



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

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

May 17, 2005

In Reply Refer To: HSA-10/WZ-198

Ronald K. Faller, PhD, PE
Midwest Roadside Safety Facility
University of Nebraska – Lincoln
P.O. Box 880529
Lincoln, Nebraska 68588-0529

Dear Dr. Faller:

Thank you for your letter of November 12, 2004, requesting the Federal Highway Administration (FHWA) acceptance of the Three D Traffic Works unballasted plastic barricade system as a crashworthy traffic control device for use in work zones on the National Highway System (NHS). Accompanying your letter was a report of the crash testing you conducted 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.”

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.

TD2150 Blow Molded Plastic Barricade

The barricade has an overall height when folded of 46.0 inches. It is 24.5 inches wide and 2.25 inches thick. When deployed the top of the upper panel is 36.375 inches above the pavement. Two 0.375 inch diameter x 5.5 inch long Grade 5 zinc coated hex head bolts with two 1 inch diameter washers and a lock nut were used to connect the barricade hinges together. One Empco-Lite Model 100 warning light was attached to the top of each barricade through a monolithically-molded plastic bracket. The 6V lantern battery light was attached to the top of the barricade with a 1/2 inch diameter x 3 1/4 inch long heavy cap screw fastener with a 1 1/8



inch diameter flat washer under the head. The unballasted barricade weighs 14.82 pounds, and the warning light with battery weighs 3.14 pounds for a total weight of 17.96 pounds. The warning lights used in System #1 were Empco-Lite Model 100, and in System #2 were Starlite 747.

Testing

Bogie vehicle testing was conducted on the Three D Traffic Works 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.

Test Number	3D-4
Barricade Tested	TD2150
Weight of Tested Barricade	8.15 kg (18.0 lbs)
Flags? Lights?	Empco Lite Model 100
Mass of Test Vehicle	1119 kg (2467 lbs)
Impact Speed	100.5 km/hr (62.4 mph)
Velocity Change Head-on	2.4 km/h (1.5 mph)
Velocity Change End-on	1.5 km/h (0.9 mph)
Extent of contact	Impact to bumper, grille, hood
Windshield Damage	No contact with windshield

This crash-testing program used a hard-nosed bogie vehicle of a mass larger than the standard 820C test vehicle. There are significant constraints involved in using such a non-standard testing device, some of which are:

1. The potential vehicle velocity change must be considered insignificant.
2. The crush characteristics of an automobile bumper must not be expected to have a significant affect on the trajectory of the test article.
3. The profile of the bogie vehicle must be configured to replicate the outline of a production vehicle. The MwRSF bogie was configured to replicate the outline of a Geo Metro, a vehicle commonly used in testing of work zone devices.
4. No part of the test article may intrude into the windshield area of the vehicle after impact.

In this test both barricades impacted the bumper, grille, and / or hood area of the bogie and were projected up and ahead of the bogie. No part of either barricade struck the “windshield” area of the bogie.

Findings

The results of the testing met the FHWA requirements and, therefore, the device 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, 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.
- Three-D Traffic Works will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- Three-D Traffic Works 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-198 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.
- Three D Traffic Works devices are patented and 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/

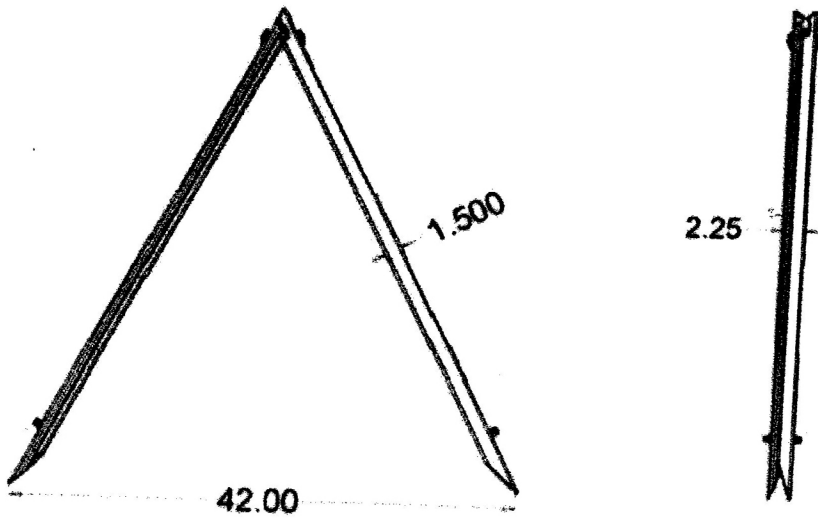
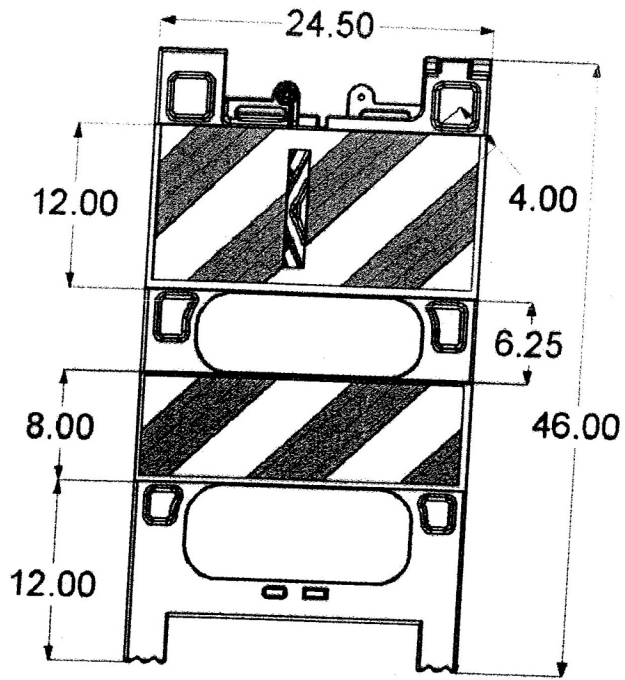
John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

