



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

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

May 25, 2005

In Reply Refer To: HSA-10/WZ-208

Mr. Jeff Anderson
POCO Incorporated
42000 Van Born Road
Canton, Michigan 48188

Dear Mr. Anderson:

Thank you for your letter of March 8, 2005, requesting the Federal Highway Administration (FHWA) acceptance of your company's H-footprint portable sign stand as a crashworthy traffic control device for use in work zones on the National Highway System (NHS). Accompanying your letter were reports of crash testing conducted by Karco Engineering and video of the tests. You requested that we find these devices acceptable for use on the NHS under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features." You provided additional documentation on April 7 and 12, 2005, in response to our requests.

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 support was made of two vertical supports of 1.5-inch square, 14 gage cold rolled steel (CRS) tubing ASTM 513A-500 Grade B, 96 inches long. The lower portion of each vertical support was reinforced with a 48 inch long section of 1 inch ID black pipe, ASTM A-500 Grade B, spot welded in place. The vertical supports were attached to the base by an 8 inch vertical piece of 2 inch square CRS tubing that was continuously welded to a horizontal foot.



The 72-inch long horizontal feet were 2 x 2 inch CRS angle of ASTM A-36 steel having a thickness of 0.25 inches. Each was held in place with a 35-pound sandbag at each end. The 48 x 48 inch sign panel was 5/8-inch thick plywood, fastened to the uprights with four 5/16-inch zinc plated bolts, 3.5 inches long. A 0.63-inch washer was placed under each bolt head and a 0.625 x 1.25 inch spacer was placed between the panel and the vertical supports. A warning light was mounted to a corner of the sign panel using a ½ inch x 13 bolt and a cup washer. The light was further stabilized with a “Z-plate” between the plywood and the light. The total height of the assembly was 128 inches and the total weight was 82 pounds.

Testing

Full-scale automobile testing was conducted on your company’s devices. Two stand-alone examples of the device were tested in tandem, one end-on and the next placed six meters downstream turned at 90 degrees with the sign facing the car head-on, as called for in our guidance memoranda.

The tests are summarized in the table below.

	NCHRP Report 350 Test 3-71	
Test Report Number	TR-P24081-02-NC	
Sign Stand Tested	90 degrees	Head-on
Weight of Tested Stand	82 pounds (5/8 inch plywood panels weigh 36 pounds)	
Mounting heights	60 inches	
Flags? Lights?	One warning light on each sign	
Mass of Test Vehicle	1732 pounds	
Impact Speed	98.2 km/hr	
Velocity Change	2.8 m/sec (limit is 5 m/sec)	
Extent of contact	Edge of sign hit roof line	Flat of sign glanced off roof
Windshield Damage	Cracking, 2.5 inch deformation	No additional contact
Other notes	Roof depressed 3.5 inches	

Findings

Moderate damage to the roof and windshield was caused by the end-on impact as the sign’s leading edge struck the roof line and was deflected over the vehicle. In the end-on impact the stiffened legs retarded them from bending until the sign detached from the uprights and glanced flat off the roof. The 2.5-inch depression in the windshield caused by the end on impact is considered marginally acceptable. The results of the testing met the FHWA requirements and, therefore, the devices 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 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-208 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 POCO portable sign stand is a patent-pending 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/

John R. Baxter, P.E.
 Director, Office of Safety Design
 Office of Safety

Enclosures

FHWA:HSA-10:NArtimovich:tb:x61331:5/19/05

File: h://directory folder/artimovich/WZ208-POCOfin

cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
 N.Artimovich, HSA-10)

Rigid Panel Sign Support System

Legs (horizontal portion) - 2" x 2" x .1875" thick x 72" long cold rolled steel angle.

Legs (vertical portion) - 2" C.R.S. Square tubing (3/16" wall thickness) x 8" tall

Vertical portion of the leg is continuously welded to angle at all available intersections.

Masts slide inside vertical portion of legs. No bolts or fastening device is used.

Vertical mast - 1.5" x 1.5" x 14 gauge wall x 96" Cold Rolled Steel Tubing. 1" inside diameter x 48" long section of schedule 40 pipe inserted into bottom of leg, and maintained in position via a small "spot" of weld at the bottom of the leg.

