

## W-BEAM TREATMENTS

### REVISION REGISTER

Revision	Description	Date
1	Issued for use.	10/3/2006
1 A	Links to Standard Drawings added and text revised.	2/6/2010
1 B	Withdrawal of Main Roads standard drawing 201031-0029.	12/8/2013

There are situations that can occur when installing a W Beam Barrier where it is difficult or impossible to install a post at the standard spacing and it may be necessary to apply a special treatment. Examples of where this can occur are over a culvert or a side-entry pit.

If there is a clash between a post and a service (including stormwater drainage pipe or pit) it is acceptable to use a double blockout on a single post to avoid the clash.

Other solutions have been developed and crash tested and the following guidance is provided on the use of options for clear spans of less than or equal to 4 metres and for clear spans between 4 metres and 8 metres.

If it is necessary to omit a post or a number of posts for a W Beam guardrail, then the appropriate treatment from the two options detailed below shall be used.

In application of either of these solutions, ideally the barrier should be 'set out' around the clear span required.

#### 1. For Clear Spans Less Than or Equal To 4 metres

Treatment is to be as shown in Main Roads standard drawing 201031-0030.

#### 2. For Clear Span > 4 metres and Less Than or Equal To 8 metres

Treatment is to be in accordance with the FHWA approval letter B58 (attached) with the following modifications:

1. W152 x 13.4 steel posts 1830 mm long as used in the test be substituted with AS / NZS 3845 C posts;
2. Blockouts to be 150 x 150 rather than 150 x 200;
3. That 3.81 metre rail lengths are replaced with standard 4 metre rail lengths;
4. Post spacing changed from 1905 mm to 2000 mm;
5. That in using the long span option, the connection of the beam between posts 11 & 12 be at the centre of the span which requires that the barrier be set out around the span;
6. That the barrier must be a minimum length of 53 metres including end treatments.

Main Roads produced standard drawing 201031-0029 that showed these modifications.

The use of this option requires timber blockouts and timber CRT posts which are to be weakened as described in approval letter B58, a copy of which is attached.

Following release of this drawing, non-conforming installations of this treatment were consistently undertaken without using timber blockouts or timber posts. This practice was not acceptable, so Main Roads standard drawing 201031-0029 has been withdrawn from use. W beam treatments for clear spans > 4m and ≤ 8m are no longer accepted.

## W-BEAM TREATMENTS



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.

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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.

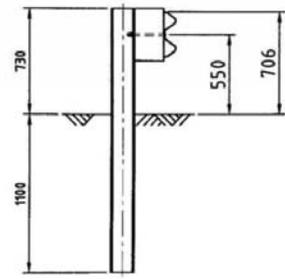
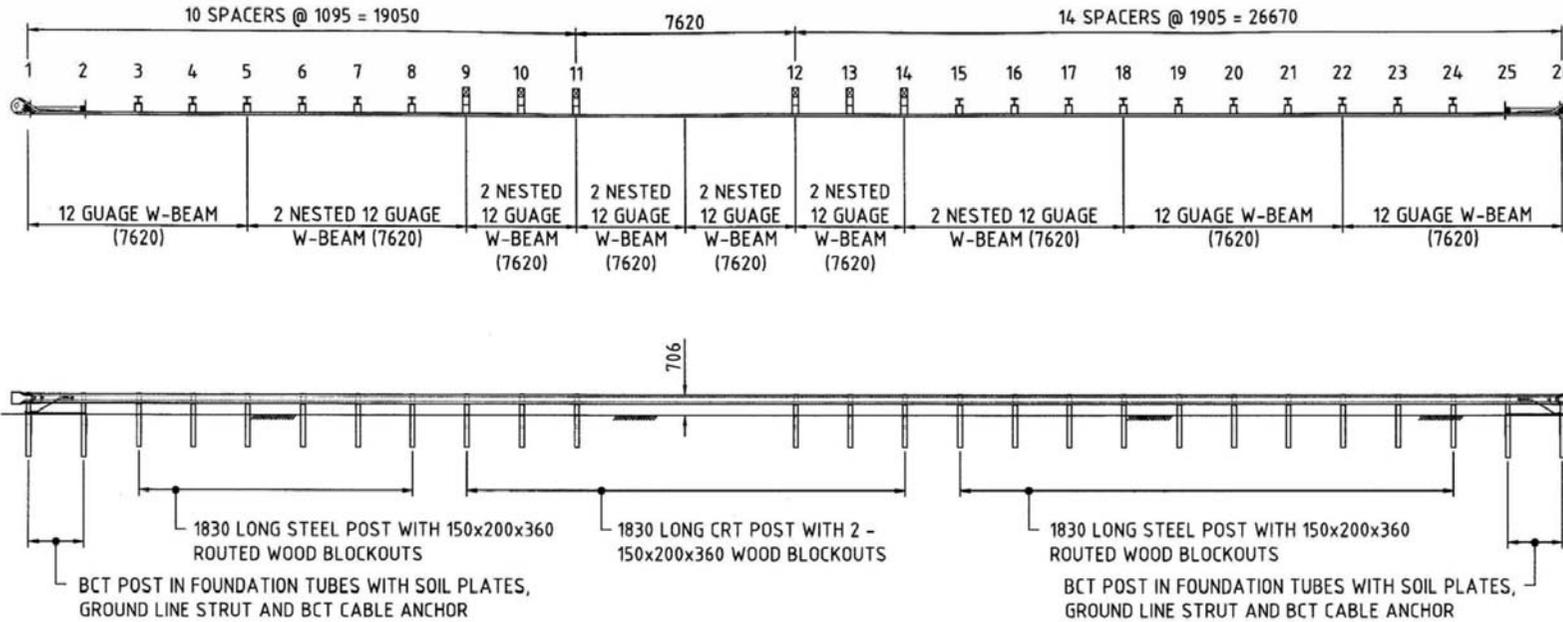
Sincerely yours,



