

January 28, 2004

Refer to: HSA-10/CC-86

Mr. Derek W. Muir  
Group Managing Director, Hill & Smith Ltd.  
Springvale Avenue, Bilston  
Wolverhampton, WV14 OQL  
West Midlands, United Kingdom

Dear Mr. Muir:

On December 16, 2003, Dr. Richard G. McGinnis, your consultant, and Mr. Jerry Emerson, representing BRIFEN USA, presented members of my staff with the final design details and crash test reports for a proprietary end terminal for use with the BRIFEN Wire Rope Safety Fence. All testing was done at the Motor Industry Research Association (MIRA) located at Nuneaton, United Kingdom. Tests designated as National Cooperative Highway Research Program Report 350 tests 3-30, 3-34, 3-35, and 3-39 were successfully completed. In previous discussions between Dr. McGinnis and members of my staff, it was mutually agreed that for your specific terminal design, tests 3-31, 3-32, and 3-33 could be waived if no concerns were noted in any of the remaining tests.

Your terminal, called the BRIFEN Wire Rope Gating Terminal (WRGT), interweaves each of the four BRIFEN cables around four anchor posts (Type A, B1, B2, and B3) having an "S" (or "Z") shape cross section and into an angled steel bracket set in a 1220-mm diameter by 914-mm deep concrete foundation. The overall layout, including post designs, spacing and detailed dimensions are shown in enclosures 1 through 5. Existing BRIFEN terminals may be retrofitted with the crashworthy design. A retrofit would require replacement of the 15 posts immediately adjacent to each anchor with the non-slotted length of need (LON) posts shown in enclosure 5. The four cables would then be woven around each post until reaching the original slotted LON posts where the top cable would be set in the slot in the top of each post. For new installations, the 4-mm thick non-slotted post may be used in place of the original 6-mm thick slotted post throughout the barrier LON. For design purposes, the dynamic deflection of the BRIFEN with 4-mm line posts may be assumed to be 2.5 meters, slightly greater than the test results with the 6-mm thick line posts. For test 3-35, the line posts were oriented so the "sharp" edges of the "S" posts were facing the test vehicle, an expected worst-case situation. I understand that your recommended orientation for field installations is to set these posts so the curved edge faces approach traffic, but agree that either orientation is acceptable.

All tests were conducted on a 100-m long installation, excluding the 7.75-m length of the terminal itself. As with all gating, non-energy absorbing terminals, impacts at or near the end of the WRGT will allow a vehicle to travel a significant distance behind and beyond the barrier, a factor that must be considered in the design and layout of the barrier installation. In cases where penetration behind the terminal is not acceptable (i.e., where significant vehicular intrusion may have severe consequences) and the barrier cannot be extended, an energy-absorbing crash cushion remains a feasible alternative. In test 3-35, the pickup truck struck the rail approximately 1600-mm upstream from the first line post or 9,350-mm downstream from the terminal end. Consequently, this point should be considered the beginning of the barrier LON. The results of each test are summarized in Enclosures 6 through 9.

Based on the results of these tests, the BRIFEN WRGT meets all evaluation criteria for a test level 3 terminal. Therefore, it may be used on the National Highway System (NHS) when selected by the appropriate transportation agency. You will be expected to certify that any hardware you furnish has essentially the same chemistry, mechanical properties, and geometry as that tested, and to provide users with sufficient information on design and installation requirements to ensure proper performance.

Any agency interested in a BRIFEN WRSF installation may obtain additional information from your website at [www.brifenus.com](http://www.brifenus.com). As noted in the Federal Highway Administration's February 27, 2003, acceptance letter B-82A, the BRIFEN system is currently manufactured in the United States from U.S. steel and is no longer subject to the "Buy America" provisions of Title 23 Code of Federal Regulations, Section 635.410. Because it is still a proprietary product, its use on the NHS must continue to comply with Title 23, Code of Federal Regulations, Section 635.411.

Sincerely yours,

*/Original Signed By/*

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

9 Enclosures