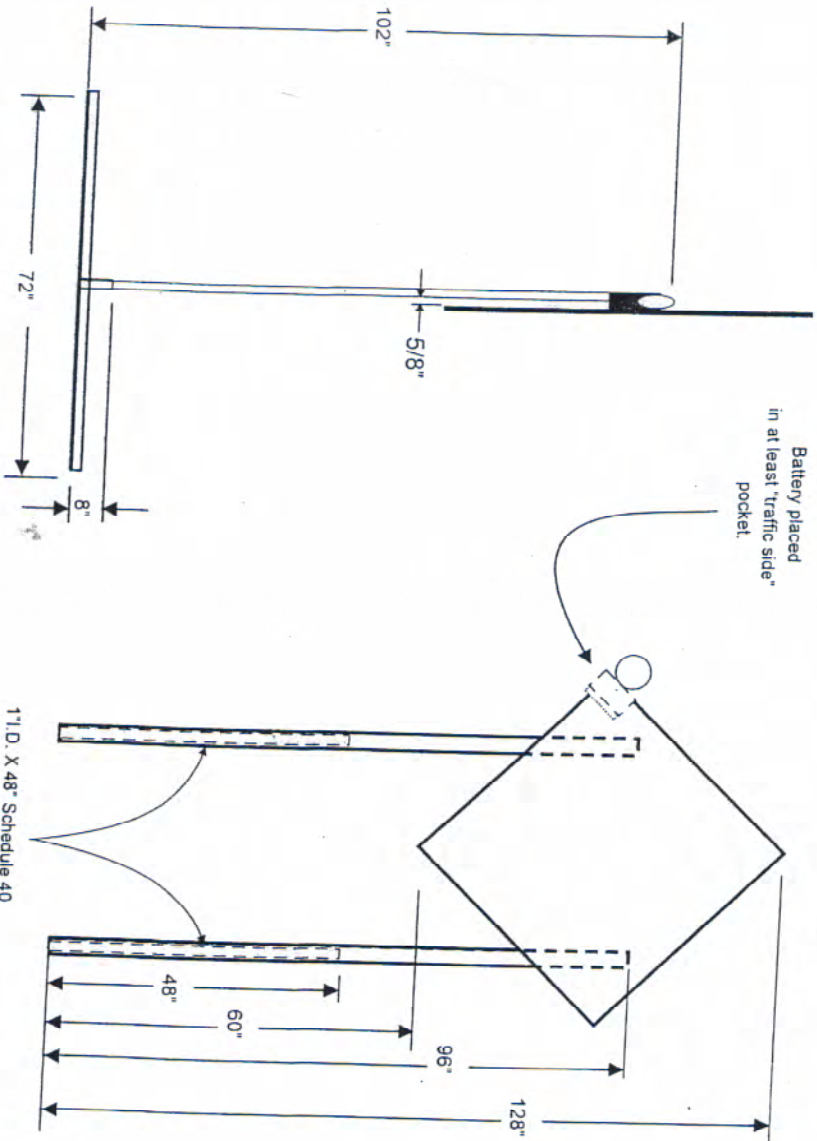
Vertical mast members punched with .3438" hole at 4 (four) locations for mounting bolts (1" and 12" from each end).

Panel - Reflective plywood, .625" thick x 48" x 48"

Panel fastened to vertical mast, supports with 5/16" 18 by 3.5" long zinc plated bolts with .063" thick fender washer under the bolt head, and a .625" thick by 1.25" diameter spacer placed between the back of the sign panel and the front of the vertical mast at each mounting location. Attachment is accomplished with a Nylock nut.

Light - Empco-like model number 400, Type A warning flasher mounted to the corner of the sign panel with "hantenn" type battery placed in both, or at least the "outer" position in the case. Light is mounted to sign panel using 1/2"-13 bolt, through .563" hole, utilizing a "cup washer". Light is further stabilized by utilizing a "Z-plate" between the plywood and the lig ht. (See attachment)

