



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

May 3, 2006

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

In Reply Refer To:  
HSA-10/WZ-236

Mr. Jeff Johnson, President  
Trafficade Service, Inc.  
2533 W. Holly Street  
Phoenix, Arizona 85009

Dear Mr. Johnson:

Thank you for your letter of February 7, 2006, requesting the Federal Highway Administration (FHWA) acceptance of your company's HD-3612 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 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 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. Our new acceptance process was outlined in our memorandum "FHWA Hardware Acceptance Procedures – Category 2 Work Zone Devices" dated November 11, 2005.



A brief description of the devices follows:

The HD-3612 Sign Stand is a portable sign system featuring a 1.5-inch x 1.5-inch x 1/8-inch thick forged steel angle iron upright support. The upright is supported in a 2-inch square tube socket, which is in turn welded to a 20-inch square, 1/4-inch thick steel base plate. The upright, socket and base plate are A-36 steel. The upright is attached to the socket with a 1/2 inch diameter by 3-inch long SAE J429 Grade 8 hex fastener and nut.

The stand features a 36-inch diamond shaped sign made of 0.080-inch thick solid 5052-H2 aluminum sheet. The sign is bolted to the upright with two 3/8-inch diameter by 1-inch long ASTM A307 hex fasteners with 1 1/4-inch OD fender washers and nylon insert lock nuts. When deployed the bottom of the sign is a nominal 12 inches above ground level.

The top of the upright is fitted with a flag bracket attached with a 3/8-inch diameter by 1-inch long ASTM A307 hex fastener and nylon insert lock nut. The bracket held two flags that were slipped into the 1-inch schedule 40 pipe sockets. The flags were 16-inch square vinyl fabric attached to 11/16-inch diameter by 24-inch long wood dowels. The top most portion of the upright has a hole for attaching a warning light. A 3.0-pound C&C Signals Type A LED warning light was included in the testing. The test article mass was 56 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 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.

NCHRP Report 350 Test 3-71		
Test Number	58-3612-001	
Sign Stand Tested	Head On	Perpendicular
Mounting heights	12 inches to the bottom, 73 inches to top of light	
Flags? Lights?	2 flags, 1 light	
Mass of Test Vehicle	1841 pounds (837 kg)	
Impact Speed	64.6 mph (103.9 kmh)	60.3 mph (97.0 kmh)
Velocity Change	1.9 m/s	1.9 m/s
Extent of contact	Sign struck hood, flag hit windshield	Sign struck hood
Windshield Damage	Area of moderate cracking	None from this impact
Other notes	Light remained attached	Light remained attached

### Findings

Damage was limited to significant deformation to the hood, minor damage to the bumper and grille, and one area of concentrated cracking along with significant overall damage to the windshield, but no penetration.

The results of the testing met the FHWA requirements and, therefore, the devices described in the 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.

You also requested acceptance for use of this stand with smaller or lighter substrate signs. The E-TECH test report supports this request. Therefore, the Trafficade HD-3612 Sign Stand is also acceptable when used with substrates that are smaller or lighter than the 36-inch diamond, 0.080 5052-H32 Aluminum substrate used in the test articles.

The incoming FHWA Form is also enclosed for reference.

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-236 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 Trafficade HD-3612 portable 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: (a) they 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.

- 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 George Ed Rice, Jr./*  
*~for~*

