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

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

March 11, 2005

In Reply Refer To: HSA-10/WZ-183

Mr. LeRoy Goff
United Rentals Highway Technologies
880 North Addison Road
P.O. Box 7050
Villa Park, Illinois 60181-7050

Dear Mr. Goff:

This is in response to Mr. Henry Ross's letter of March 19, 2004, requesting Federal Highway Administration (FHWA) acceptance of your company's Featherweight Stand for rigid signs as a crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter were reports of crash testing conducted by E-Tech Testing Services and video of the tests. You requested that we find these 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." Please accept our apologies for not promptly following up on this action after Mr. Ross's departure from your company last year.

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 Featherweight Sign Stand is a compact telescoping type portable sign system with a rigid upright support. It has four telescoping square tube support legs with spring loaded detents that form a nominal 1778 x 1143 mm X-shaped pattern when extended. The outer support leg is

made of 31.8 mm square 14ga ASTM A500GD B welded steel tubing. The inner support leg is made of 25.4 mm square 2.2 mm wall aluminum tubing. The tips of the inner support legs are rubber capped. The support legs pivot on a central two-piece steel "leg support" bracket which is equipped with a spring loaded detent mechanism that allows the legs to be unlocked and folded up compactly. The bracket holds the upright support with spring-loaded detents. The upright consists of three telescoping sections of 2.4 mm wall aluminum tubing: 38.1 mm, 31.8 mm, and 25.4 mm square.

The stand supports a 12.7 mm thick, 1219 mm diamond shaped plywood sign at a nominal 1524 mm height as measured from the bottom edge of the sign to the ground level. The stand with sign weights 29.9 kg. One 16 kg sand bag was placed at the end of each of the four legs.

Testing

Full-scale automobile testing was conducted on your company' devices. Two stand-alone examples of the device were tested in separate test runs, one perpendicular and the second head-on. Both devices were placed on flat, clean dry asphalt surfaces. The tests are summarized in the table below.

	Featherweight stand with plywood sign	
Test Number	05-3483-008	05-3843-009
Sign Stand Tested	Perpendicular Featherweight	Head-On Featherweight
Weight of Tested Stand	29.9 kg (66 pounds)	
Mounting heights	1524 mm (60 inches)	
Flags? Lights?	None	
Mass of Test Vehicle	825 kg	
Impact Speed	101 km/hr (62.8 mph)	101.8 km/hr (63.3 mph)
Velocity Change	0.5 m/s	1.61 m/s
Extent of contact	Bumper, Grille, Hood	Grille, Hood, Roof
Windshield Damage	No contact	No contact

Findings

Damage was limited to scrapes and dents to the bumper, grille, hood, and roof. There was no contact between the signs and the windshield. The velocity changes are well below the 5 m/s permitted by the NCHRP Report 350. The results of the testing met the FHWA requirements and, therefore, the devices described in the various requests above and detailed in the enclosed drawings are acceptable for use on the NHS under the range of conditions tested, when proposed by a State.

Mr. Ross also requested that this acceptance extend to solid aluminum signs as well as the tested plywood, and for other sign shapes and sizes as long as the overall area does not exceed that of the tested signs. The tested 48 x 48 x 1/2 plywood sign weighed 24.4 pounds while 48 x 48 x 0.080 aluminum signs weigh 19 pounds. Because the tested signs detached from the uprights almost immediately after impact, and passed over the vehicle without contacting the windshield or roof, we concur that solid aluminum signs may also be used on this stand, under the range of conditions tested. Your request for additional sign shapes and smaller sizes is also acceptable as it is in line with our stated policy. However, the bottom of the signs should be no lower than the bottom of the tested sign (5 feet.)

