

February 9, 2001

Mr. David R. Lewis
HALCO, L.L.C.
263 Bradford Drive
Canfield, Ohio 44406

HSA-10/B80

Dear Mr. Lewis:

In Mr. David Hubbell's January 30 letter to Mr. Richard Powers of my staff, he requested acceptance of a fabricated tubular steel post as a direct replacement for the W150 x 13.5 wide flange posts currently used with the G4(1S) guardrail system. Under separate cover, Mr. Powers also received a copy of the Texas Transportation Institute's January 2001 report entitled "NCHRP REPORT 350 TEST 3-11 OF THE G4 W-BEAM GUARDRAIL SYSTEM WITH CENTRAL FABRICATORS, INC. STEEL POST AND PLASTIC BLOCKOUT," a copy of the crash test video tape, and material certifications for the steel used to make your posts.

The tested posts, designated as X-48 Posts, were fabricated from 12-gauge steel plate into a rectangular cross-section with a back flange 165-mm wide, a traffic face 80-mm wide and a depth of 140 mm. The posts were comprised of several pieces of steel plate fastened together using a "partial punch" technology. Each post was 1600-mm long, spaced on 1.9-m centers, and embedded approximately 922.5 mm below grade in an NCHRP Report 350 standard soil. The 12-gauge w-beam rail was offset from the posts with 155 mm x 200 mm x 360 mm Central Fabricator's recycled plastic blocks. These blocks were installed to extend approximately 50 mm above the top of each X-48 post, thus centering the w-beam rail 550 mm above the ground. Post and offset block dimensions are shown in Enclosure 1.

The X-48 posts were tested with a 2000-kg pickup truck impacting at the nominal speed of 100 km/h and an impact angle of 25 degrees. As noted in the test summary sheet (Enclosure 2), the test vehicle was contained and redirected upright. Occupant risk values were below the preferred limits and well below the maximums allowable. When compared to the test results with the standard G4(1S) guardrail system with the same plastic offset blocks, the X-48 post design resulted in similar occupant impact velocities and ridedown accelerations, but higher vehicular roll and pitch angles due to the increased stiffness of the X-posts. The dynamic deflection of the barrier system was 811 mm or approximately 32 inches. We concur with the researchers' conclusion that the Report 350 occupant severity test with the 820-kg car may be waived in light of the barrier's performance with the pickup truck, but would recommend that initial installations of the barrier be closely monitored to verify its in-service performance under field conditions.

Based on the information you provided, I agree that the HALCO X-48 guardrail post with the Central Fabricators' recycled plastic offset block may be considered acceptable for use on the National Highway System as a substitute for the steel post and routed wood or plastic offset blocks currently used in the G4(1S) barrier system when such use is requested by the contracting highway agency. Please note that this acceptance is only for the use of these posts in the barrier proper. They cannot be used in guardrail terminals unless specifically tested for that application.

Since your post is a proprietary design, the provisions of Section 635.411 (Material or product selection) of Title 23, Code of Federal Regulations apply. A copy of this regulation is provided for your ready reference (Enclosure 3).

Please do not hesitate to call Mr. Powers at (202) 366-1320 if you have any questions regarding this acceptance of your product.

Sincerely yours,

(original signed by Frederick G. Wright, Jr.)

