May 13, 2003

Refer to: HSA-10/B-119

Mr. Rodney A. Boyd
Trinity Highway Safety Products Division
P.O. Box 568887
Dallas, Texas 75356-8887

Dear Mr. Boyd:

In his March 28, 2003, letter to Mr. Richard Powers of my staff, your representative, Mr. Don Johnson, requested formal Federal Highway Administration acceptance of a high-tension, wire rope traffic barrier called the Cable Safety System (CASS). Included with the letter were copies of a Texas Transportation Institute (TTI) report dated March 2003, entitled "National Cooperative Highway Research Project (NCHRP) Report 350 test 3-11 of the TRINITY CASS" and videotapes of the crash test.

The CASS barrier described in the test report consisted of three 19-mm diameter, pre-stretched 3 x 7 strand steel cables. Mounting heights were 530 mm, 640 mm, and 750 mm above the ground and each cable was tensioned to 24kN using turnbuckles attached to swaged threaded fittings on each end. These cables were supported by 1600-mm long, galvanized 100 x 50 x 4 mm C-channels driven into a Report 350 standard soil on 3-m centers. As shown on Enclosure 1, the upper central section of the post web was removed to accept the cables, which are kept separated in a vertical plane by the insertion of plastic spacer blocks, a stainless steel strap, and a plastic cap over the top of each post.

In test 3-11, the pickup truck impacted at 100.6 km/h near the mid-point of a 100-meter long test installation at 24.2 degrees. As seen on the test summary sheet (Enclosure 2), all Report 350 evaluation criteria were met. The cable rail deflected 2.4 meters.

In a supplementary letter dated April 25, 2003, Mr. Johnson provided additional information on CEN (European Committee for Standardization) test TB-11 on the CASS barrier. This test, which is similar to NCHRP Report 350 test 3-10, was run by the Spanish testing agency CIDAUT and documented in its October 10, 2002 report entitled "Test Report for Cable Safety System, CASS – EN 1317 test TB11." Based on the similarity of these two tests and on the results of test TB-11, I will waive the requirement for running Report 350 test 3-10.

Although the posts in the test installation were driven directly into the soil, you requested the use of posts set in steel tubes or posts set into concrete sockets as alternative designs. As long as the post failure mechanism remains essentially unchanged (i.e., post failure by bending at the ground line with minimal deflection below ground as in the test installation), these options are acceptable. The CASS barrier should ideally be introduced and ended with a crashworthy terminal such as the previously accepted TTI breakaway terminal for a high-tensioned cable barrier. If the TTI terminal is used, the first six posts beyond the third breakaway anchor post must be the same posts at the same spacing as were used in the terminal certification tests unless you repeat the appropriate tests using the CASS post at these locations. A non-crashworthy terminal may be used if both the upstream and downstream anchors are adequately shielded.

In summary, the CASS barrier, as described above, meets NCHRP Report 350 evaluation criteria as a test level 3 barrier and may be used on the National Highway System (NHS) as either a roadside or median barrier when such use is acceptable to the contracting agency. Since it is a proprietary product, the provisions of Title 23, Code of Federal Regulations, Section 635.411 apply to its use on Federally funded projects, except exempt non-NHS projects.

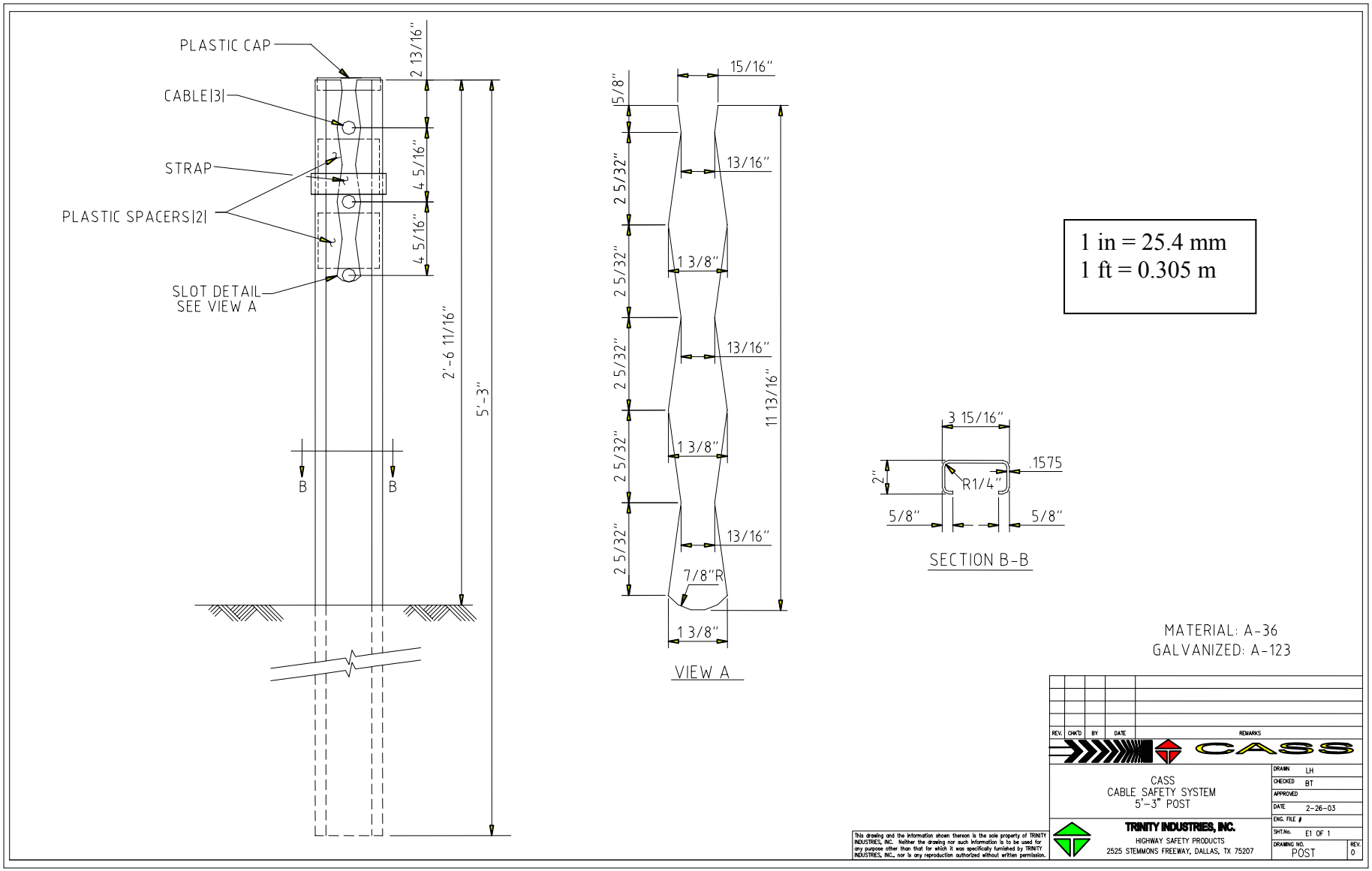
This Acceptance Letter shall not be construed as authorization or consent by the Federal Highway Administration to use, manufacture, or sell any patented device. The Acceptance Letter is limited to the crashworthiness characteristics of the candidate device, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