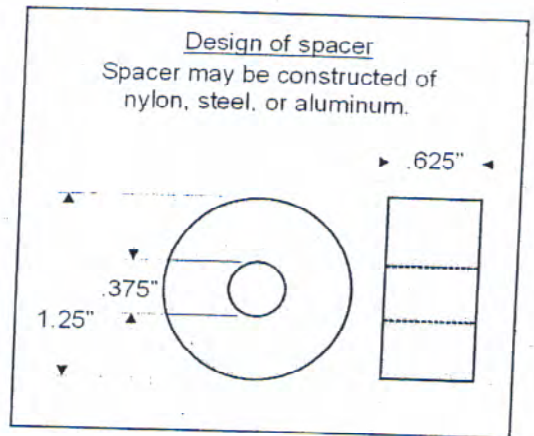
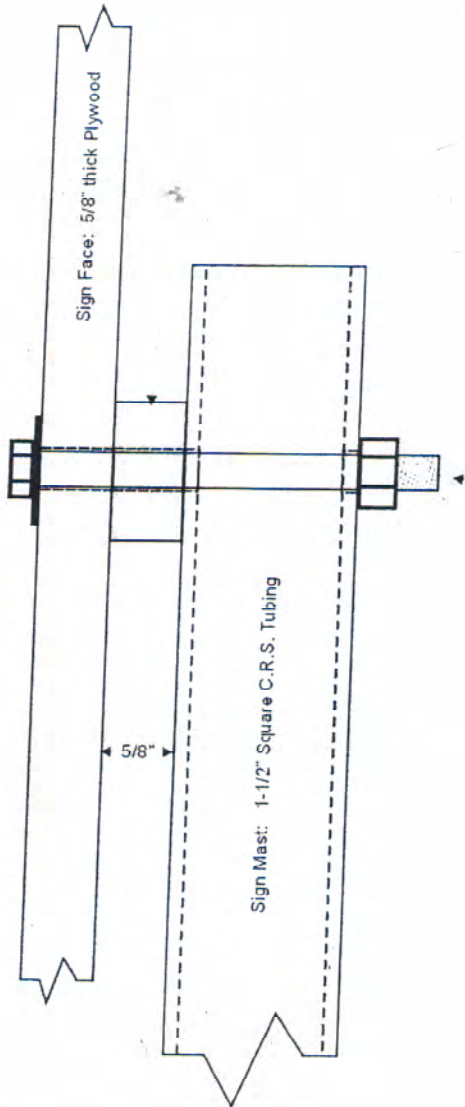
Ballast - 35 pound sandbag placed at each end of each horizontal leg.



Battery placed in at least "traffic side" pocket.

1 1/2" I.D. X 48" Schedule 40 "Black Pipe" inserted into bottom portion of vertical mast and "spot" welded to maintain location.

Company	Poco Incorporated
Project Name	NCHRP 350 Sign Stand - 4' x 4'
Phone	734-397-1677
Sheet Number	1
Prepared By	J. Anderson
Date	February 15, 2005



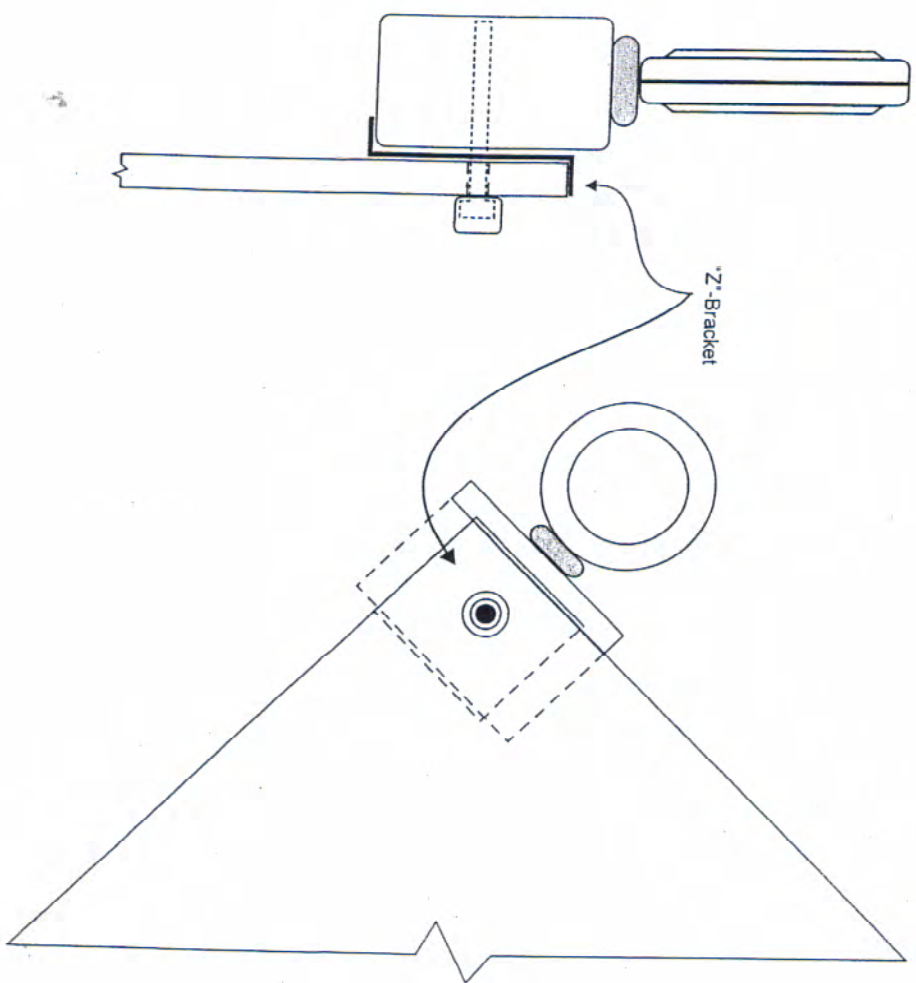
5/16"-18 x 3.5" Bolt with washer and Nylok nut

