

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

Dear Mr. Ross:

Thank you for your July 24, 2002, letter that you hand delivered to Mr. Nicholas Artimovich of my office on October 23, 2002. In that letter you are requesting Federal Highway Administration (FHWA) acceptance of your company's 8-foot wide Type III barricades using 0.450-inch solid polyethylene plastic panels and X-tube plastic uprights as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter was a summary report of crash testing conducted by E-Tech Testing Services and a CD with photos 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.

A brief description of the devices follows:

The frame of the barricade consists of 44.5 mm (1.75 inch) square plastic X-tube uprights. The skids are 2 PPF U-channel posts. The socket for supporting the uprights is a 6-inch long piece of 50.8 mm (2 inch) perforated square steel tube welded to a piece of 7 ga flat steel. The flat steel piece is drilled to accommodate bolts used to attach the socket to the skid. The uprights are

simply inserted into the socket. The barricade rails measured 2438 mm long by 203 mm high by

11.4 mm thick (8 feet by 8 inches x 0.14 inch) polyethylene board. The entire barricade (without ballast or lights) weighs 32.8 kg (72.3 pounds.) Each barricade also had two lightweight warning lights mounted to the top of the upright.

### Testing

Full-scale automobile testing was conducted on your company's devices. Two stand-alone examples of the device were tested in separate tests, one head-on and one turned at 90 degrees, as permitted in our guidance memoranda. The complete device as tested is shown in Enclosure 1.

The crash test is summarized in the table below:

Test Number	05-7210-020	05-7210-021
Test Article Orientation	Head on	90 degrees
Height to Top Rail	1570 mm (61.8 inches)	
Height to Top of Light	1860 mm (73.19 inches)	
Flags or lights	Two lightweight lights, one on each upright	
Test Article Mass (each)	32.8 kg (72.3 pounds) plus lights, ballast	
Vehicle inertial mass	813 kg	813 kg
Impact Speed	102.5 km/h	100.4 km/h
Velocity Change	2.2 m/s	1.6 m/s
Vehicle crush	Denting	Denting, minor roof crush
Occupant Compart. Intrusion	None	Windshield/roof deformation
Windshield Damage	Moderate	Moderate to severe*

\* In this end-on test the top two rails impacted the windshield causing moderate deformation and cracking. One of the lights hit in such a manner as to snag briefly on the windshield trim and causes a hole through the glass near the roofline. This dime-sized hole did not penetrate the inside metal rim of the windshield mount. Although this nominally violates the FHWA windshield damage criteria for work zone devices, we have carefully considered the implications. This barricade is similar in many respects to other Type III barricades that have been successfully tested. Because of a unique occurrence, it caused a hole in this test.

**Findings**

Damage was limited to moderate to severe cracking of the windshield and minor sheet metal damage to the hood and roof. There did not appear to be a potential for penetration of the occupant compartment. With the exception noted above, the results of the testing met the FHWA requirements and, therefore, the devices described above and shown in the enclosed drawings for reference 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.
- 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-136 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 Rentals 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,

Harry W. Taylor,  
Acting Director, Office of Safety Design

Enclosure

FHWA:HSA-10:NArtimovich:tb:x61331:1/23/03  
File: h://directory folder/nartimovich/WZ136-UR1  
cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;  
N. Artimovich, HSA-10)

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.

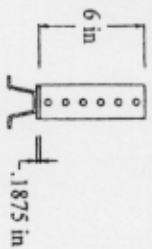
(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable 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.

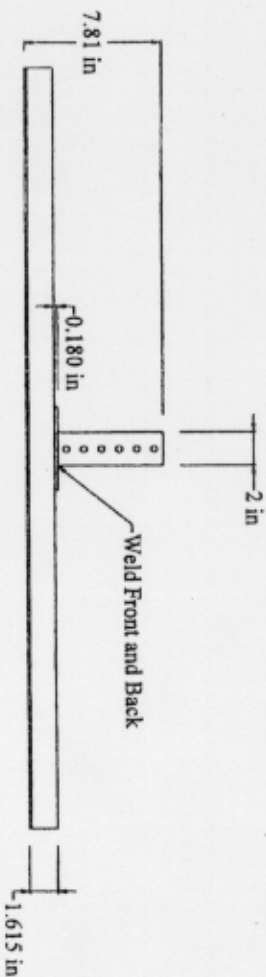
(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.

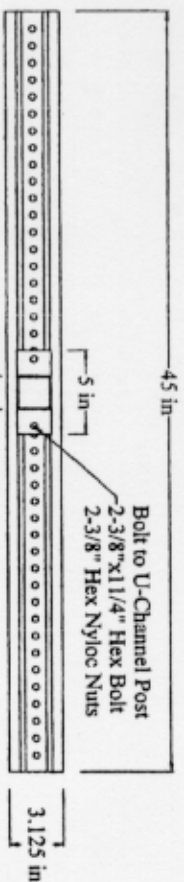
ENCLOSURE 2



End View



Side View



Top View

Materials

- 2# U-Channel Post
- 2"x2" Square Telespar PSSST
- 3/16"x2"x5" Flat Steel