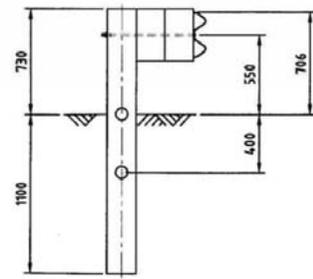
Dwight A. Horne  
Director, Office of Highway Safety Infrastructure

2 Enclosures

# W-BEAM TREATMENTS

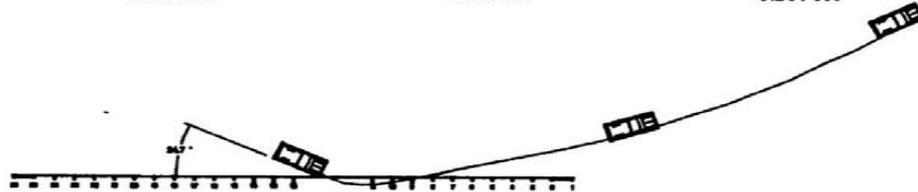
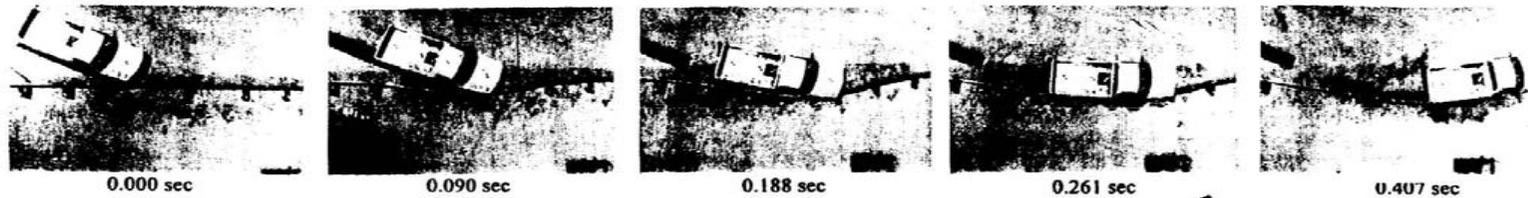


W152x13.4 STEEL POSTS, 1830 LONG WITH 150x200x360 ROUTED WOOD BLOCKOUTS  
POSTS 3-8, 15-24



CRT WOOD POSTS, 1830 LONG WITH 2 - 150x200x360 WOOD BLOCKOUTS  
POSTS 9-14

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- 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
  - TAD<sup>14</sup> ..... 1-RFQ-3
  - SAE<sup>15</sup> ..... 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)

ENCLOSURE 2