

Refer to: HSA-10/WZ-146

Mr. Henry Ross
United Rentals Highway Technologies
880 North Addison Road
P.O. Box 7050
Villa Park, Illinois 60181

Dear Mr. Ross:

This is in response to your letter of January 29, 2002, requesting Federal Highway Administration (FHWA) acceptance of your company's Low H-Stand Sign Stand with 48" sign, as 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."

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.

The **Low H-Stand Sign Stand with 48” sign** features an “H” frame upright which supports a 1219 mm diamond shaped aluminum sign that is 2.03 mm thick. The sign is supported such that its bottom tip is a nominal 305 mm above ground level. The support consists of two 44.5 mm square 12 gauge Unistrut Telespar perforated steel tubing uprights. The uprights are braced with two 44.5 mm square steel tubing crossbars. Each crossbar is fastened to the uprights with four 9.5 mm diameter SAE J429 Grade 5 hex bolts. Each bolt uses a flat washer, lock washer, and hex nut. Each upright slips into a 50.8 mm square Telespar sleeve that is welded to a base tube. The base tubes are 44.5 mm square 11-gauge tubing. The material specification for the steel tubing is ASTM A500 Grade B. The mass of each stand was 44.5 kg and four 16 kg sand ballast bags were placed on the lower support legs of each test article.

Testing

Full-scale automobile testing was conducted on your company’ stands. Two stand-alone examples of the devices 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 tests are summarized in the table below.

	Low H-Stand Sign Stand with 48” sign	
Test Number	Test 05-1640-001	
Sign Stand Tested	Head On	Perpendicular
Weight of Tested Stand	44.5 kg	44.5 kg
Mounting heights	305 mm	305 mm
Flags? Lights?	None	None
Mass of Test Vehicle	818 kg	
Impact Speed	100.4 km/h	90.9 km/h
Velocity Change	2.64 m/s	2.64 m/s
Extent of contact	Slight damage to bumper and hood	
Windshield Damage	Contact, no damage	No contact*
Other notes	No deformation of the occupant compartment	

* Following the impact with the head-on sign and stand, the test article remained on the vehicle. The film of the impact with the perpendicular stand shows that the test vehicle’s bumper accelerated the test article with little, if any, tendency for the test article to bend towards the windshield. Thus, it appears that the first sign did not compromise the results of the impact with the second sign. We attribute the rigidity of the stand in the perpendicular orientation to the presence of the two crossbars, which led to successful performance.

Findings

Damage was limited to cosmetic damage to the bumper, grille, and hood. The vehicle velocity change was within the “desirable” range for crash-tested work zone traffic control devices. The results of the testing met the FHWA requirements and, therefore, the sign stand described 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 FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, or 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.
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- 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-146 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 United Rental traffic control 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, a copy of which is enclosed.

Sincerely yours,

Michael S. Griffith
Acting Director, Office of Safety Design
Office of Safety

Enclosures

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.



