



U.S. Department  
of Transportation

**Federal Highway  
Administration**

AUG 22 1995

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

CC 12-1

Refer to: HNG-14

Mr. Don H. Johnson  
President  
Syro Steel, Inc.  
2525 Stemmons Freeway  
Dallas, Texas 75207

Dear Mr. Johnson:

Your August 9 letter to Mr. William A. Weseman requested the Federal Highway Administration (FHWA) to concur in your assertion that the ET-2000 guardrail terminal has satisfied the National Cooperative Highway Research Program (NCHRP) Report 350 evaluation criteria for a test level 3 (TL-3) terminal. To support this request, you provided copies of appropriate test reports, drawings, photographs, and videotapes of the full-scale crash tests. The summary results of the NCHRP Report 350 certification tests are enclosed for ready reference. In response to questions raised by my staff, you submitted supplemental information with your letter dated August 14 and identified three specific ET-2000 designs for which you sought FHWA acceptance under the NCHRP Report 350 criteria. This second letter also stated that you were not seeking acceptance of the ET-2000 as modified per Mr. Jerry L. Poston's April 26 letter (copy enclosed) as an NCHRP Report 350 terminal at this time.

Based on our review of the information presented, we have concluded that the ET-2000 designs designated as Option A and Option B (drawings enclosed) satisfy the NCHRP Report 350 evaluation criteria for a TL-3 terminal and that either or both of these designs may continue to be used on the National Highway System (NHS) when selected by a highway agency. These two designs are identical except that posts five through eight are shortened wood posts in steel tubes in Option A, whereas these posts are full-length CRT posts in Option B. Since the ET-2000 is proprietary, all regulations regarding its use on Federal-aid projects (except non-NHS projects) remain applicable.

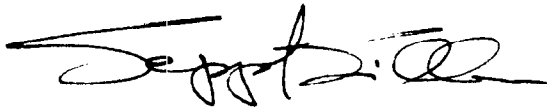
You will note we have not accepted the modified Option B design (Texas Department of Transportation version) which uses weakened round wood posts in lieu of CRT posts at post positions five through eight. Based on our review of Test 9429A-2 (NCHRP Report 230 test number 40) which was conducted with a 2,000-kg passenger car, we have concerns that this particular design would not pass the NCHRP Report 350 test 3-35. These concerns are based on the facts that the rear wheel of the passenger car in test 9429A-2 contacted and rode up on a post, creating some instability, the round wood posts are approximately half as strong as the CRT posts and deflect considerably more on impact, increasing the likelihood of pocketing and the 2000-kg pickup truck has proven


relatively unstable in several recent length-of-need and strength tests. If you chose to conduct test 3-35, or have additional information to offer, we will be please to review our current position.

We also noted that in test 3-39 (reverse direction hit), the extruder head was detached from the w-beam and slid 64 m from its original location and 3.5 m nearer the traffic lane. While such a trajectory might pose a hazard to other vehicles, we agree with your analysis that such an event is unlikely. Nonetheless, user agencies should be made aware of this occurrence so that each can make an objective assessment of the appropriateness of the ET-2000 at a specific location.

A copy of this letter and enclosures will be sent to the FHWA field offices for information.

