of the sign.

MDI 4884 CS Compact Sign Stand

This is a single vertical spring mounted support for roll-up signs. The rigid legs have a maximum spread of 2800-mm (110 inches), and the upright mast extends to a maximum height of 3030-mm (119 inches) to the top of the sign. It was tested with a sign mounted with its lowest point 2134-mm (84 inches) above the pavement.

MDI 4860 KA

This is a dual vertical spring mounted support for roll-up signs. The rigid legs have a maximum spread of 3124-mm (123 inches), and the upright mast extends to a maximum height of 3350-mm (132 inches) to the top of the sign. It was tested with a sign mounted with its lowest point 1524-mm (60 inches) above the pavement.

Test Number	SQI99002-MDI4	SQI99002-MDI5	SQI99002-MDI6
Device Number	MDI 4814 CS	MDI 4884 CS	MDI 4860 KA
Test Article Mass (each)	13.8 kg	22 kg	23.1 kg
Ballast Used (each)	None	None	None
Sign Mounting Height	368 mm	2134 mm	1524 mm
Lights	None	None	None
Flagstaffs	2 Fiberglass	3 Fiberglass	3 Wood
Vehicle Test Inertial Mass	814 kg	814 kg	814 kg
Vehicle Impact Speed, Head-on	103 km/hr	101 km/hr	101 km/hr
Windshield Damage	Extensive localized cracking	Extensive localized cracking	Minor damage
Other Damage	Dents to bumper and hood	Dents to bumper, hood, and roofline	Dents to bumper, hood, and roofline. Fuel leak.
Vehicle Velocity Change	Judged Negligible	Judged Negligible	Judged Negligible

During the tests the most extensive windshield damage was significant cracking confined to the immediate vicinity of the impact. There were no holes through the glass, though both inner and outer layers of the windshield were cracked. There was no occupant compartment intrusion observed, and only minor deformation of the roofline occurred. No test article debris showed

potential for penetrating the occupant compartment. After the final test run, the fuel tank was found to be leaking. This may be the result of impacting six sign stands, as the same vehicle was used for all three tests with only the windshield being replaced between tests.

The results of this testing met the FHWA requirements and, therefore, the devices above and illustrated in the enclosures are acceptable for use on the NHS under the range of conditions tested, when proposed by a State.

You also requested acceptance of certain portable stands by virtue of their similarity to the stands that were tested:

Model 4860 was tested at 0 and at 90 degrees. This metal mast support carried a roll-up sign mounted at 1524 mm. You requested acceptance for model 4850 with sign mounted as shown in the enclosed drawing, and model 4860 with sign mounted at 2.1-m (7 feet). Stand 4850 is comparable in design to the tested 4860, and holds the sign at the same height.

Although there are some differences in the layout of the legs and the manner in which the sign attaches to the stand, we concur that performance would be similar. Stand 4860 was tested at 1524-m and we concur that the same stand would perform acceptably at 2.1- m because of the greater likelihood that the test article would go over the vehicle without further damage. Stand models 4818 and 1812 have similar bases and mast structure but do not hold the sign as high as the tested Model 4860.

However, your stand Model 50SM which holds signs at similar mounting heights has been tested successfully.

Model 4814CS was tested at 0 and 90 degrees. This stand has an aluminum mast up to a point in the middle of the roll-up sign bracing.

It carries a sign mounted at 370-mm. You requested acceptance for model 4815 which only differs in the length of the legs and in the specific method of attaching the sign to the stand. We concur that the performance of the Model 4815 stand would be comparable to the 4814 CS.

You also requested that we specifically mention sign stand Model 4814K. This stand is identical to the 4814DLK stand previously accepted in a letter dated July 16, 1998, except it does not have the "drop-n-lock" feature. Because of the low mounting height this difference should not be significant, therefore, we concur in this request.

Finally, you asked that we amend our acceptance letter WZ-20 , dated October 28, 1999, based on the results of the latest testing.

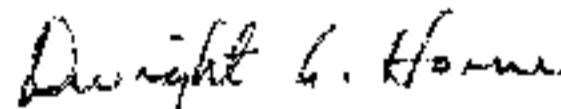
In the earlier letter we had limited your sign stands to a vertical fiberglass upright of a thickness no greater than 6.35mm (1/4 inch). The Safety Quest testing showed that a 9.52-mm thick upright was acceptable. The Safety Quest testing also showed that your flag assemblies with fiberglass supports were acceptable when tested with roll-up signs. Therefore, we consider your crash tested sign stands as acceptable with vertical fiberglass uprights with a maximum thickness of 9.52-mm and when using flag assemblies mounted on top.

In summary, the stands we find acceptable are the tested 4814 CS, 4884CS, 4860 KA and the similar stands 4850, 4860 with 2.1 m mounting height, 4812, 4818, 4815, and 4814 K, as shown in the enclosed drawings.

Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover structural features, nor conformity with the Manual on Uniform Traffic Control Devices. Presumably, you will supply potential users with sufficient information on design and installation requirements to ensure proper performance. We anticipate that the States will require certification from MDI that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance. To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-28, shall not be reproduced except in full.

If components of your portable sign stands are patented products they may be 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



Dwight A. Horne
Director, Office of Highway Safety Infrastructure

2 Enclosures