



U.S. Department
of Transportation

**Federal Highway
Administration**

October 8, 1999

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

Refer to: HMHS-B58

Ronald K. Faller, Ph.D., P.E.
Midwest Roadside Safety Facility
1901 'Y' Street, Building C
P.O. Box 880601
Lincoln, NE 68588-0601

Dear Dr. Faller:

In your September 20 letter, you requested the Federal Highway Administration's (FHWA) acceptance to National Cooperative Highway Research Program (NCHRP) Report 350 criteria of a w-beam guardrail treatment with nominal clear-span of 7620 mm for use at low-fill culverts and other locations where full-length posts could not be used. A similar design with a shorter clear span (5720 mm) was accepted several years ago based on NCHRP Report 230 testing.

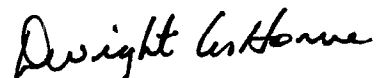
To support your request, you included test reports and a videotape of the tests that you ran. Your final design consisted of a standard strong post w-beam guardrail installation with three posts omitted over a 7620 mm span and nested 12-gauge w-beam rail over the gap with an additional 11430 mm of nested rail on each side of the gap. This made the total length of nested rail segments 30.48 m, centered over the clear span. All splices were lapped in the direction of adjacent traffic. The test installation used standard 150 mm x 13.5 steel posts 1830 mm long with routed wood blocks except for the three posts on each side of the clear span. These six posts were 150 mm x 200 mm x 1830-mm long weakened wood posts (CRT posts) and each had two 150 mm x 200 mm x 360-mm long wood spacer blocks. These design details are shown in Enclosure 1.

Your design was tested with a 2000-kg pickup truck impacting at 102.4 km/h and at an angle of 24.7 degrees. The impact point was 2.44 m downstream from post number 12. All Report 350 evaluation criteria were satisfactory. Summary test results for Test No. OLS-3 are shown as Enclosure 2. The reported dynamic deflection of the barrier was 1450 mm. The report also cautioned that, since the rail deflected 1450 mm in the test, a minimum distance of 1.5 m behind the rail should be clear of any fixed-object hazards that could snag an impacting vehicle.

We noted that the tested design used four nested w-beam rail elements that were 3810-mm long in the middle of the 30.48 m nested-rail section. This design layout placed a splice in the center of the clear span. Your report implied that this was an assumed "worst case" situation, and that the splices could be located anywhere within the nested section. For example, four 7620-mm long nested segments could be used in lieu of the tested two 7620-mm and four 3810-mm long segments. Finally, you stated that the long span design would perform acceptably if standard timber posts were used in lieu of steel line posts. We agree that these options would also be acceptable.

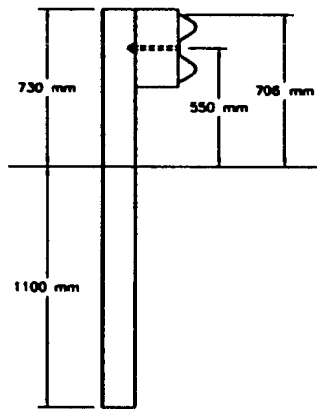
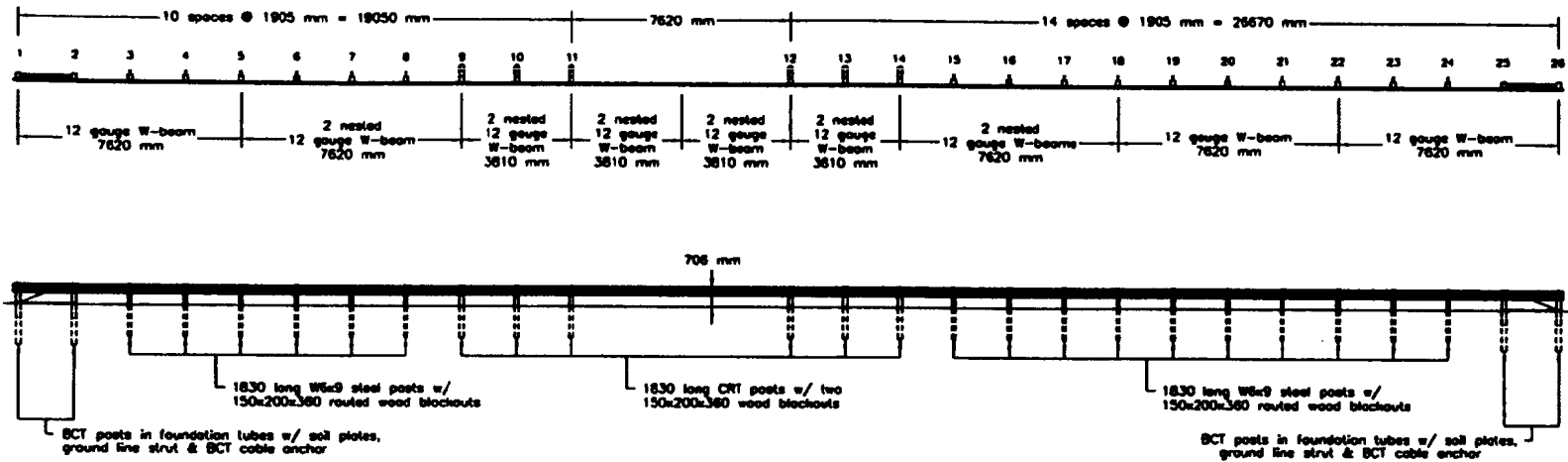
Based on our review of the information you submitted, the FHWA considers the long-span design to meet Report 350 evaluation criteria at Test Level 3 (TL-3) and it may be used where appropriate on the National Highway System when such use is recommended by the State transportation agency.

