U.S. Department
of Transportation
Federal Highway Administration

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

October 12, 2005 In Reply Refer To: HSA-10/B-96A

Mr. Rick Mauer
Outside Sales National Representative
Nucor Steel Marion Inc.
912 Chaney Avenue
Marion, Ohio 43302

Dear Mr. Mauer:

The Federal Highway Administration formally accepted your high-tension 3-strand cable median barrier in Ms. Carol H. Jacoby's August 30, 2002 letter to you. This original acceptance letter, designated as B-96, mistakenly described the Saferoads barrier as a 3-strand cable guardrail with wire ropes 520 mm, 650 mm, and 775 mm above the ground. As noted below, the cable heights were actually 545 mm, 650 mm, and 750 mm. Its line posts were standard 1664-mm long 6 kg/m U-channel posts installed on 2-meter centers with trapezoidal soil plates just below the ground line. The cables were attached to the line posts with proprietary 6.4-mm diameter locking hook bolts. The test installation was anchored at both ends with the Texas Transportation Institute's (TTI) proprietary Cable Guardrail Terminal and each cable was tensioned to 25 kN (5600 lbs.) for the ambient temperature of 21 degrees Celsius.

Your September 9, 2005 letter to Mr. Richard Powers of my staff requested acceptance of two variations on the original design. The first change was the use of your standard 6 kg/m U-channel line posts, 1219-mm long, set in 100-mm diameter 12-gauge steel pipe sockets in lieu of direct-driven posts with soil plates. Each socket was set in the center of a 300-mm diameter by 760-mm deep reinforced concrete footing. The second change was the post spacing. Whereas the original design used line posts on 2-m centers, you tested installations with post spacings of 3.8 m and 5.1 m. Detailed information on these tests was contained in copies of TTI's reports entitled "NCHRP Report 350 Test 3-11 on Saferoads Cable Rail with Socketed Posts Spaced at 3.8 m" (dated May 2005) and "NCHRP Report 350 Test 3-11 of the Nucor Steel Marion, Inc. Cable Barrier with Posts Spaced at 5.1 m" (dated September 2005). While reviewing your request, staff members noted a discrepancy between the heights of the cables noted in the report narratives and those shown on the report drawings. A revised report, "NCHRP Report 350 Test 3-11 of the Nucor Steel Marion, Inc. US High Tension Cable System (16 ft-8 in Line Post Spacing),"dated October 2005, confirmed the height of each cable, measured at its center at each line post, to be 545 mm, 650 mm, and 750 mm.

As seen in the report titles, NCHRP Report 350 Test No. 3-11 was run on both test installations. In the first test, conducted on March 29, 2002 with the 3.8-m post spacing, the pickup truck impacted at post 14 at 99.3 km/h and at an impact angle of 25.7 degrees. All Report 350 evaluation criteria were met and the barrier dynamic deflection was reported to be 1.8 m. In the second test, conducted on July 26, 2005 with the 5.1-m post spacing, the truck impacted at 98.1 km/h and 26.4 degrees. The dynamic deflection of the cable barrier in the second test was 2.3 m. Summary sheets from the TTI test reports for each test are enclosed.

Both 3-strand cable barrier variations described above are acceptable for use on the National Highway System as NCHRP Report 350 test level 3 median barriers. Since both the TTI anchor used in the test installations and the locking hook bolts at each line post are considered proprietary, the provisions of Title 23 CFR, Section 635.411 apply to the use of this system on federally funded projects.