Sincerely yours,

(original signed by Michael S. Griffith)

Michael S. Griffith
Acting Director, Office of Safety Design
Office of Safety

2 Enclosures



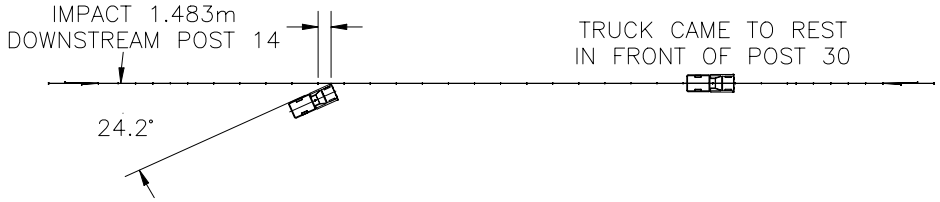
Details of the CASS post.

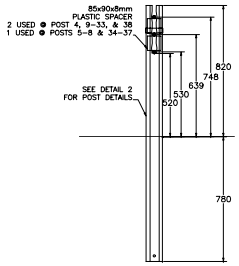
0.000 s

0.193 s

0.725 s

2.175 s





General Information
- Test Agency . . . . . Texas Transportation Institute
- Test No. 400001-TCR1
- Date 01/08/03

Test Article
- Type . . . . . Guardrail
- Name . . . . . Trinity Cable Safety System (CASS)
- Installation Length (m) 101.9
- Material or Key Elements . . . 3 Wire Ropes Supported By C-Channel Mild Steel Support Posts

Soil Type and Condition . . . . Standard Soil, Dry

Test Vehicle
- Type . . . . . Production
- Designation 2000P
- Model . . . . . 1998 Chevrolet 2500 Pickup
- Mass (kg)
  - Curb 2077
  - Test Inertial 2045
  - Dummy . . . . . N/A
  - Gross Static 2045

Impact Conditions
- Speed (km/h) 100.6
- Angle (deg) 24.2

Exit Conditions
- Speed (km/h) 13.9
- Angle (deg) 9.4

Occupant Risk Values
- Impact Velocity (m/s)
  - x-direction 2.7
  - y-direction 3.5
- THIV (km/h) 14.7
- Ridedown Accelerations (g's)
  - x-direction . . . . . -3.9
  - y-direction . . . . . -5.1
- PHD (g's) 5.2
- ASI 0.37
- Max. 0.050-s Average (g's)
  - x-direction . . . . . -2.2
  - y-direction 3.2
  - z-direction 1.5

Test Article Deflections (m)
- Dynamic 2.40
- Permanent 0.14
- Working Width 2.80

Vehicle Damage
- Exterior
  - VDS 11FL1
  - CDC 11FLEW1
- Maximum Exterior
  - Vehicle Crush (mm) 200
- Interior
  - OCDI. LF0000000
- Max. Occ. Compart. Deformation (mm) . . . . . None

Post-Impact Behavior
(during 1.0 s after impact)
- Max. Yaw Angle (deg) 31.2
- Max. Pitch Angle (deg) 9.2
- Max. Roll Angle (deg) 10.9

Summary of results for test 400001-TCR1 (CASS w/3 m spacing), *NCHRP Report 350* test 3-11.