

May 4, 2004

Refer to: HSA-10/WZ-178

Ronald K. Faller, PhD.
Midwest Roadside Safety Facility
1901 'Y' Street, Bldg. C
P.O. Box 880601
Lincoln, Nebraska 68588-0601

Dear Mr. Faller:

Thank you for your letter of March 17, 2004, requesting Federal Highway Administration (FHWA) acceptance of RooGuards, Incorporated's longitudinal channelizing barricade 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 the Midwest Roadside Safety Facility (MwRSF) 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.

A brief description of the devices follows:

The "RGI Safety Barricade" is a roto-molded, linear low density polyethylene barricade section, with a density of 0.938 g/cm^3 , an Ultra Violet resistant rating of 8, and an environmental stress crack resistance of 1000. Each RGI Safety Barricade is 1,994 mm (78.5 inches) long, 927 mm

(36.5 inches) tall, 546 mm (21.5 inches) wide at the base, and 140 mm (5.5 inches) wide at the top. The nominal base thickness is 8.9 mm (0.35 inch). The unit's bottom vertical face is 152 mm (6 in) in height.

One RGI Safety Barricade weighs 34.0 kg (75 pounds) empty. Water ballast was placed in the units to the bottom of the drain level locate approximately 38 mm (1.5 inches) above the base of the device which accounted for 16.8 kg (37 pounds) of water. An A-frame reflector was installed in the rectangular slot on the top of the RGI Safety Barricade.

Testing

Full-scale automobile testing was conducted on the RooGuards longitudinal channelizing barricade. An 885 kg (1950 pound) Geo Metro was accelerated into the line of barricade units at an angle of 22.6 degrees and a speed of 69.2 kph (43.0 mph), which was within the limits of test level 2.

Thirty-seven barricade units were connected together for a length of approximately 67.7 m (225 feet). The test vehicle impacted barricade unit number 13 (as counted from the beginning of the installation) and pushed through, displacing barricade units number 13 through 17. Units number 8 through 12, as well as number 18 through 23, also were displaced by the movement of adjacent units but they remained connected to the beginning and end sections of the barricade installation respectively. Only one unit, number 14, was fractured and leaked water.

The test vehicle penetrated over 20 feet behind the line of units, and traveled nearly 105 feet downstream from the point of impact. Exterior vehicle damage was minimal, with little or no occupant compartment deformation. Cosmetic damage, consisting of dents, scuff marks, and broken lenses, was concentrated on the right front corner of the vehicle. The drive shaft was pulled slightly out resulting in a leak of transmission fluid. No contact was made with the vehicle's glass. The occupant impact velocities and ride-down accelerations were well within the limits in the NCHRP Report 350.

Findings

The results of the testing met the FHWA requirements for longitudinal channelizing barricades. and, therefore, the devices described in the various requests 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. As this device is not intended as a barrier, redirection of the test vehicle was not expected. It should be noted that the penetration of the Roo-Guards longitudinal channelizing barricade would be greater if the 2000P pick-up truck impacting at 25 degrees had been used. The test using the 820C automobile showed that a passenger vehicle can impact the device without undue risk to the vehicle occupants.

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 the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-178 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 Roo Guards “RGI Safety Barricade” 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 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 Harry W. Taylor/

for

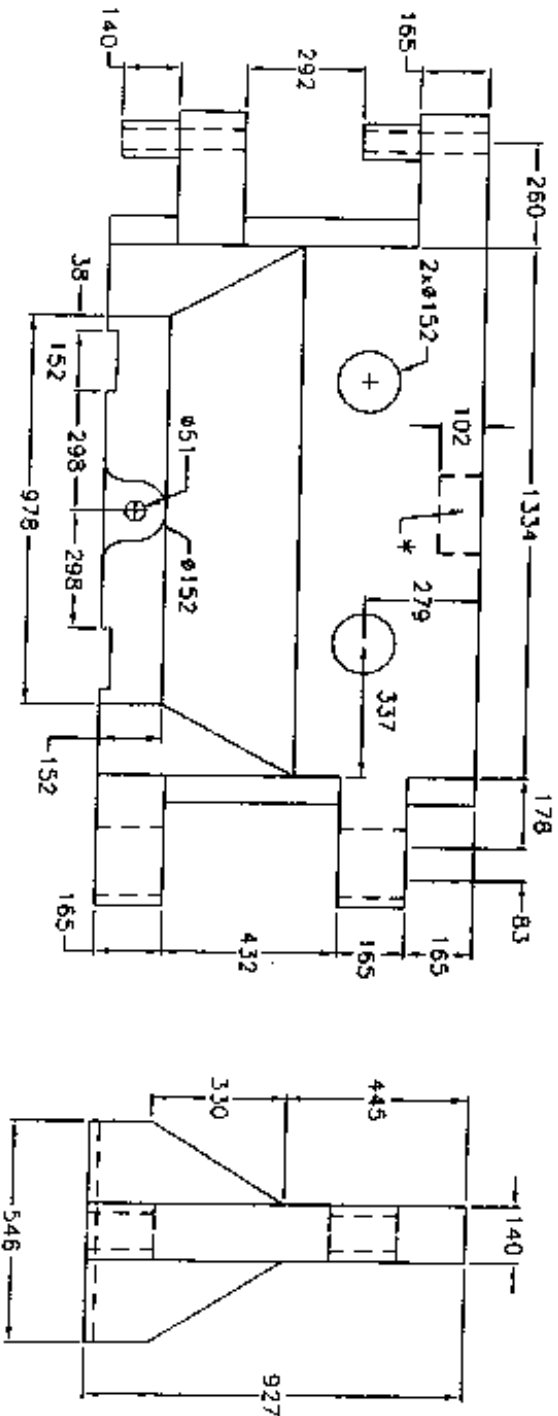
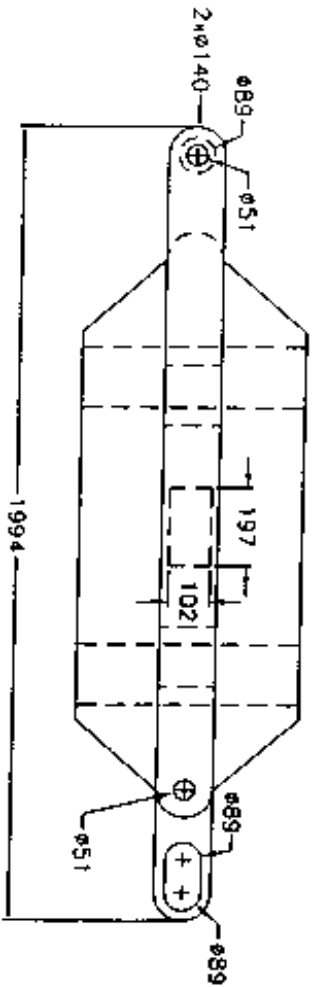
John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

Enclosures

FHWA:HSA-10:NArtimovich:tb:x61331:4/29/04

File: h://directory folder/nartimovich/WZ178-RooGuardsFIN

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



NOTE: Dimensions in millimeters

*NOTE: Manufacturer supplied reflectors (not shown) inserted into rectangular spot on top of barriers.



Midwest Roadside
Safety Facility

Report on the Plastic
Temporary Barrier

Final Report

RD-75-001-1

Nov.

1975

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Figure 2. RGI Safety Barricade Unit Details

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.