



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

1200 New Jersey Ave., SE
Washington, D.C. 20590

October 6, 2011

In Reply Refer To:
HSST/ B-153A

Jason D.C. Hubbell, President
The Atlanticum Bridge Corporation
POBox 1644
Fort Walton Beach, Florida 32549

Dear Mr. Hubbell:

This letter is in response to your request for the Federal Highway Administration (FHWA) acceptance of a modification to a roadside safety system for use on the National Highway System (NHS).

Name of system:	Nature Rail Quick Joint
Type of system:	Aesthetic Guardrail System
Test Level:	NCHRP Report 350 TL-2
Testing conducted by:	TSR Engineering GmbH, Switzerland ISO 17025 accreditation valid until March 2013
Date of request:	December 22, 2010
Date initially acknowledged:	December 22, 2010

You requested that we find this system acceptable for use on the NHS under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Decision:

The following device was found acceptable, with details provided below:

- Quick Joint modification to the Nature Rail Aesthetic Guardrail System.

Requirements

Roadside safety devices should meet the guidelines contained in the NCHRP Report 350 or the American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH). The FHWA Memorandum "Identifying Acceptable Highway Safety Features" of July 25, 1997 provides further guidance on crash testing requirements of longitudinal barriers.

FHWA:HSST:NArtimovich:ms:x61331:9/27/11
File: s://directory folder/HSSI/B-153A Nature Rail New Splices.docx
cc: HSST: NArtimovich

Description

The B-153 guardrail is comprised of steel components: c-channel posts; steel spacers and steel rails. Wood elements cover the steel post and rail components. The B-153 wood covering for steel posts are round. The wood coverings are connected to the steel post via a bolt that connects the steel post, the wood covering and the steel spacer together, as shown on the enclosed B-153 drawings.

The B-153 steel rail component is masked with a wood covering which is slotted and saddles the steel rail, as shown in the drawings. Three modifications differentiate the B-153 from the B-153A are: a) the horizontal 90 degree rotation of the steel c-channel post, b) change of the post's wood covering from round to rectangular in profile, and c) increase in the cross-section of the rail steel component at connections.

There are four structural differences between B-153 and B-153A. The first is the rotation of the steel post. The second, specifically with regard to the 4 meter post spacing configuration, is the addition of a 5mm thick steel rail component on the away-from-traffic side of the rail. The third is the steel spacer. The fourth is the configuration of the splice. Collectively these structural changes have been shown, through testing to have reduced the guardrail system's maximum dynamic deflection.

The B-153 steel spacer consists of a bent steel plate. The B-153A spacer is a 3/4 hexagonal shape welded to a steel plate. The B-153A "honeycomb" spacer is stiffer than the B-153 spacer. The B-153 rail splice is made by overlapping the steel rail sections which doubles up on the overall thickness of the steel at the splice as compared to the rest of the rail. The B-153A rail splice is a 3mm thick plate that is folded in half and saddles on top of the steel rail components of two sections of rail. This means the overall thickness of steel at the splice of the B-153 has increased by 1mm in the 2m post spacing configuration and 6mm in the 4m post spacing configuration.

Improvement in dynamic deflection is seen when comparing the B-153 test results to the B-153A test results. The B-153's 4m post spacing configuration had a maximum dynamic deflection with the heavy vehicle test of 2.1m (approximately 6.9 feet). The B-153A's 4m post spacing configuration under the same testing conditions had a maximum dynamic deflection of 1.4m, a one-third reduction in deflection.

Crash Testing

FHWA Acceptance Letter B-153, dated January 17, 2007, found the Nature Rail system acceptable for use on the NHS at NCHRP Report 350 Test Level 2. Four full-scale crash tests of the modified Nature Rail were performed according to EN1317 norms. These tests are summarized below and the Test Data Summary Sheets are enclosed for reference.

EN-1317 Designation	Test Lab Number	Vehicle model & weight	Impact Speed	Angle of Impact	Post Spacing	Dynamic Deflection
TB 32	PHG3	1991 Opel 3251 pounds	67.8 mph	20.5 degrees	2.0 m	4.6 feet
TB 11	PHG4	1993 Peugeot 1804 pounds	61.2 mph	20.5 degrees	2.0 m	3.0 feet
TB 11	PHG6	1993 Peugeot 1795 pounds	60.0 mph	20.0 degrees	4.0 m	3.9 feet
TB 32	PHG7	1994 Opel 3304 pounds	67.8 mph	20.0 degrees	4.0 m	6.2 feet

Findings

The occupant risk factors in each of the listed EN-1317 test were met. While EN-1317 testing is ordinarily not accepted for use on the NHS, you are requesting FHWA acceptance of a modification to an existing system, and only to NCHRP Report 350 Test Level 2. The Impact Severity of a TL-2 pickup truck test required under Report 350 (Test 2-11) is nominally 67.6 kJ. The Impact Severity of the EN-1317 TB 32 tests (PHG3 and PHG7) noted above was 88.78 kJ and 86.02 kJ respectively, which are significantly higher than the Report 350 TL-2 tests. We concur that these tests are adequate to establish equivalent performance of the modified barrier design.

The system described in the requests above and detailed in the enclosed drawings is acceptable for use on the NHS under the range of conditions tested, when such use is acceptable to a highway agency.

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

- This acceptance is limited to the crashworthiness characteristics of the systems 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 system 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 system being marketed is significantly different from the version that was crash tested, we reserve the right to modify or revoke our 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 it will meet the crashworthiness requirements of the FHWA and the

NCHRP Report 350.

- To prevent misunderstanding by others, this letter of acceptance is designated as number B-153A and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.
- The Nature Rail barriers are patented products and considered proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the 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.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate system, 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,

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety



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Michael S. Griffith
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