Sincerely yours,

/original signed by/

John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

Enclosure

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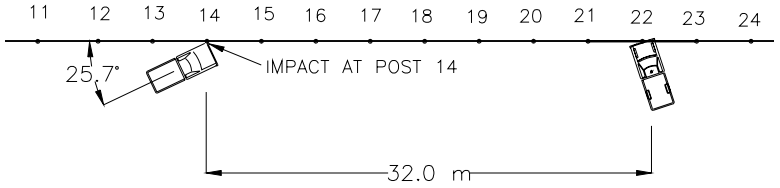
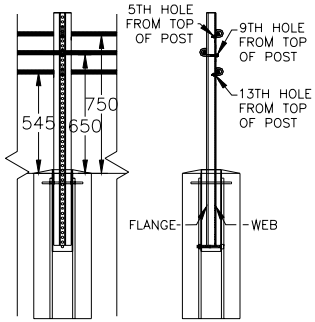




CABLE HEIGHTS ALONG LON
(HOOK BOLTS)

General Information
- Test Agency: Texas Transportation Institute
- Test No.: 400001-SFR4
- Date: 03-29-2005

Test Article
- Type: Guardrail
- Name: SAFERoads Cable Rail
- Installation Length (m): 101.4
- Material or Key Elements: Three-Cable Barrier System With Socketed Posts Spaced at 3.8 m

Soil Type and Condition: Standard Soil, Dry

Test Vehicle
- Type: Production
- Designation: 2000P
- Model: 1999 Chevrolet 2500 Pickup
- Mass (kg)
  - Curb: 2201
  - Test Inertial: 2074
  - Dummy: N/A
  - Gross Static: 2074

Impact Conditions
- Speed (km/h): 99.3
- Angle (deg): 25.7

Exit Conditions
- Speed (km/h): N/A
- Angle (deg): N/A

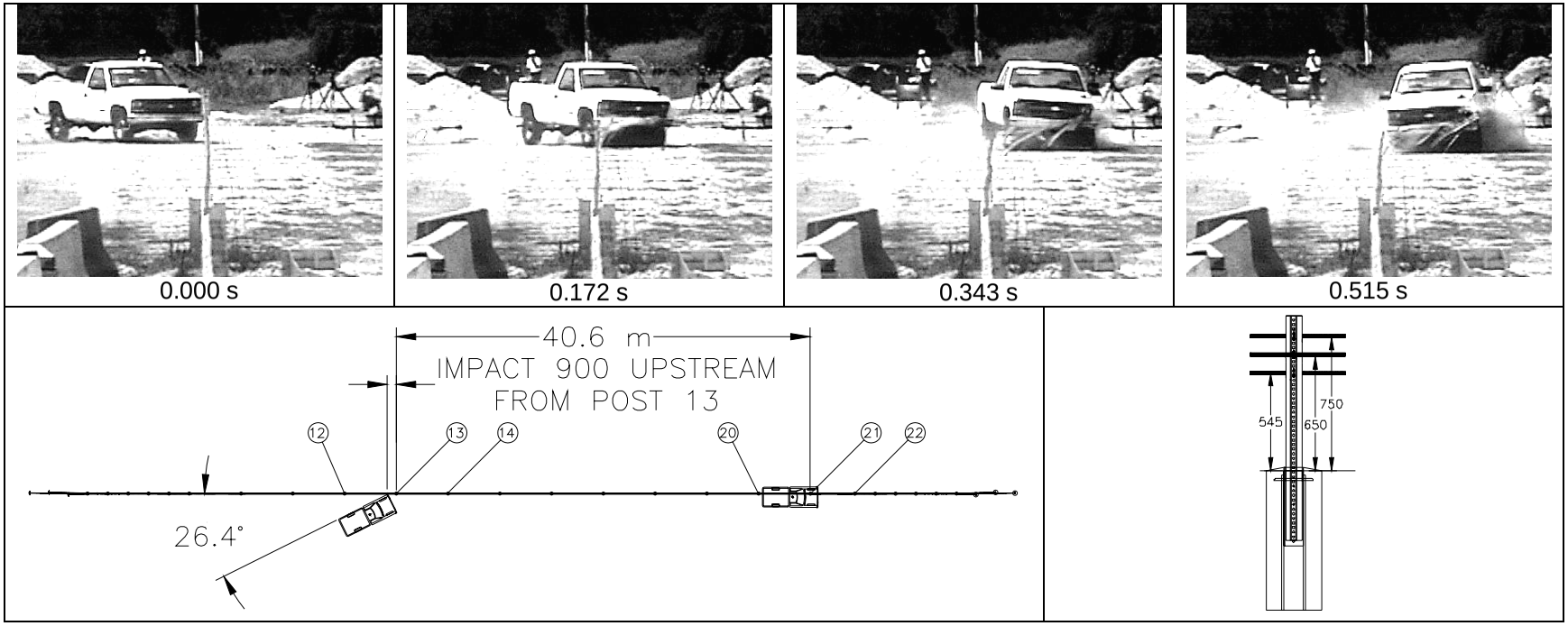
Occupant Risk Values
- Impact Velocity (m/s)
  - Longitudinal: 2.7
  - Lateral: 4.0
- THIV (km/h): 16.1
- Ridedown Accelerations (g's)
  - Longitudinal: -5.3
  - Lateral: 6.3
- PHD (g's): 7.2
- ASI: 0.49
- Max. 0.050-s Average (g's)
  - Longitudinal: -3.0
  - Lateral: 3.9
  - Vertical: 1.6

