



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

January 23, 2007

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

In Reply Refer To:
HSSD/B-154

Mr. Terrence M. Flynn
Perini Corporation
1022 Lower South Street
Peekskill, New York 10566

Dear Mr. Flynn:

Thank you for your October 18, 2006, request for the Federal Highway Administration (FHWA) acceptance of the ESB bridge rail for use on the Tappan Zee Bridge. The proposed ESB rail is a steel tube railing you compared to the SISTEMA barrier originally accepted by the FHWA in our letter B-123 dated March 12, 2004. Accompanying your letter was a report titled "LRFD Rail Analysis–Nonlinear Static Incremental Analysis–Steel Side Barrier Types ESB and SISTEMA–Tappan Zee Bridge Repair Project" by Ammann & Whitney (A&W). You requested that we find this barrier acceptable for use under the provisions of the 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 roadside safety hardware is contained in a memorandum dated July 25, 1997, titled "INFORMATION: Identifying Acceptable Highway Safety Features."

The SISTEMA barrier, was accepted in B-123 by virtue of European tests that exceeded the Impact Severity of tests required by the NCHRP Report 350. The ESB and the SISTEMA are similar concerning general dimensions. The total height of the two barriers is about 60 inches as measured from the roadway to the center of the top rail. The transverse dimensions are also close, with 19 inches for the SISTEMA and 20 inches for the ESB. The upper post spacing for the SISTEMA is 9.8 feet, which is comparable to the ESB spacing of 10 feet. Both systems have a top pipe, and three longitudinal rail members. The longitudinal rail members are distributed more or less evenly within a range of 1.0m measured from the top of the roadway. Both systems have an upper opening of about 19 inches, mainly for traveler's view, and lower opening of about 2.5 inches for drainage. Both systems have a front steel sheet connecting the three longitudinal members that will increase the barrier nominal resistance when the effects of tensile field action are significant in the longitudinal direction.



The A&W report concluded that the strength and overall barrier performance was satisfactory as compared to the ESB. The design specified an anchor bolt configuration in which some of the bolts were designed to break away prior to the application of the full design load. The FHWA Office of Infrastructure reviewed the A&W report and rejected the original ESB design because some of the bolts broke prior to the application of the minimum load of 120 kips, as required by the American Association of State Highway and Transportation Officials LRFD. The A&W redesigned the attachment bolts and stiffened the edge of the bridge deck in order to increase the loading that the rail system would tolerate before deflecting without damaging the bridge deck. The FHWA Office of Infrastructure concurred with the redesign.

Findings

The ESB bridge railing as redesigned, described above, is acceptable for use on the NHS as a test level 5 barrier.

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

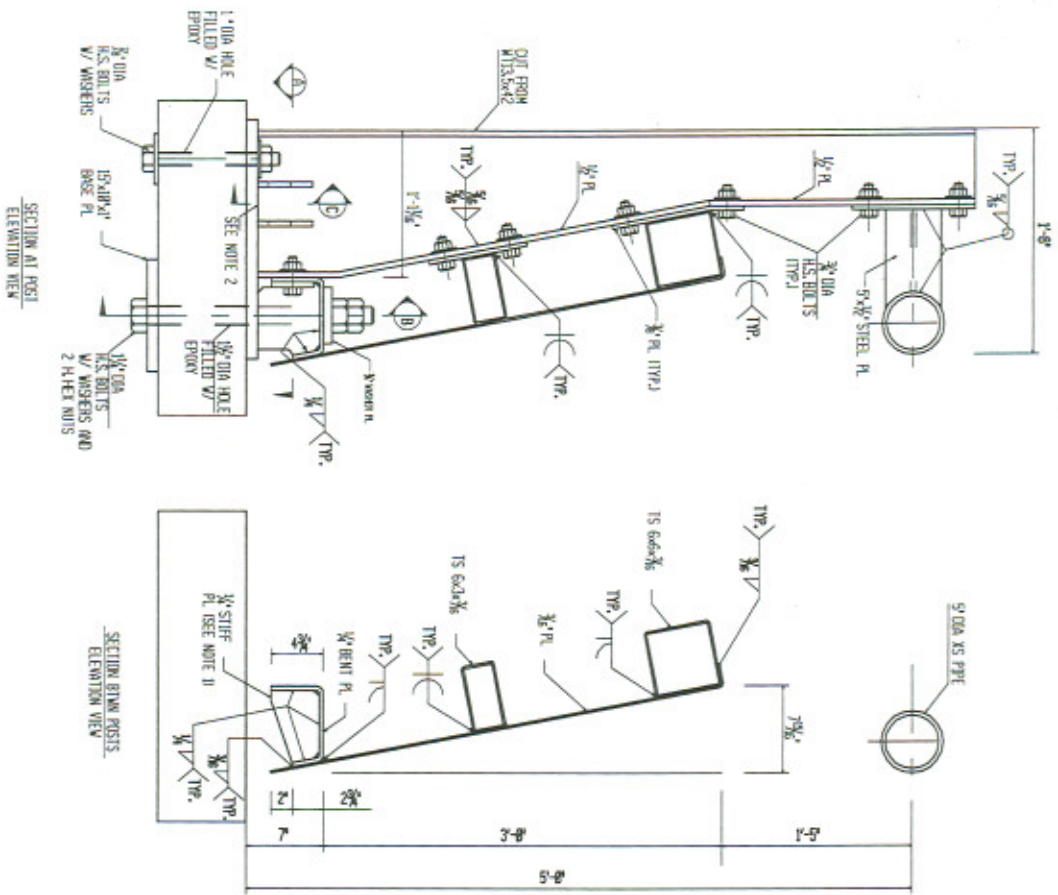
- Our acceptance is limited to the crashworthiness characteristics of the barrier.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing or engineering analysis was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was reviewed in this acceptance process, 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 B-154 shall not be reproduced except in full. This letter, and the documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.
- 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,