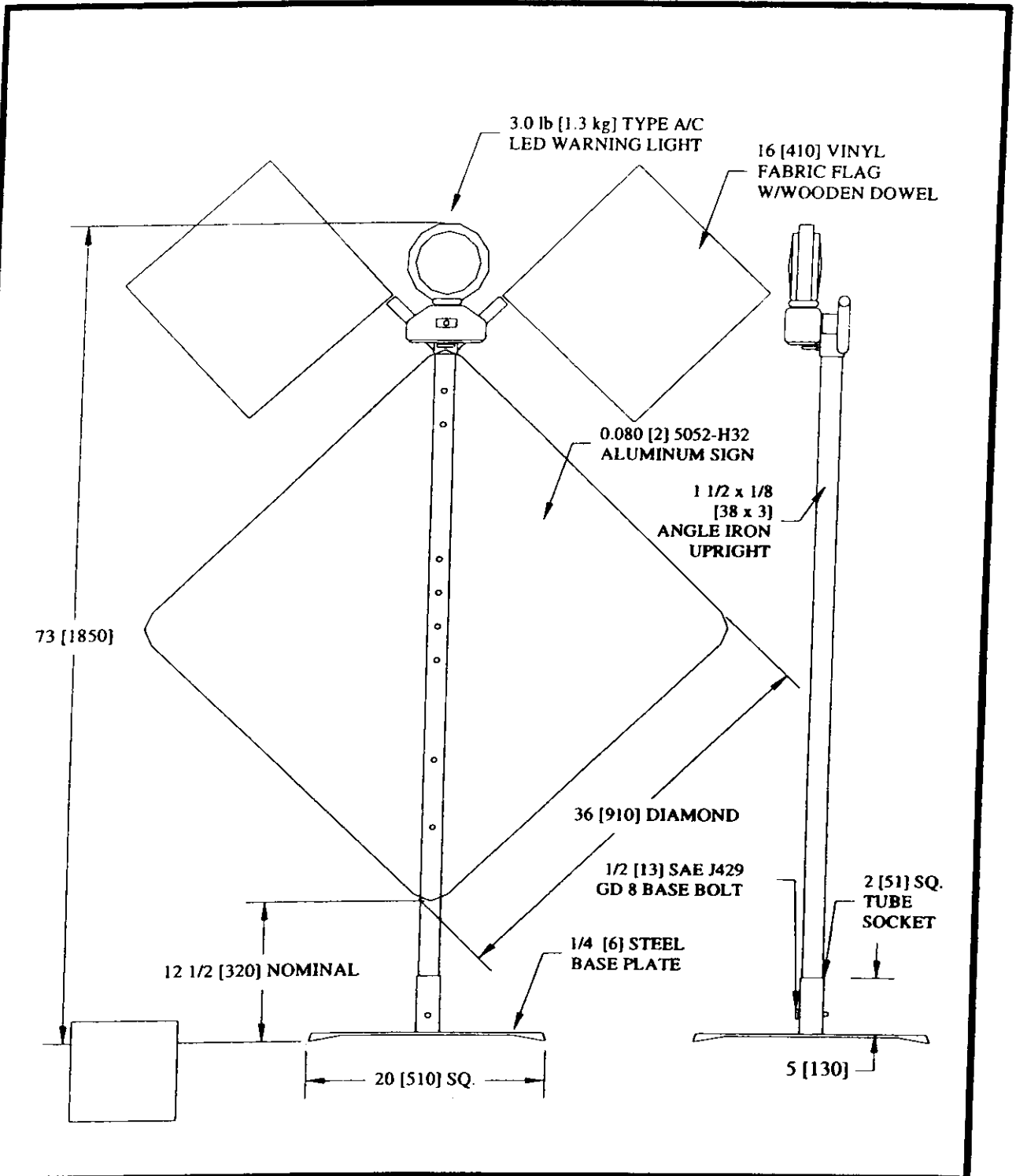
John R. Baxter, P.E.  
Director, Office of Safety Design  
Office of Safety

Enclosures

FHWA:HSA-10:NArtimovich:tb:x61331:4/27/06

File: h://directory folder/artimovich/WZ236-TrafficadeFIN1.doc

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



### TRAFFICADE™ HD-3612 SIGN STAND



## SWMxx

SHEET NO.

DATE:

1 of 2

12/05

Illustration 1. Trafficade HD-3612 Sign Stand Drawing and Specification (1 of 2)