

October 10, 2003

Refer to: HSA-10/WZ-163

Ron Faller, PhD, P.E.
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Dear Dr. Faller:

This is in response to your letter of July 7, 2003, requesting Federal Highway Administration (FHWA) acceptance of the Gleason and Son Signs' "Patrol Car" temporary sign system as a crashworthy traffic control device for use in work zones on the National Highway System (NHS). Accompanying your letter was a letter report of 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 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 are to be self-certified by the vendor, Category II devices were other lightweight devices which needed individual crash testing but with reduced instrumentation, Category III devices were barriers and other fixed or heavy devices also needing crash testing with normal instrumentation, and Category IV devices were 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 Gleason and Son Signs' "Patrol Car" temporary sign system replicates the rear silhouette of a police car. It is constructed of 50-52 white aluminum, 2.3 mm (0.090 inches) thick and covered with vinyl reflective tape. Overall, the sign is 1524 mm (60 inches) tall, 1835 mm (72.25 inches) wide, and 406 mm (16 inches) deep. Three 6.4 mm (0.25 inch) diameter x 15.9 mm (0.625 inch) long bolts with hex nuts, along with aluminum rivets, connect each leg to the body. Aluminum

rivets are also used to connect the horizontal portion of the leg to the vertical portion that is connected to the system's body. The Patrol Car system weighs 16.86 kg (31.76 pounds) and is ballasted with 45 kg (100 pounds) of sand per leg.

Testing

Bogie vehicle testing was conducted on the Gleason sign. Two stand-alone examples of the devices were tested in separate impacts, one head-on and the second turned at 90 degrees.

The tests are summarized in the table below.

Test Number	SPS-3	SPS-4
Sign Stand Tested	Gleason and Son Signs' "Patrol Car" temporary sign system	
Weight of Tested Stand	16.86 kg (31.76 pounds)	
Flags? Lights?	None	
Mass of Test Vehicle	929 kg (2049 pounds)	
Impact Speed	99.1 km/hr (61.6 mph)	96.1 km/hr (59.7 mph)
Velocity Change	8.4 km/h, 2.33 m/s	5.7 km/hr, 1.58 m/s
Extent of contact	No windshield contact	No windshield contact
Windshield Damage	None	None
Other notes	Top of sign struck hood only	Sign crushed and pushed ahead

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 Midwest Roadside Safety Facility 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.

Findings

In both impacts the Patrol Car was pushed ahead with no part of the sign approaching the "windshield" area of the bogie vehicle, nor did there appear to be any potential for serious damage or passenger compartment intrusion. The results of the testing met the FHWA requirements and, therefore, the device described above and detailed in the enclosed drawings is 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.
- Gleason and Son Signs will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- Gleason and Son Signs 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-163 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 Gleason and Son Signs' "Patrol Car" temporary sign system 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. Patent issues are to be resolved by the applicant and the patent owner.

Sincerely yours,

/Original Signed by/

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

Enclosures

FHWA:HSA-10:NArtimovich:tb:x61331:10/7/03

File: h://directory folder/nartimovich/WZ163-MWRSEF_GleasonFIN

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