Refer to: HSA-10/WZ-132

Mr. Scott Behm
Three D Traffic Works, Inc.
430 North Varney Street
Burbank, California 91502

Dear Mr. Behm:

Thank you for your June 23, 2003, letter to Mr. Nicholas Artimovich requesting Federal Highway Administration (FHWA) acceptance of your company's Type III barricade Model TD2400. Accompanying your letter were the crash test report and videos produced by E-Tech Testing Services. You requested that we find this all-plastic barricade acceptable under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features for use in work zones on the National Highway System (NHS).

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.

The Three D Traffic Works TD2400 Series Type III Barricade is a FHWA Category II work zone traffic control device. The barricade is described and dimensioned in the enclosure *"TD2400 Series Type III Barricade Product Information Sheet."* It is an all plastic, lightweight, portable barricade made from a specially formulated polypropylene plastic with UV stabilizers and cold weather package. The barricade panel construction is detailed in the enclosure *"TD2400 Series Type III Barricade Panel Product Information Sheet."*

Panels for crashworthy barricades are available in 1219, 1524, 1829, and 2438, mm (4, 5, 6, and 8 foot) lengths. A 2438 mm (8 foot) wide barricade panel was selected for testing. The barricade plastic upright support legs are referred to as Tuff-1TM uprights and are specially designed with
an extrusion pattern which yields additional strength. These plastic uprights are a nominal

1600 mm (5 feet, 4 inches) in length and 44.5 mm (1.75 inches) square. The uprights are supported by injection molded "EZ Foot" bases with nominal 1524 mm (5 feet) length and 305 mm (1 foot) nominal height and width.

The test articles were equipped with the Flex-O-Lite signal Sundowner TM warning lights at the top of the each upright. The warning light design is shown in the enclosed *"Flex-O-Lite Sundowner Warning Light Product Information Sheet."* The warning lights were outfitted with one battery each and the barricade bases were ballasted with two 16 kg (35 pounds) sand bags each, positioned on the diagonal.

Testing

Full-scale automobile testing was conducted on your company's devices. 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.

Test Number	NCHRP 350 Test 3-71	
	14-0160-001	
Barricade Orientation	Head-on	90 degrees
Weight of Tested Stand	20.4 kg (45 pounds)	
Weight of Sand Ballast	Two 16 kg bags (70 pounds of sand, total)	
Mounting heights	1600 mm (63 inches) to top of top rail	
Flags? Lights?	Two Flex-O-Lite Sundowner warning lights	
Mass of Test Vehicle	821 kg (1808 pounds)	
Impact Speed	98.3 km/hr	96.4 km/hr
Velocity Change	1.9 km/hr (0.53 m/sec)	2.0 km/hr (0.56 m/sec)
Extent of contact	Top rail impacts windshield	End of top rail impacts windshield
Windshield Damage	Both impacts caused modest cracking but no holes through the glass.	

Findings

Damage was limited to moderate windshield cracking, but not to the extent that a driver's ability to see would be severely limited, nor were any holes made through the glass. The results of the testing met the FHWA requirements and, therefore, the Three D Traffic Works Model TD2400 barricade 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 which 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-132 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 products are patented devices and 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 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 on to use, manufacture, or sell any patented device. Patent issues are to be resolved by the applicant and the patent owner.

Sincerely yours,

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

Enclosures

FHWA:HSA-10:NArtimovich:tb:x61331:9/9/03
File: h://directory folder/nartimovich/WZ132-ThreeDFIN
cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
N. Artimovich, HSA-10)