



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

March 22, 2006

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

In Reply Refer To:
HSA-10/B-85D

Mr. Steve L. Brown
President
Trinity Highway Safety Products Division
P.O. Box 568887
Dallas, Texas 75356-8887

Dear Mr. Brown:

This is in response to the November 30, 2005, letter from Mr. Don Johnson requesting the Federal Highway Administration (FHWA) acceptance of a revision to your company's King Block for use with strong steel-post w-beam guardrail on the National Highway System (NHS). The proposed modifications alter the shape, width, and material composition (weight) of the block while maintaining the same overall dimensions of height and depth. To support this request, you included a report of the pendulum test conducted by the Southwest Research Institute. You requested that we find this device acceptable for use on the NHS under the provisions of National Cooperative Highway Research Program Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Introduction

The FHWA guidance on crash testing of roadside safety hardware is contained in a memorandum dated July 25, 1997, titled "INFORMATION: Identifying Acceptable Highway Safety Features."

A brief description of the device follows:

The test article was an injection-molded offset block composed of 68.5 percent recycled High Density Polyethylene (HDPE), 30 percent ground recycled rubber, 0.5 percent blowing agent, and 1 percent color concentrate. This composition is essentially the same as the crash-tested original King Block but differs significantly from the 52 percent HDPE/45 percent rubber formulation that was noted in the FHWA acceptance letter B-85A, dated July 10, 2001. The new block is also different in shape from the former rectangular honeycomb design. The new shape consists essentially of an upper and a lower cylinder connected by additional structure that includes locations for bolt placement. A drawing of the revised King blockout is enclosed for reference.



Testing

A single W6 x 8.5 steel galvanized guardrail post was embedded 44 inches in soil. The blockout was bolted, along with a 12-inch long section of 12 gauge W-beam, to the post with a 10-inch long x 5/8-inch button head bolt. The 820 kg mass pendulum, fitted with a flat steel face, impacted the test article at a speed of 35 km/hr (22 mph) at a height of 18 inches above grade.

During the test the blockout detached from the post due to bolt failure after the post had bent rearward 20 inches and rotated in the soil more than 60 degrees. The rail lip at the bottom was knocked off during impact. (The rail lip is considered an installation aid and not of structural significance.) The bolt attachment hole showed slight elongation, but no indication of the bolt tearing through the cast-in-place hole was noted. The block received minor damage from both top and bottom edges of the W-beam but did not suffer any structural damage.

Findings

Based on the results of the pendulum test run, your product may be considered acceptable for use on the NHS when it conforms to the dimensions noted above and is composed of the same materials as the tested block. As with all other recycled material blocks accepted for use on the NHS, this FHWA acceptance is based solely on the reported impact performance in the pendulum test and is not intended to address the long-term performance or durability of the product. Therefore, the revised King Block described in the request above and detailed in the enclosed drawing is acceptable for use on the NHS under the range of conditions tested, when proposed by a transportation agency.

Please note the following standard provisions that apply to the FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not address its long-term durability.
- 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.
- To prevent misunderstanding by others, this letter of acceptance, designated as number B-85C 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 King Block is a patented device and is considered "proprietary." The use of proprietary devices *specified by a highway agency* for use on Federal-aid projects must meet one of the following criteria: (a) it must be supplied through competitive bidding

with equally suitable unpatented items; (b) the highway agency must certify that it is essential for synchronization with existing highway facilities or that no equally suitable alternative exists or; (c) it 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.

- 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

Enclosure

cc: Mr. Don Johnson, Trinity Highway Safety Products Division
Mr. Steve Smith, Trinity Highway Safety Products Division

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