



August 30, 2007

In Reply Refer To: HSSD/CC-94A

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

Dear Mr. Brown:

In the Federal Highway Administration's (FHWA) acceptance letter CC-94 dated September 2, 2005, we accepted a modified version of your ET-Plus guardrail terminal named the ET-Plus 31. On January 16, 2007, you requested that the FHWA extend our acceptance of the ET-Plus 31 to include 6 inch x 8 inch wood posts. On April 24, 2007, you followed up with additional information that we requested.

The modifications noted below were needed to match the ET-Plus terminal, which was originally tested with standard W-beam guardrail, to the Midwest Guardrail System (MGS). The MGS barrier was formally accepted as an National Cooperative Highway Research Program (NCHRP) Report 350 test level 3 (TL-3) barrier on March 1, 2005, (acceptance letter B-133). To verify the crashworthiness of the modified ET-Plus, the Texas Transportation Institute (TTI) conducted the following two tests, which are described in that agency's July 2005 report, "NCHRP Report 350 Testing of the ET-Plus for 30-inch High W-Beam Guardrail":

- Report 350 test 3-30 (TTI Test 220601-2)
- Report 350 test 3-35 (TTI Test 220601-1)

To match the MGS barrier design, the following modifications (shown in CC-94) were made to the original ET-Plus terminal:

1. The guardrail height was raised to 787 mm (31 inches) throughout the terminal length.
2. The depth of each offset block (beginning at post 3) was increased to 305 mm (12 inches).
3. The upper section of the Hinged Breakaway Anchor post was modified to accommodate the increased guardrail height.
4. A 3.8-m (12.5-ft) long W-beam rail, with anchor bracket holes, was used between posts 1 and 3. A special 2.86-m (9.375-ft) W-beam section begins at post 3 and results in a splice located midway between posts 4 and 5. Standard W-beam sections with holes punched on 0.95 m (3.125 ft) centers are then used from mid-span of posts 4 and 5 and beyond. The terminal proper ends at post 7 (the first standard line post) making its total length 11.43 m (37.5 ft).



5. Ground-line weakening holes in the Steel Yielding Terminal Posts (SYTP) are located 810 mm (31.875 inches) from the top of each post. Since the overall post length is unchanged, each SYTP post is embedded approximately 1020 mm in the ground.
6. Modified SYTP posts are used for post positions 2 through 6.
7. Standard W6 x 8.5 line posts are used at post 7 and beyond. The NCHRP Report 350 requires up to seven crash tests to determine the adequacy of a traffic barrier terminal at TL-3. However, since the original designs for attachment to standard W-beam guardrail have proven to be crashworthy, only those tests that are likely to be affected by the design changes noted above are considered necessary. You successfully completed test 3-30 (head-on test with the 820-kg car) and test 3-35 (20-degree impact with the pickup truck at post 3).

Your present request is to allow either the SYTP or 6 inch x 8 inch wood posts in the ET-Plus 31 as shown in the enclosed drawing. Because the 6x8 wood posts have been shown to perform in a similar manner to steel posts (including the SYTP) the wood post ET-Plus 31 may be considered a TL-3 design that can be used on the National Highway System when connected to the MGS barrier. While the barrier itself is non-proprietary, your terminal is proprietary and remains subject to the conditions stated in Title 23, Code of Federal Regulations, Section 635.411 when used on Federal-aid highway projects. All other conditions in the FHWA acceptance letter CC-94 continue to apply.

Sincerely yours,



George E. Rice, Jr.
Acting Director, Office of Safety Design
Office of Safety

Enclosure

Historical
Purposes
Only