Test Article Deflections (m)
- Dynamic: 1.80
- Permanent: N/A
- Working Width: 2.30

Vehicle Damage
- Exterior
  - VDS: 11FL2
  - CDC: 11FLEW2
  - Maximum Exterior Vehicle Crush (mm): 160
- Interior
  - OCDI: LF0000000
  - Maximum Occupant Cmpt. Deformation (mm): None

Post-Impact Behavior
(during 1.0 sec after impact)
- Max. Yaw Angel (deg): 32
- Max. Pitch Angle (deg): 2
- Max. Roll Angle (deg): 10

Figure 15. Summary of results for *NCHRP Report 350* test 3-11 on the SAFERoads cable barrier with socketed posts spaced at 3.8 m.



General Information

Test Agency	Texas Transportation Institute
Test No.	400001-SFR5
Date	07-26-2005

Test Article

Type	Cable Guardrail
Name	Nucor Steel Marion, Inc. Cable Barrier
Installation Length (m)	100
Material or Key Elements	High Tension, 3 Cable Median Barrier 5.1 m Post Spacing
Soil Type and Condition	Standard Soil, Dry

Test Vehicle

Type	Production
Designation	2000P
Model	2000 Chevrolet 2500 Pickup Truck
Mass (kg)	
Curb	2164
Test Inertial	2123
Dummy	No dummy
Gross Static	2123

Impact Conditions

Speed (km/h)	98.1
Angle (deg)	26.4

Exit Conditions

Speed (km/h)	Stopped
Angle (deg)	N/A

Occupant Risk Values

Impact Velocity (m/s)	
Longitudinal	4.9
Lateral	3.8
THIV (km/h)	19.9
Ridedown Accelerations (g's)	
Longitudinal	-4.3
Lateral	5.2
PHD (g's)	6.1
ASI	0.42
Max. 0.050-s Average (g's)	
Longitudinal	-2.7
Lateral	3.5
Vertical	2.9

Test Article Deflections (m)

Dynamic	2.31
Permanent	N/A
Working Width	2.35

Vehicle Damage

Exterior	
VDS	11LFQ1
CDC	11FLEW1
Max. Exterior	
Vehicle Crush (mm)	70
Interior	
OCDI	FS0000000
Max. Occupant Compartment	
Deformation (mm)	0

Post-Impact Behavior

(during 1.0 sec after impact)	
Max. Yaw Angle (deg)	28
Max. Pitch Angle (deg)	-3
Max. Roll Angle (deg)	5

Figure 16. Summary of results for *NCHRP Report 350* test 3-11 on Nucor Steel Marion, Inc. cable barrier.