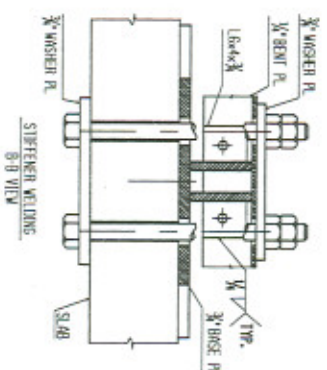
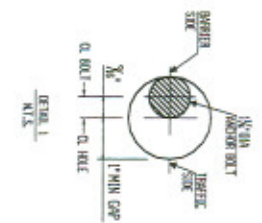
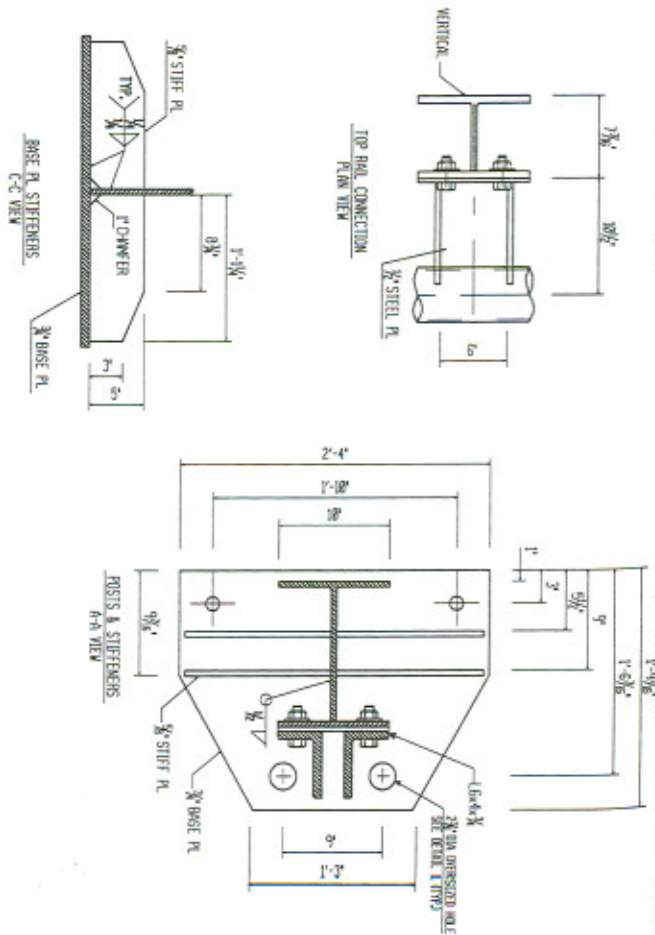
/original signed by/

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

Enclosures



BOLTING OPTION 50 FT BARRIER PANEL LENGTH



- NOTES
1. PROVIDE FIVE 1/2" STIFF PL. BRN POSTS AT EQUAL SPACES
 2. POSTS ARE TO BE VERTICAL, CUT BASE OF POST TO ACCOMMOD FOR SLOPE OF DECK
 3. STEEL ASTM A589 GRADE 58A, TUBE ASTM A500 GRADE B, PIPE ASTM A53 GRADE B