Sincerely yours,



 Jerry L. Poston, Chief  
Federal-Aid and Design Division

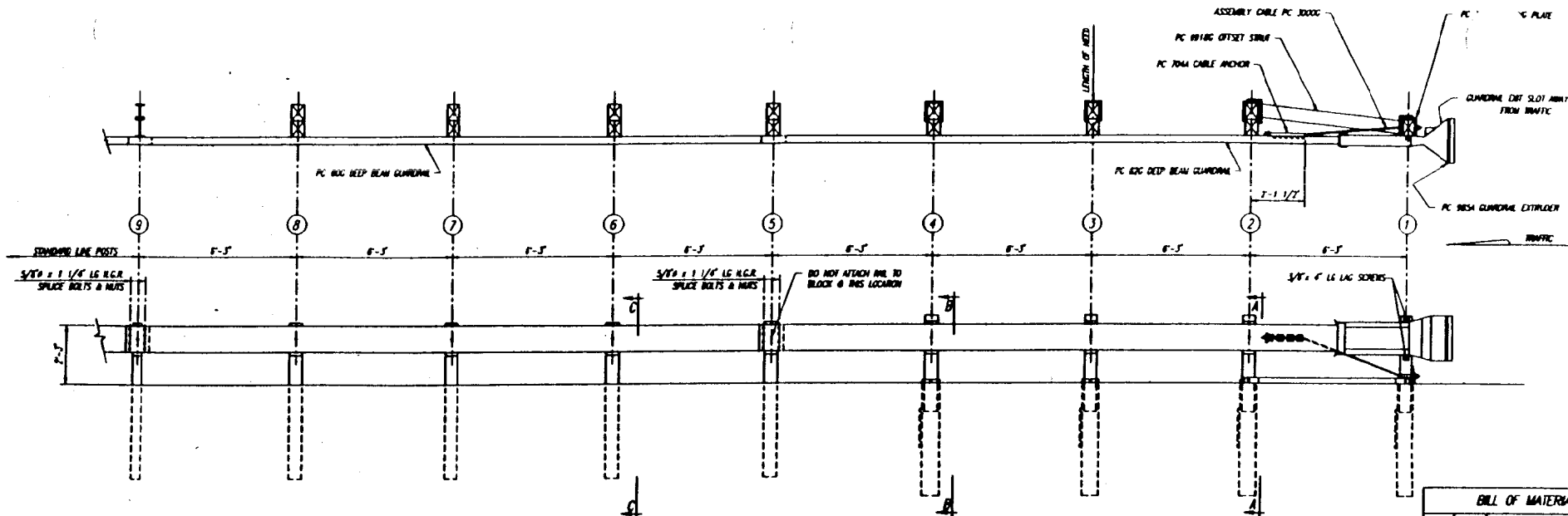
3 Enclosures

Supplement to Geometric and Roadside Design Acceptance Letter CC-12

**SUMMARY OF ET-2000 COMPLIANCE TESTS FOR TEST LEVEL 3 OF NCHRP REPORT 350**

<b>NCHRP 350 Test No.</b>	<b>Description</b>	<b>TTI Test No.</b>	<b>Test Report and Test Article Description</b>	<b>Max OIV (m/sec)</b>	<b>Max RA (G's)</b>	<b>Results Meet All Report 350 Requirements?</b>
3-30	820C head-on on nose w/15" offset, 0° approach	6001-1	See Ref 1 and drawing SS 215	9.3	17.3	Yes
3-31	2000P head-on on nose, 0° approach	220510- 5	See Ref 2 and drawing SS 241T	8.1	13.0	Yes
3-32	820C head-on on nose, 15° approach	220510- 3	See Ref 2 and drawing SS 241T	9.0	7.4	Yes
3-33	2000P head-on on nose, 15° approach	220510- 4	See Ref 2 and drawing SS 241T	5.5	4.0	Yes
3-34	820C between nose and beginning of LON, 15° approach (at post #2)	9429A-1	See Ref 3 and drawing SS 230	5.2	10.3	Yes
3-35	2000P at beginning of LON, 20° approach (at post #3)	220510- 2	See Ref 2 and drawing SS 241T	7.6	8.2	Yes
3-39	2000P reverse hit midway along length of terminal, 20° approach (at post #5)	220537- 6	See Ref 2 and drawing SS 241T	6.0	10.5	Yes

