

Refer to: HSA-10/WZ-130

Mr. David Stoudt
Sign Up Corporation
P.O. Box 14624
Portland, Oregon 97293

Dear Mr. Stoudt:

Thank you for your letter of June 14, 2002, requesting Federal Highway Administration (FHWA) acceptance of your company's X-CELL 48 HDL tall portable sign stands as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter was a report of crash testing conducted by E-Tech Testing Services and a 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." You provided additional information at our request via a facsimile message on December 12, 2002.

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 follows:

The X-CELL 48 HDL Sign Stand is a portable sign system featuring a spring loaded upright support and a 1219 mm x 2 mm thick diamond shaped aluminum sign. The sign stand has four legs made of 25.4 mm square 2 mm wall tubing. The tips of the legs are rubber capped and form

a 2235 mm by 1321 mm base pattern. The material specification is ASTM A500/A513 Grade A for all ERW (electronic resistance welded) steel square tubing used in the sign support. Each leg is attached to an “X-CELL” assembly which spring loads the sign support upright.

The X-CELL assembly in turn supports a sign mounting stem “socket” made from 31.8 mm square 2.4 mm wall tube. A 25.4 mm square 2 mm wall steel tubing “center mast” is locked into the stem by a spring detent pin. A 19.1 mm square 1.6 mm wall steel tubing “upper mast” is locked into the stem by a spring detent pin. The sign is mounted to the mast with two sliding “rigid sign clamps.” Each clamp has two 9.5 mm carriage bolts with wing nuts used to clamp down on the sign corner. The clamps are secured in position on the mast with a thumbscrew. The lower rigid sign clamp supports the bottom of the sign 1626 mm above ground level. A flag holder, made of two 20 gage steel plates formed and spot welded together, completes the top of the mast. Three 457 mm square vinyl fabric flags with wooden dowels were attached to the top of the support.

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 complete device as tested is shown in Enclosure 1. The crash test is summarized in the table below:

Test Number	18-7222-001
Test Article	X-CELL 48 HDL Sign Stand with 2 mm Aluminum Sign
Height to Bottom of Sign	1626 mm
Height to Top of Sign	3350 mm
Flags or lights	Three flags on wood dowels
Test Article Mass (each)	28.1 kg, ballasted with four 16 kg sand bags
Vehicle Inertial Mass	820 kg
Impact Speed, Head-on	101.1 km/hr
Impact Speed, 90 Deg.	97.5 km/hr
Velocity Change, Head-on	1.00 m/s
Velocity Change, 90 deg.	1.00 m/s
Vehicle crush	None, slight cosmetic damage only
Occupant Compart. Intrusion	None
Windshield Damage	No contact by sign nor stand

Findings

Damage was nonexistent in this impact as the mast separated from the base and the sign rotated over the vehicle in both impacts. Velocity changes were well below the maximum and within the “desirable” range. The results of the testing met the FHWA requirements and, therefore, the portable sign stand described above and shown in the enclosed drawings for reference 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 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-130 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 X-CELL 48 HDL Sign Stand 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,

Harry W. Taylor
Acting Director, Office of Safety Design

Enclosure

Sec. 635.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.

ENCLOSURE 2



C. Illustrations

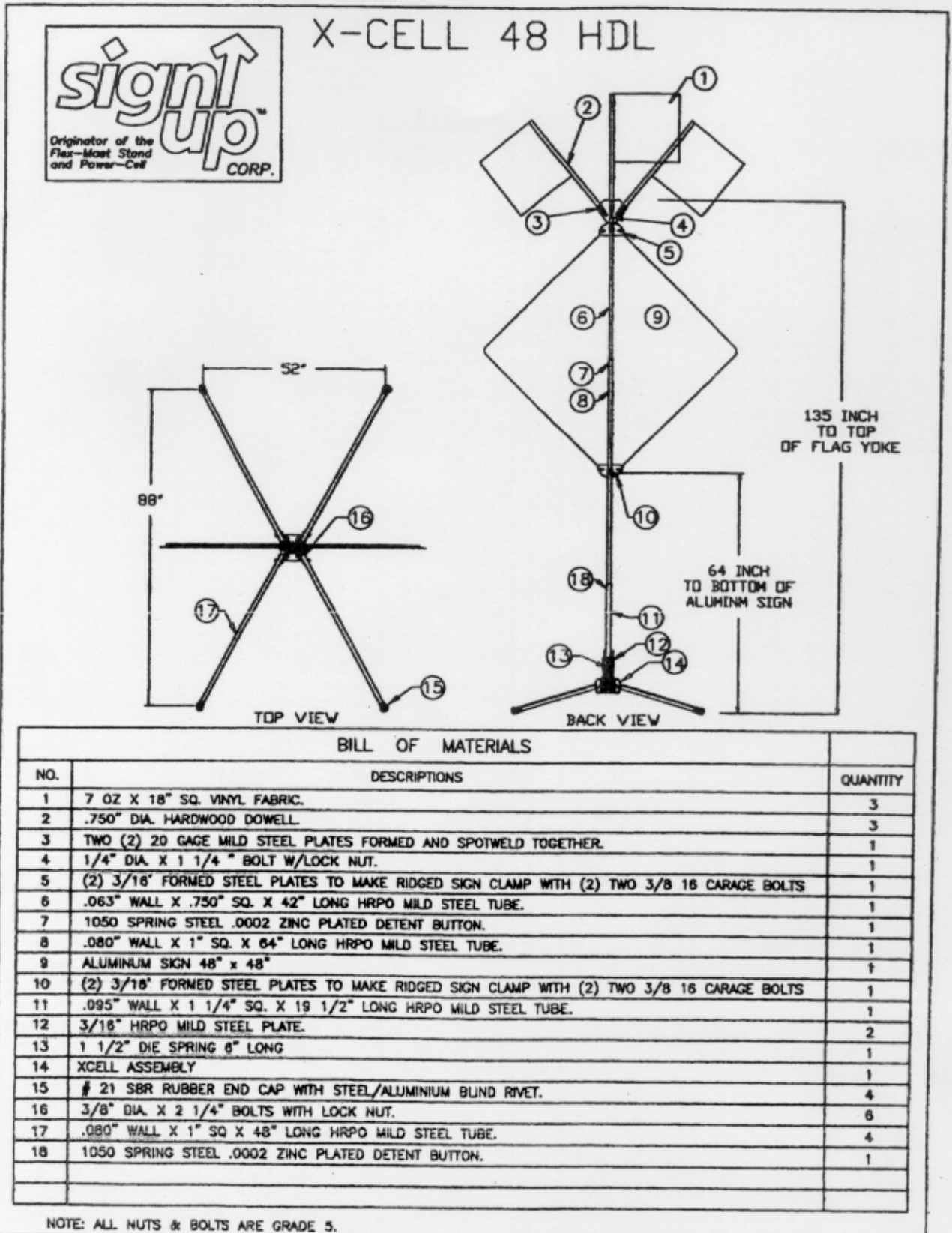


Illustration 1. X-CELL 48 HDL Sign Stand (1 of 1)