

Mr. Dave Gertz
 TraFFix Devices, Incorporated
 220 Calle Pintoresco
 San Clemente, California 92672

Dear Mr. Gertz:

Thank you for your letter of February 28, 2002, requesting Federal Highway Administration (FHWA) acceptance of modifications to your company's portable sign stands and barricades as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). All of the basic devices had been found acceptable in our letter to you WZ-108 dated February 8, 2002. You requested that we find these modified devices 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." We responded via facsimile on March 21, 2002, and expressed concern over the excessive mass of the heavier gage aluminum and plywood substrates you proposed using with the Big Buster stand. Subsequently, you had a crash test conducted using 5/8 inch plywood on the Big Buster and submitted the results on October 15, 2002.

Introduction

A brief description of the crash-tested devices you requested modifications for are presented below:

A. Big Buster Sign Stand with 48 x 48 inch aluminum sign. The vertical mast of this stand is telescoping square aluminum tubes. The aluminum sign is mounted 66 inches above the ground.

AS TESTED:

Component	Material	Height to top	Width	Thickness	Weight
Legs	Aluminum	n/a	1.25 in	0.100 in	3 pounds ea.
Outer Mast	Aluminum	n/a	1.50 in	0.100 in	3 pounds
Inner Mast	Aluminum	n/a	1.25 in	0.100 in	3 pounds
Sign	Aluminum	133 inches	48 x 48 in	0.080	16 pounds
Light	none	n/a	n/a	n/a	n/a

REQUESTED MODIFICATION:

Component	Material	Height to top	Width	Thickness	Weight
Sign	Aluminum	133 inches	48 x 48 in	0.100 in	20 pounds
Sign	Plywood	133 inches	48 x 48 in	2 in	24 pounds
Sign	Plywood	133 inches	48 x 48 in	5/8 in	30 pounds
Signs	Aluminum	133 in min.	60 x 48 vert	0.080	20 pounds
Signs	Plywood	133 in min.	60 x 48 vert	5/8 inch	37 pounds

In the testing detailed in WZ-108 the device caused moderate damage to the windshield. For that reason we requested a test with a heavier sign. You had that test run with the following results:

Test Number	1
Test Article	Big Buster Stand with 48x48 Plywood Sign
Height to Bottom of Sign	66 inches
Height to Top of Sign	3380 mm (133 inches)
Flags or lights	Type A / Type C warning light
Test Article Mass (each)	
Vehicle Inertial Mass	874.4 kg (1928 pounds)
Impact Speed, Head-on	100.16 km/hr (62.25 mph)
Impact Speed, 90 Deg.	99.36 km/hr (61.75 mph)
Velocity Change, Head-on	0.2 m/sec
Velocity Change, 90 deg.	Unknown
Vehicle crush	None
Occupant Compart. Intrusion	None
Windshield Damage	Minor cracking near roof line

In this test the signs separated from the mast and rotated over the test vehicle with no contact. Minor windshield damage resulted from the impact of the mast near the roofline. These results are acceptable.

B. Rubber Base Sign Stand with Pinned Inner Mast, 48 x 48 inch aluminum sign and

B-Light. The vertical mast of this stand was 1.75 x 1.75 inch square 16 gage steel tubing, 72 inches long. The 0.080 inch aluminum signs weighed 16 pounds and was supported 12 inches above the ground. The Type B warning light weighed 4.5 pounds and was attached to the top of the mast using an Emco plastic flag bracket.

AS TESTED:

Component	Material	Height to top	Width	Thickness	Weight
Base	Rubber	n/a	17 x 27 in	2 in	40 pounds
Mast	Steel	72 in	1.75 x 1.75 in	16 gage	9 pounds
Sign	Aluminum	80 in	48 x 48	0.080 in	16 pounds
Light	Type B	n/a	n/a	n/a	n/a

REQUESTED MODIFICATION:

Component	Material	Height to top	Width	Thickness	Weight
Sign	Aluminum Laminate	80 in max.	48 x 48 in	2 mm	10 pounds
Sign	Corrugated Plastic	80 in max.	48 x 48 in	10 mm	8 pounds
Sign	Roll Up	80 in max	48 x 48	1/4 in thick horiz. rib	4 pounds

The stand performed in an acceptable manner and was found acceptable in WZ-108. The modifications substitute lighter substrates for the heavier sign that was tested. The lightweight rigid substrates (aluminum laminate and corrugated plastic) are expected to perform similar to or better than the tested aluminum sign. Although a roll-up sign may impact a windshield with a different pattern of force (i.e., the impact force will be concentrated at the fiberglass ribs rather than being spread over a wider area as in the lightweight rigid panels) there was no windshield contact exhibited in the original test. Therefore, the potential for damage using the roll up sign would appear minimal.

C. Sign Stand. Rubber Pole Base with 30 pound ballast, 36 x 36 inch aluminum sign, and light. The vertical mast of this stand was 2 x 2 inch square 16 gage steel tubing, 66 inches long. The aluminum signs were supported 18 inches above the ground.

AS TESTED:

Component	Material	Height to top	Width	Thickness	Weight
Base	Rubber	n/a	16 x 18 in	2 inches	30 pounds
Mast	Steel	66 in long	2 inches	16 gage	9 pounds
Sign	0.080 Al	69 inches	36 x 36 in	0.080 in	9 pounds
Light	Empco Light	78 inches	n/a	n/a	4.5 pounds

REQUESTED MODIFICATION:

Component	Material	Height to top	Width	Thickness	Weight
Sign	Aluminum Laminate	80 in max.	48 x 48 in	2 mm	10 pounds
Sign	Corrugated Plastic	80 in max.	48 x 48 in	10 mm	8 pounds
Sign	Roll Up	80 in max	48 x 48	1/4 in thick horiz. rib	4 pounds

As in the discussion for request “B” above we expect that the lighter substrates will perform in an acceptable manner. As the stand was considered “marginally acceptable” with the solid aluminum sign, performance may improve with the lighter signs.

D. Type 3 Plastic Barricade with Plastic Posts and Pinned Rubber Bases, carrying a 48 x 48 inch diamond sign.

You requested that a single post sign stand using the same base, post, and sign substrate as was tested in the Type III Barricade configuration be found acceptable. We cannot agree to this as the sign stand configuration is very different from the tested barricade. Although it supports a sign in a similar manner to the stands discussed in Sections B and C above, the plastic uprights will not likely perform in the same manner as the acceptable perforated square steel tube. Low mounted sign stands have been some of the most problematic work zone traffic control devices and need to be crash tested.

SUMMARY:

The changes to the tested devices described above in **Sections A, B, and C** are acceptable as noted for use on the NHS under the range of conditions tested, when proposed by a State. The basic devices were illustrated in our previous letter, WZ-108.

Please note the following standard provisions that 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 - 113 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.
- Your company's devices 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, copies of which have been provided with prior correspondence.

Sincerely yours,

Harry Taylor,
Acting Director, Office of Safety Design

FHWA:HSA-10:NArtimovich:tb:x61331:1/21/03
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