Company POCO Incorporated

Project Name NCHRP 350 Sign Stand - 4' x 4'

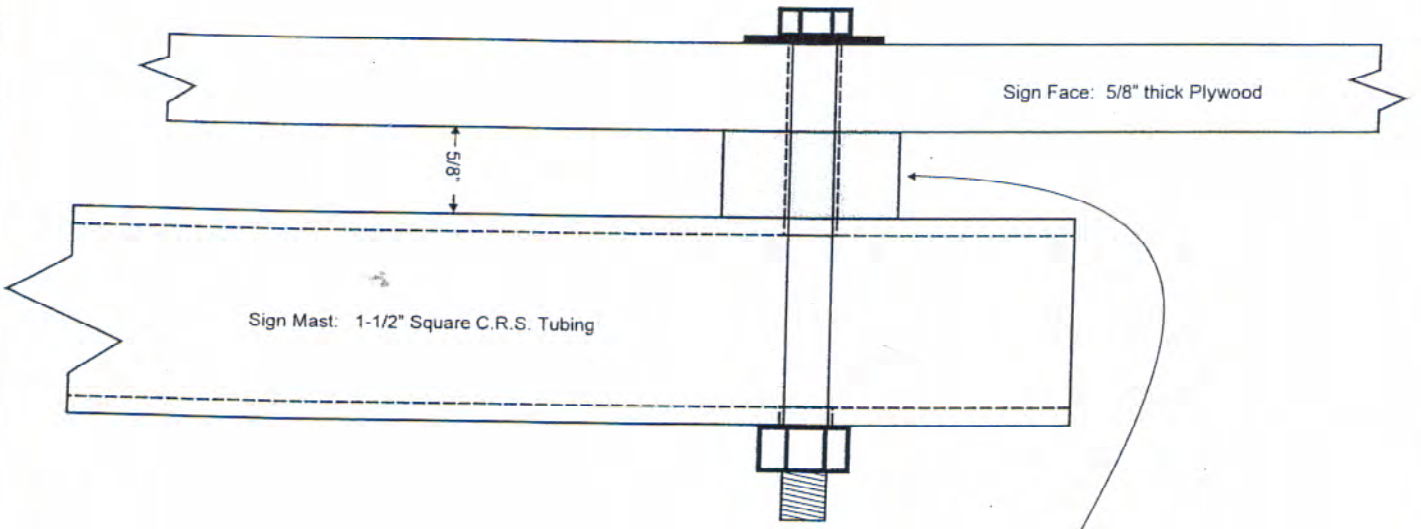
Phone 734-397-1677 Sheet Number 3 February 15, 200

Prepared By J. Anderson

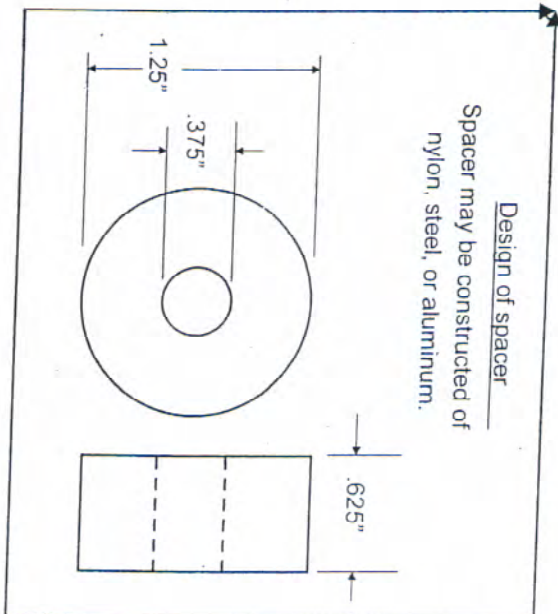


"Z"-Bracket

Company	Poco Incorporated
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5/16"-18 x 3.5" Bolt with washer and Nylok nut



Company	Poco Incorporated		
Project Name	NCHRP 350 Sign Stand - 4' x 4'		
Price	734-397-1677	Sheet Number	3
Prepared By	J. Anderson	Date	February 15, 2005