C. Illustrations

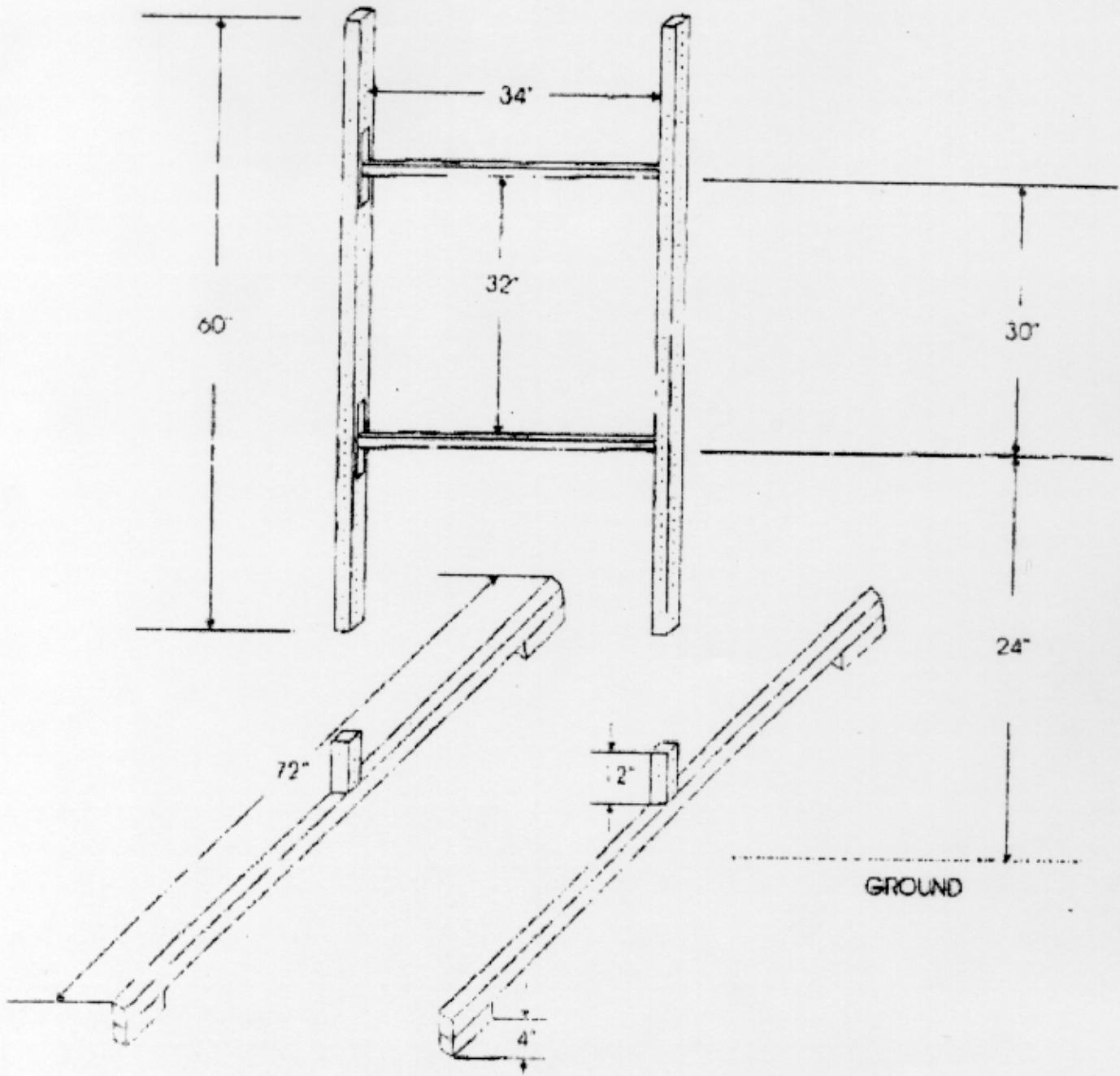


Illustration 1. 48" "H" Stand Sign Stand (1 of 4)