Sincerely yours,

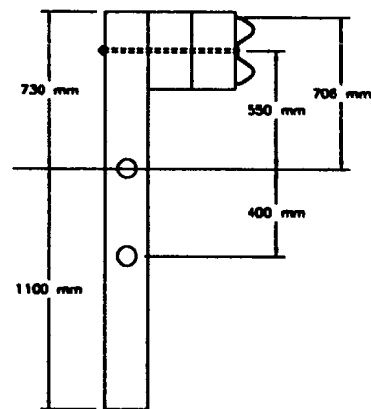
A handwritten signature in black ink that reads "Dwight A. Horne". The signature is written in a cursive style with a large initial 'D' and 'H'.

Dwight A. Horne
Director, Office of Highway Safety Infrastructure

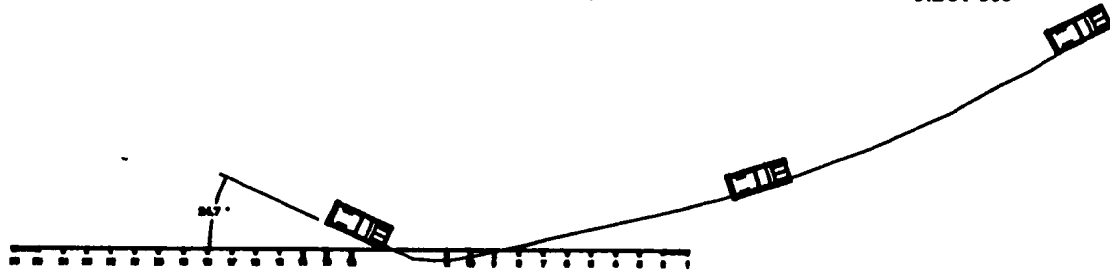
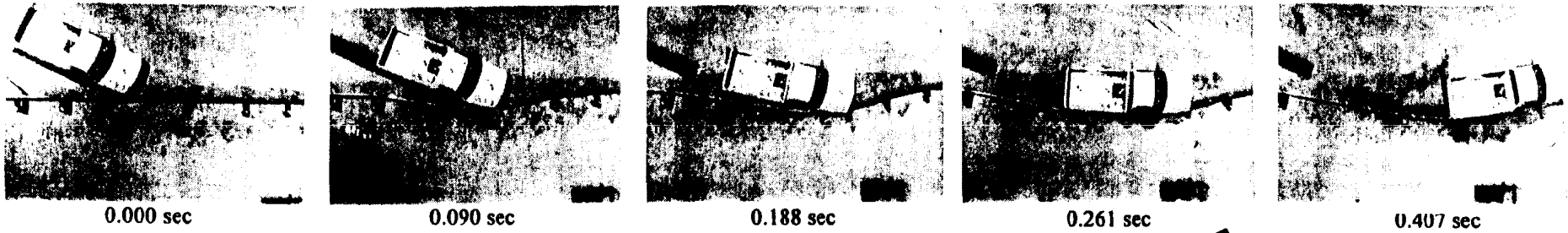
2 Enclosures



W152x13.4 steel posts, 1830 long w/
150x200x360 routed wood blockouts
Posts 3-8, 15-24



CRT wood posts, 1830 long w/
two 150x200x360 wood blockouts
Posts 9 - 14



24

- Test Number OLS-3
- Date 5/26/99
- Appurtenance Nested W-beam long-span guardrail system
- Total Length 53.34 m
- Steel W-Beam (Nested)
 - Thickness 2.66 mm
 - Top Mounting Height 706 mm
- Steel Posts
 - Post Nos. 3 - 8, 15 - 24 W150x13.5 by 1,830-mm long
- Wood Posts
 - Post Nos. 9 - 14 (CRT) 150 mm x 200 mm by 1,830-mm long
 - Post Nos. 1 - 2, 25 - 26 (BCT) 140 mm x 190 mm by 1,080-mm long
- Wood Spacer Blocks
 - Post Nos. 3 - 8, 15 - 22 150 mm x 200 mm by 360-mm long
 - Post Nos. 9 - 14 Two 150 mm x 200 mm by 360-mm long
- Soil Type Grading B - AASHTO M 147-65 (1990)
- Vehicle Model 1992 Chevrolet 2500 2WD
 - Curb 1,882 kg
 - Test Inertial 1,994 kg
 - Gross Static 1,994 kg

- Vehicle Speed
 - Impact 102.4 km/hr
 - Exit 70.2 km/hr
- Vehicle Angle
 - Impact 24.7 degrees
 - Exit 9.4 degrees
- Vehicle Snagging None
- Vehicle Pocketing None
- Vehicle Stability Satisfactory
- Occupant Ridedown Deceleration (10 msec avg.)
 - Longitudinal 7.28 < 20 G's
 - Lateral (not required) 10.10
- Occupant Impact Velocity (Normalized)
 - Longitudinal 3.72 < 12 m/s
 - Lateral (not required) 4.96
- Vehicle Damage Minimal
 - TAD¹⁴ 1-RFQ-3
 - SAE¹⁵ 1-RFEE3
- Vehicle Stopping Distance 57.37 m downstream
18.62 m traffic-side face
- Barrier Damage Moderate
- Maximum Deflections
 - Permanent Set 1,016 mm
 - Dynamic 1,450 mm

Figure 8. Summary of Test Results and Sequential Photographs, Test OLS-3 (Design No. 3)