Frederick G. Wright, Jr.
Program Manager, Safety

3 Enclosures

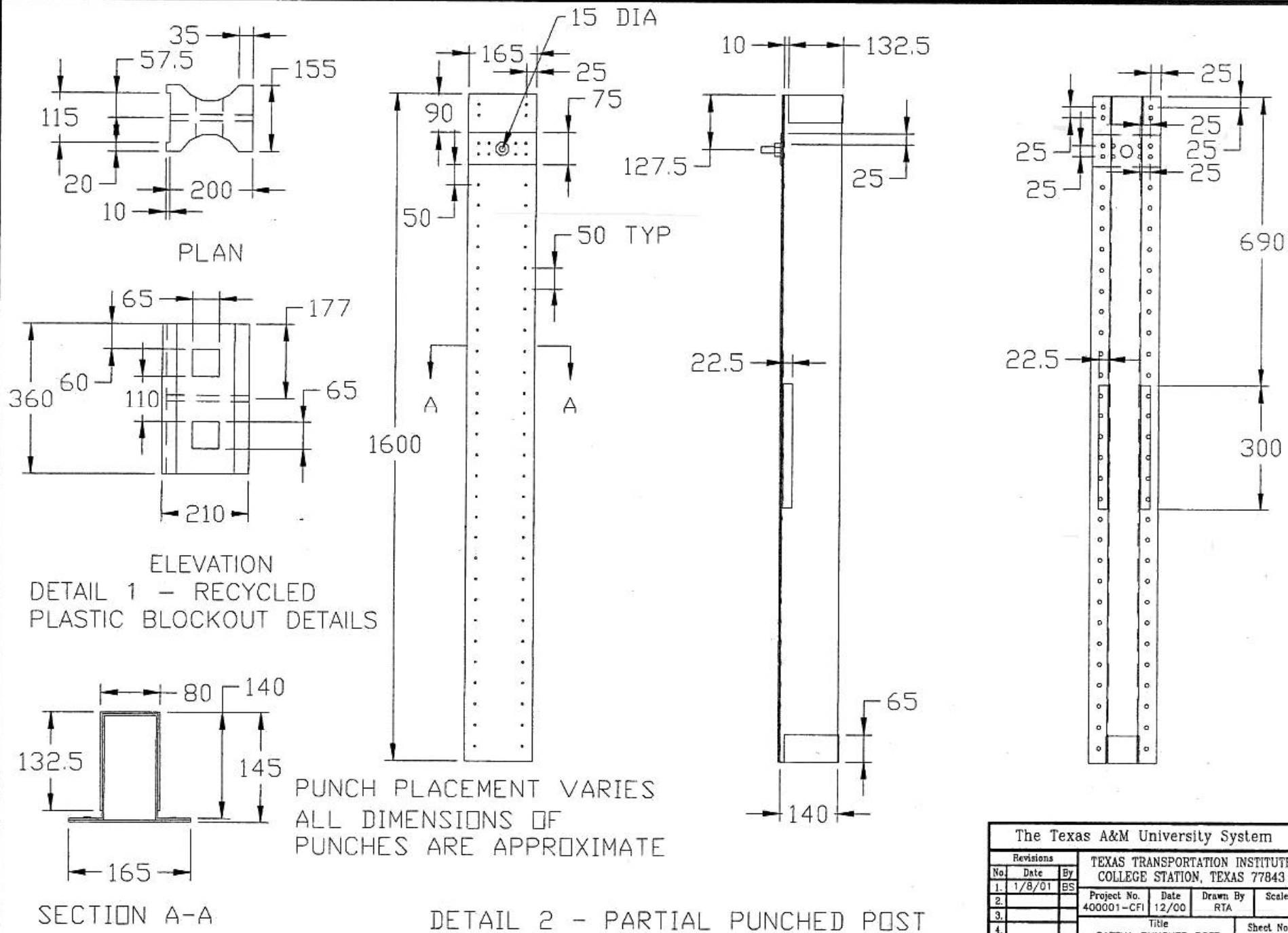
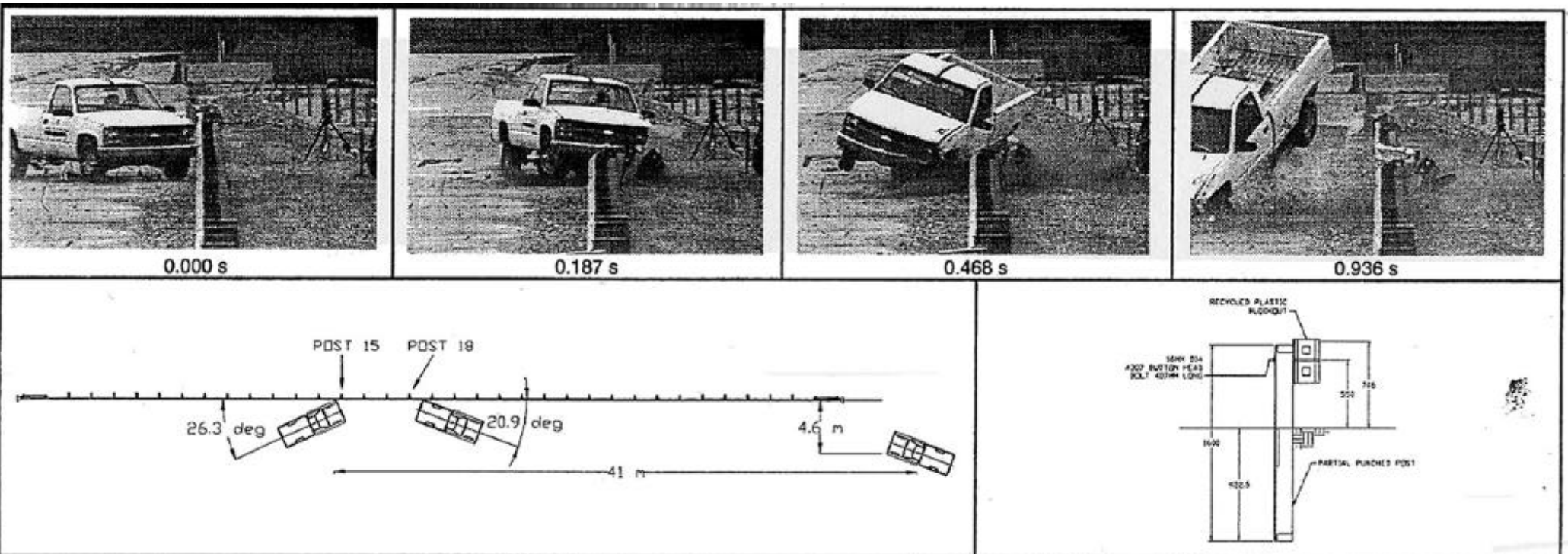