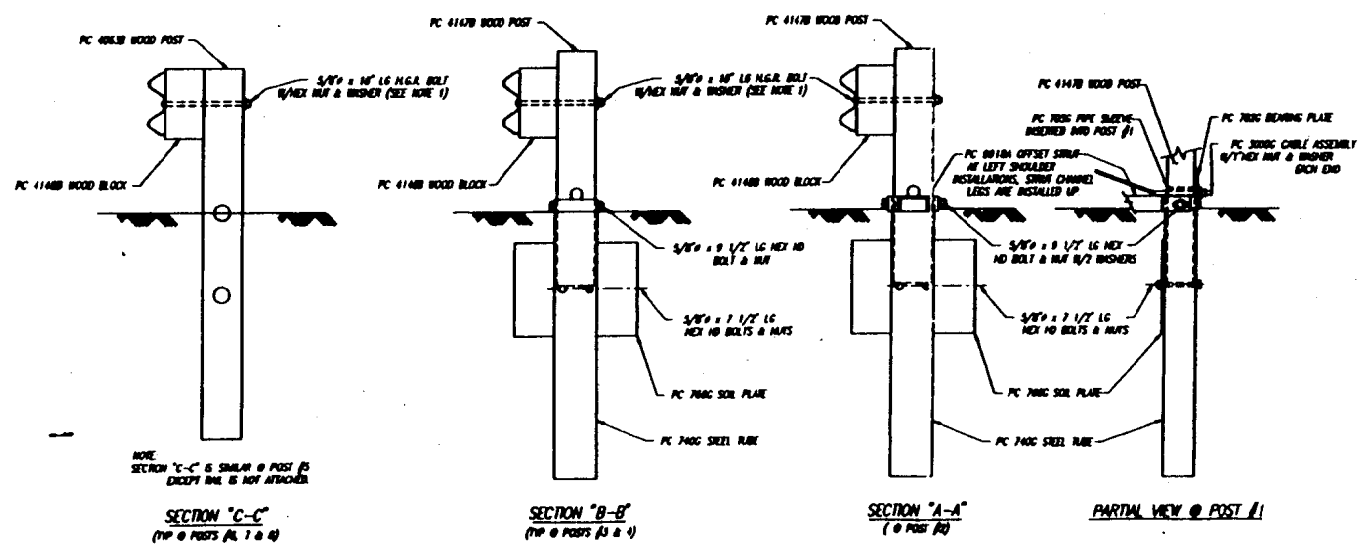




BILL OF MATERIAL		
PC	QTY	DESCRIPTION
42C	1	DEEP BEAM CLAMP INL (1X2)
42F	1	DEEP BEAM CLAMP INL (1X2)
70M4	1	CABLE ANCHOR
70S3	1	PIPE SLEEVE
70S4	4	SOIL PLATE
70S5	6	SOIL PLATE
70S6	1	BEARING PLATE
70S7	1	GLANDWIRE EXTRUDER
70S8	1	CABLE ASSEMBLY
70S9	11	5/8" WOOD POST
70S10	35	5/8" N.G.R. NUT
70S11	16	5/8" x 1 1/4" N.G.R. SPACER BOX
70S12	8	5/8" x 7 1/2" HEX HD BOLT
70S13	4	5/8" x 9 1/2" HEX HD BOLT
70S14	7	5/8" x 10" N.G.R. POST BOX
70S15	2	7" WISHER
70S16	2	1" HEX NUT
70S17	4	WOOD POST
70S18	4	WOOD BLOCK
70S19	2	5/8" x 4" LAG SCREW
70S20	1	OFFSET STRUT

- NOTES:
- 1.) THE 5/8" FLAT WISHER IS USED UNDER THE INL, BEHIND THE POST ONLY. NO WISHER IS USED AT THE INL.
  - 2.) THE BREAKAWAY POSTS @ LOCATIONS #1, 2 & 4 MAY BE AS SHOWN OR MAY WALKER POSTS AS SHOWN IN OPTION "C" ONLY FOUNDATION RULES (SEE DRAWING NO SS 240). POSTS @ LOCATIONS #1, 2, 3 & 4 MUST USE FOUNDATION RULES.
  - 3.) THE ET-2000 WAS DESIGNED ON FLAT & LEVEL TERRAIN. IT IS NOT RECOMMENDED ON SLOPES.
  - 4.) MANUFACTURER SUGGESTS CUSTOMER TO PROVIDE REFLECTIONS OF TERRAIN.

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1	IP	BY	3-9-85	CNC PC 1204 TO 4230
REV	CHG	BY	DATE	REASON
<b>ET-2000</b>				
ET-2000 PLAN, ELEVATION & SECTIONS OPTION "B"				
DATE	4-12-84	SCALE	AS SHOWN	SHEET NO. 1 OF 1
<b>TRINITY INDUSTRIES, INC.</b>				