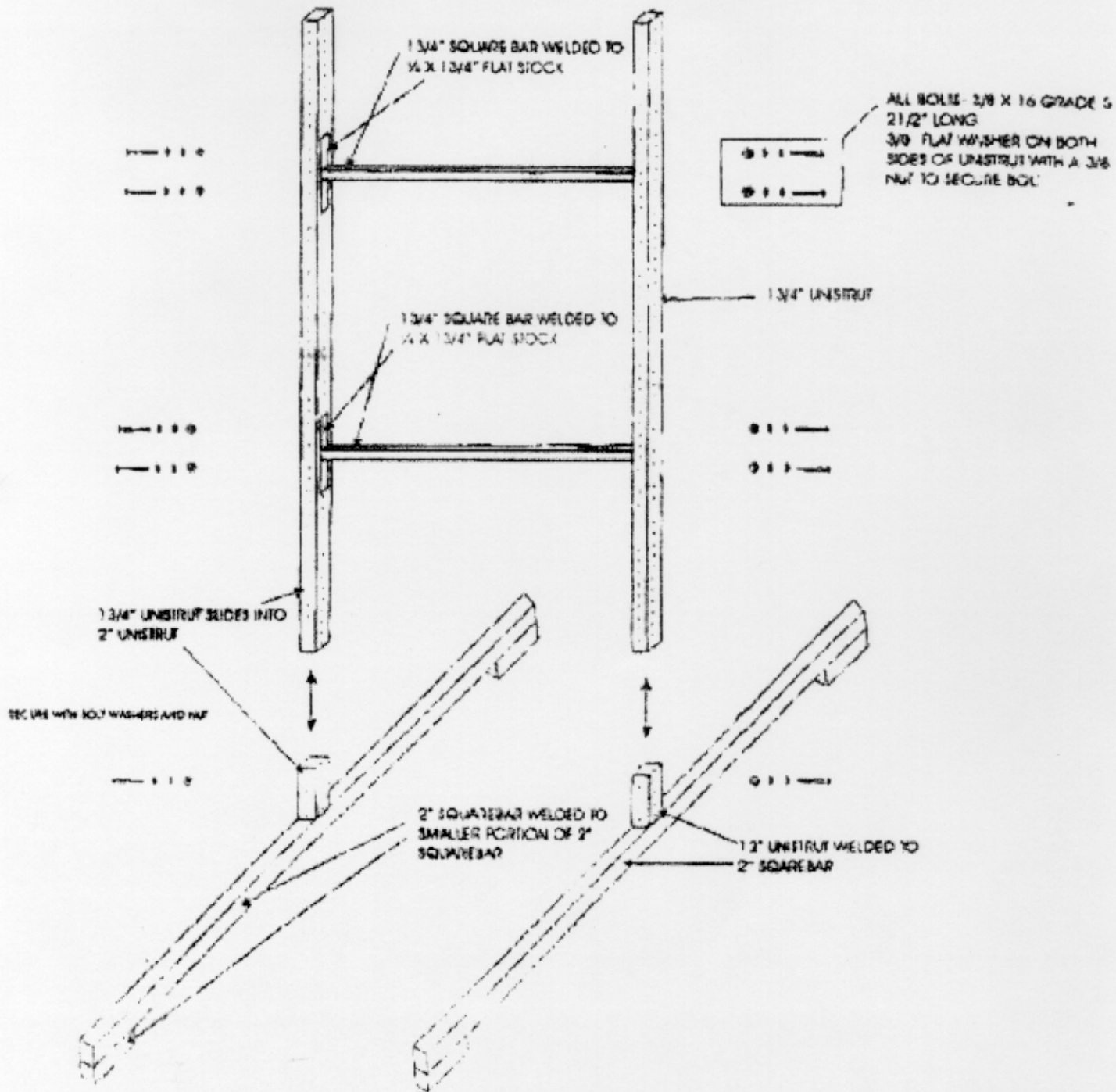


Illustration 1. 48" "H" Stand Sign Stand (2 of 4)