Figure 1. Details of guardrail installation with Central Fabricators, Inc. posts and blockouts.



General Information

Test Agency Texas Transportation Institute
 Test No. 400001-CF11
 Date 12/05/00

Test Article

Type Guardrail
 Name G4 guardrail with Central Fabricators, Inc. steel posts and recycled plastic blockouts
 Installation Length (m) 68.5
 Material or Key Elements .. 12-gauge W-beam guardrail with steel posts and recycled plastic blockouts

Soil Type and Condition ... Standard soil, dry

Test Vehicle

Type Production
 Designation 2000P
 Model 1996 Chevrolet 2500 pickup truck
 Mass (kg)
 Curb 2130
 Test Inertial 2000
 Dummy No Dummy
 Gross Static 2000

Impact Conditions

Speed (km/h) 101.4
 Angle (deg) 26.3

Exit Conditions

Speed (km/h) 56.5
 Angle (deg) 20.9

Occupant Risk Values

Impact Velocity (m/s)
 x-direction 5.5
 y-direction 5.5
 THIV (km/h) 25.9
 Ridedown Accelerations (g's)
 x-direction -7.0
 y-direction 11.1
 PHD (g's) 11.1
 ASI 0.81
 Max. 0.050-s Average (g's)
 x-direction -5.8
 y-direction 6.3
 z-direction 4.1

Test Article Deflections (m)

Dynamic 0.811
 Permanent 0.326
 Working Width 1.157

Vehicle Damage

Exterior
 VDS 11LFQ2
 CDC 11FLEK2 & 11LYEW3

Maximum Exterior
 Vehicle Crush (mm) 360

Interior
 OCCDI FS0000000

Max. Occ. Compartment
 Deformation (mm) 20

Post-Impact Behavior

(during 1.0 s after impact)
 Max. Yaw Angle (deg) 61
 Max. Pitch Angle (deg) -25
 Max. Roll Angle (deg) -30

Figure 10. Summary of results for test 400001-CF11, NCHRP Report 350 test 3-11.

Sec. 635.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.