Enclosures

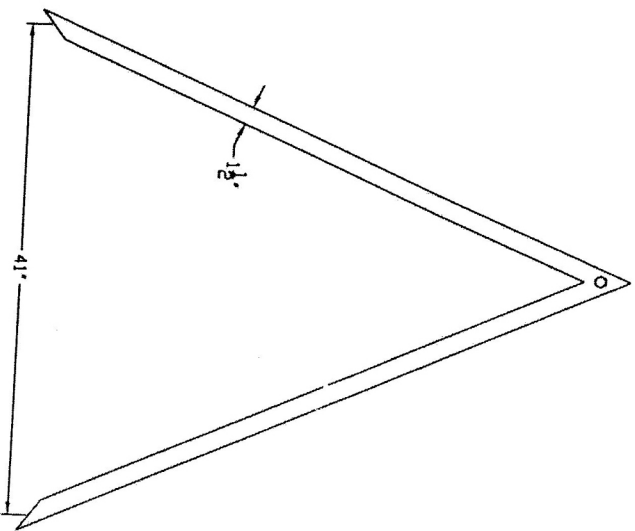
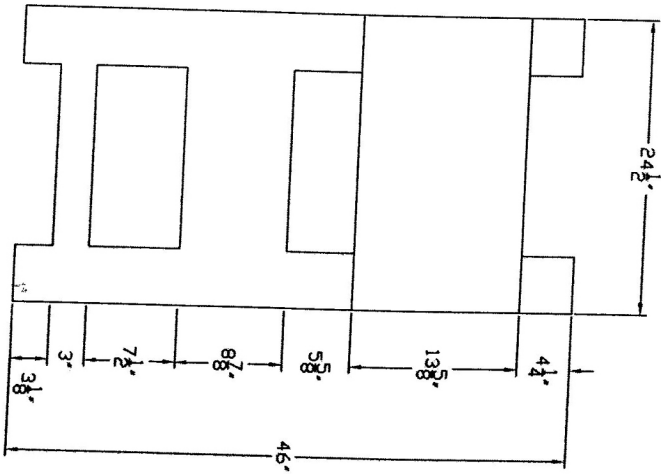
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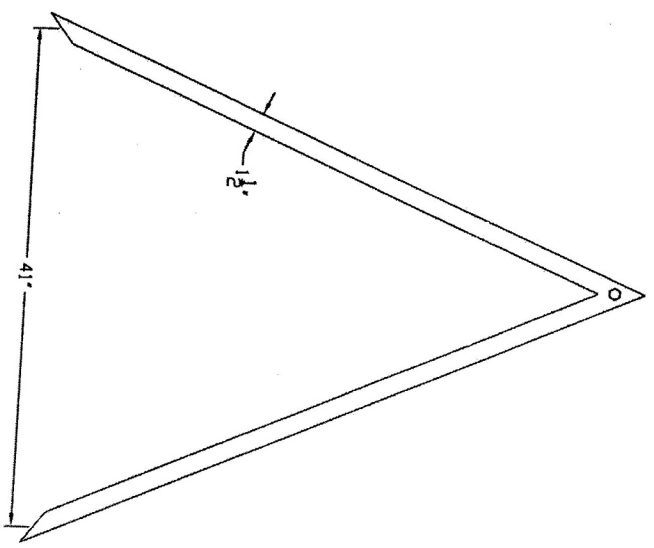
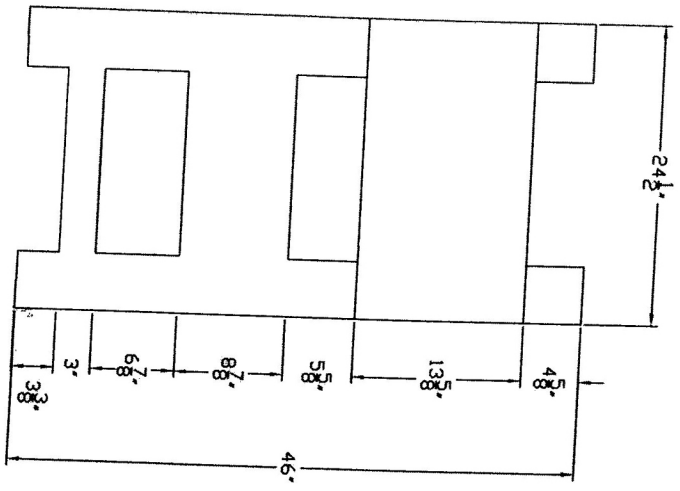
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TD2150 Works Plastic A-Frame Barricade Details



TD2150 Works Plastic A-Frame Barricade Details, Bogie Test 3D-4, System No. 1



TD2150 Works Plastic A-Frame Barricade Details, Bogie Test 3D-4, System No. 2