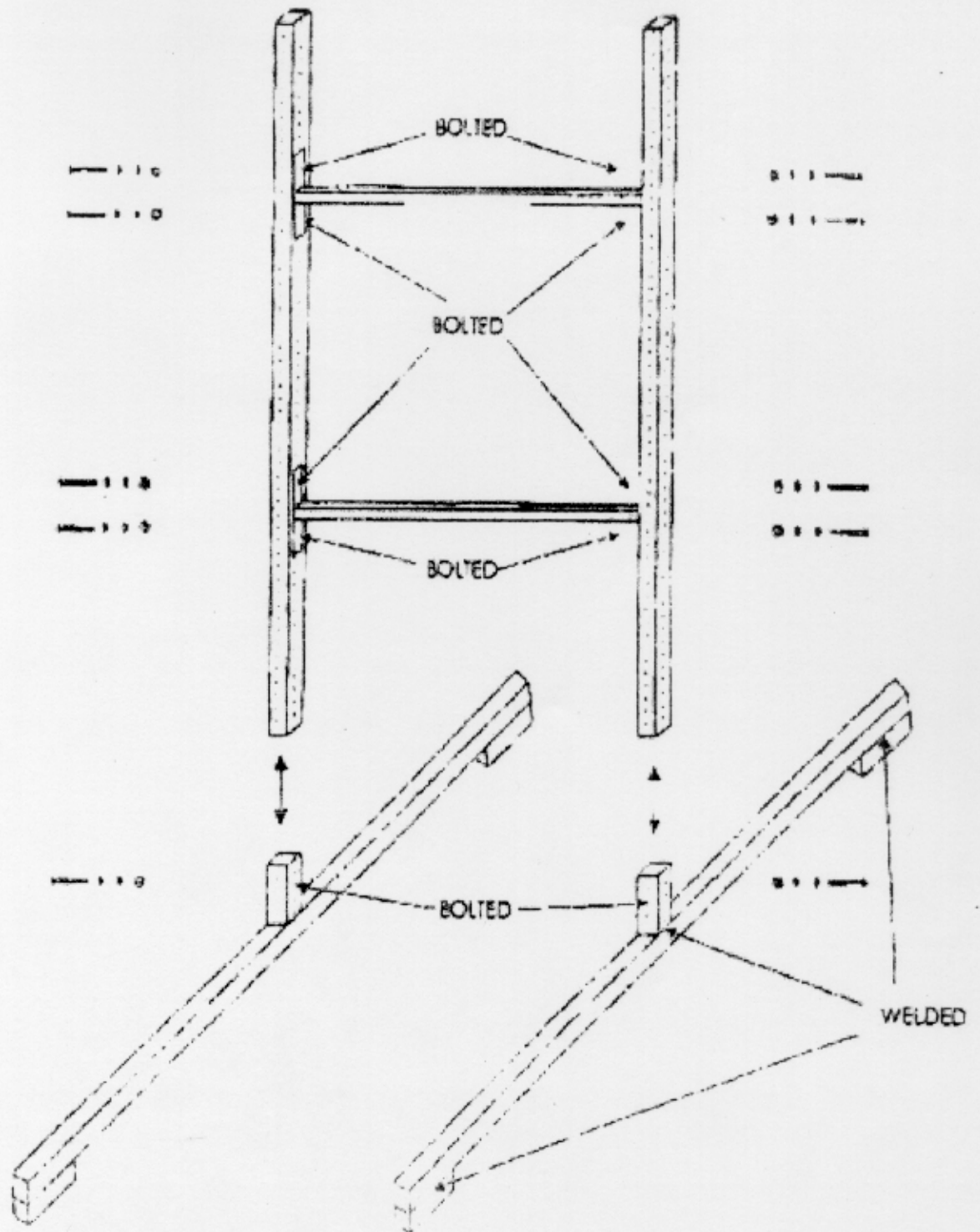


Illustration 1. 48" "H" Stand Sign Stand (3 of 4)

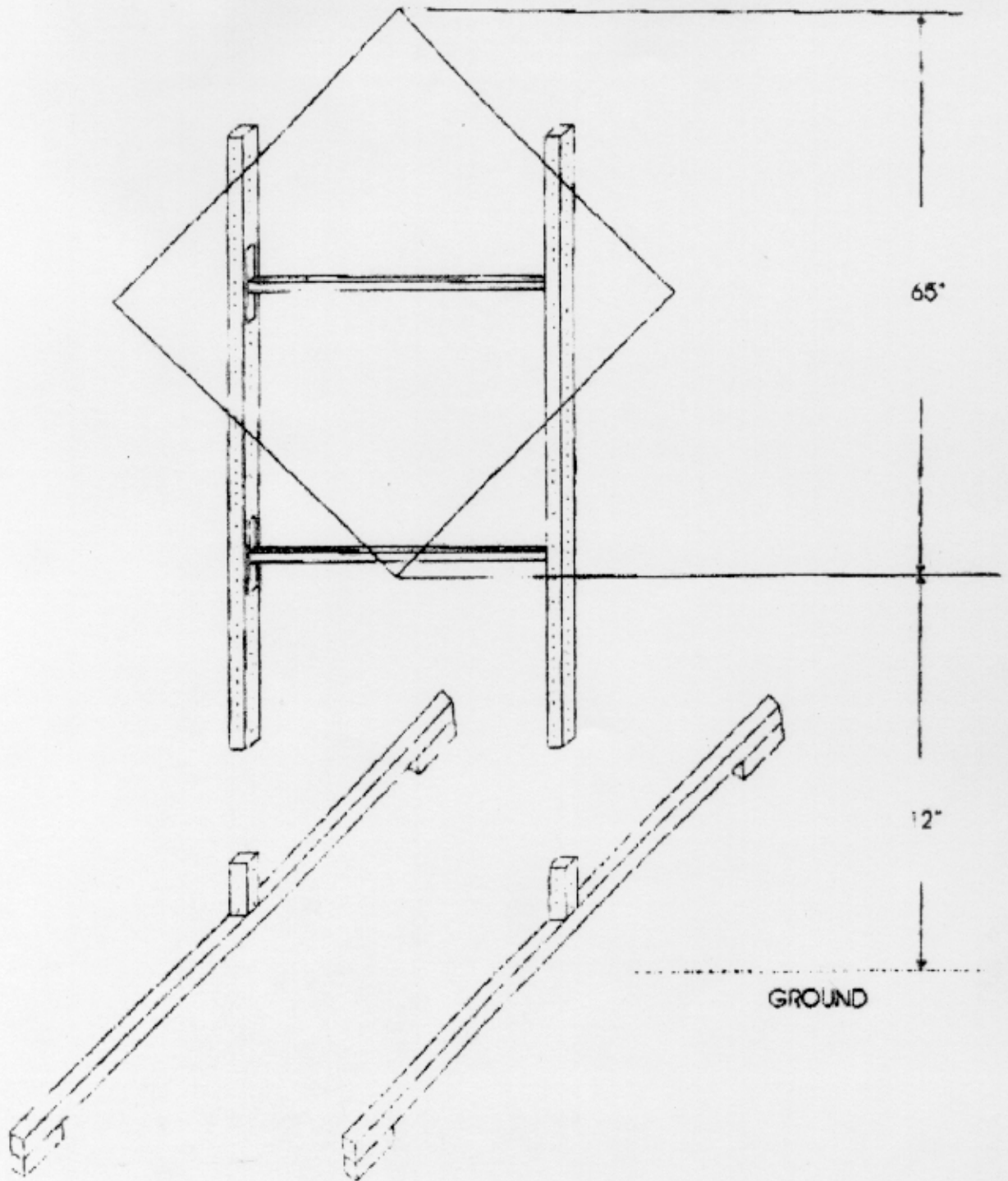


Illustration 1. 48" "H" Stand Sign Stand (4 of 4)