The results of the testing met the FHWA requirements and, therefore, the devices described in the various requests above and detailed in the enclosed drawings 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 the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-183 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.
- The Featherweight Sign stand is a patented device and is 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/
~for~
John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

Enclosure

FHWA:HSA-10:NArtimovich:tb:x61331:3/10/05
File: h://directory folder/artimovich/WZ183UnitedRentals
cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
N.Artimovich, HSA-10)

C. Illustrations

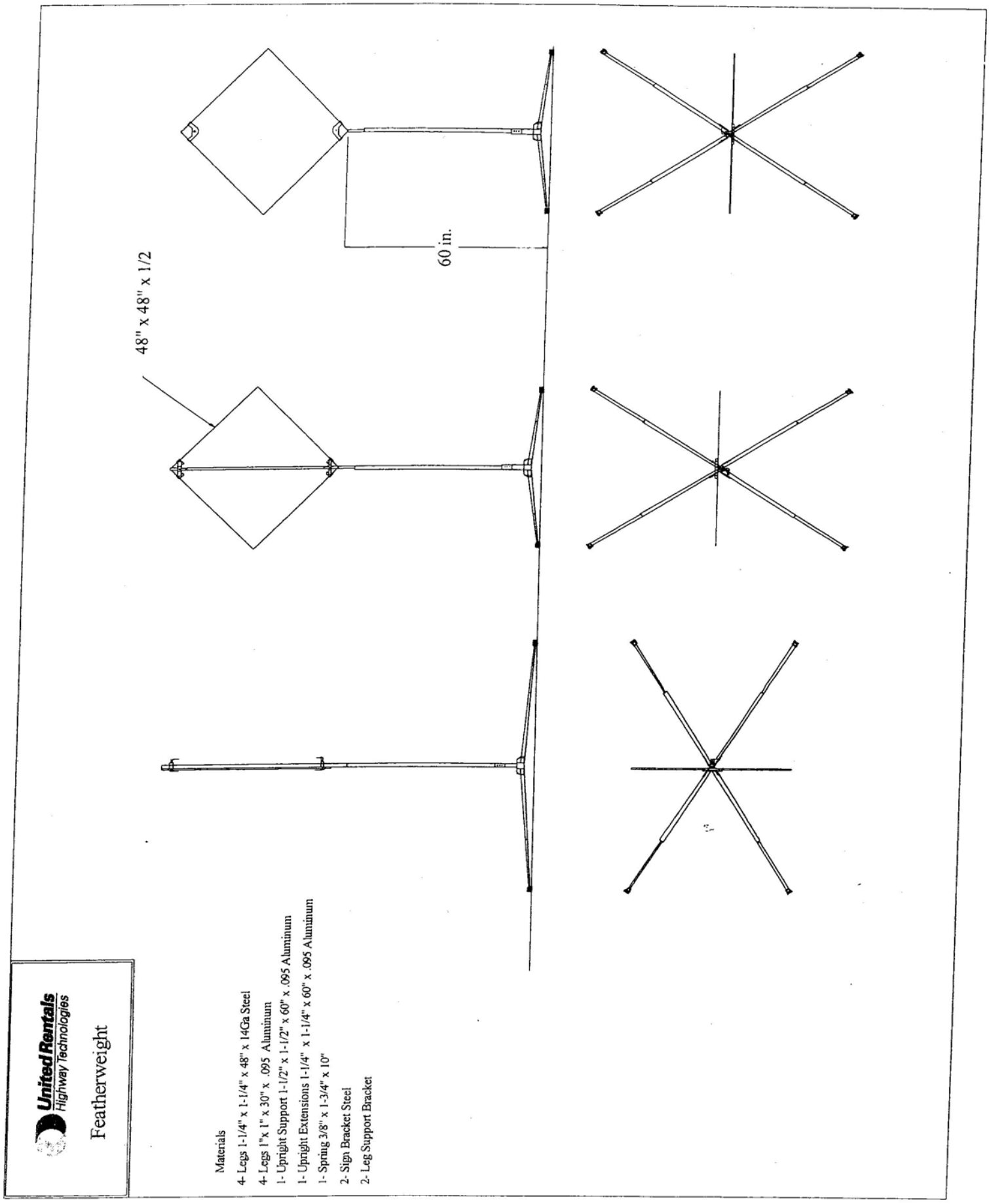

Illustration 1. Featherweight Sign Stand (1 of 1)