



U.S. Department
of Transportation

**Federal Highway
Administration**

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

December 13, 1999

Refer to: HMHS-B62

Mr. Gunnar Englund
President, Gunnar Prefab AB
Box 208, SE-792 23
Mora, SWEDEN

Dear Mr. Englund:

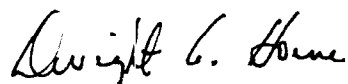
In response to your March 17 letter to Mr. Richard Powers of my staff, you were advised that your precast concrete barrier, called GPLINK, could be accepted for use in the United States if it performed acceptably in the two full-scale crash tests recommended in the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features" for a test level 3 (TL-3) barrier. At that time, you had already completed and reported to us a successful test with a small car (NCHRP Report 350 test 3-10), and needed only to complete NCHRP Report 350 test 3-11, an impact with a 2000-kg (4400-pound) pickup truck at an impact angle of 25 degrees and an impact speed of 100 km/h (62.2 mph). On October 6, you sent Mr. Powers a copy of a test report prepared by the Swedish National Road and Transport Research Institute (VTI) which reported the results obtained for test 3-11.

After reviewing both test reports, we can agree that each test met the evaluation criteria recommended in NCHRP Report 350. Both vehicles were redirected upright with no passenger compartment intrusion. For test 3-10, the theoretical occupant impact velocities were 4.1 m/s in the longitudinal direction and 6.6 m/s in the lateral direction. Longitudinal and lateral ridedown accelerations were 3.3 G's and 4.5 G's, respectively. Barrier deflection was reported as 420 mm (16.5 inches). For test 3-11, the comparable longitudinal/lateral values for occupant impact velocities were 4.4 m/s and 6.9 m/s and for ridedown accelerations, 13.5 G's and 15.4 G's. Barrier deflection for the pickup-truck test was 1760 mm (69.3 inches). Roll, pitch and yaw angles were 36.2 degrees, 24.7 degrees and 75.8 degrees, respectively.

The tested GPLINK precast concrete barrier segments were 6-m (approximately 20-feet) long and 870-mm (34.25-inches) high. Width at the base supports was 440 mm (17.3 inches) and the barrier itself was 240-mm (9.45-inches) thick with vertical sides. Adjacent segments were connected with 680-mm (26.8-inch) long, 22-mm (0.87-inch) diameter steel rods inserted through holes in steel plates, two of which are cast into each barrier segment. Steel reinforcing consists primarily of 10 16-mm (0.63-inch) steel bars. These and other design details are shown in Enclosure 1 to this letter.

Based on our review of the information you provided, we find the GPLINK precast concrete barrier, as tested, to meet the requirements for an NCHRP Report 350 test level 3 (TL-3) traffic barrier. It may be used on the National Highway System in the United States when such use is requested by the governing transportation agency. Federal laws currently require steel products and products containing significant amounts of steel to be manufactured in the United States using U.S. steel. We assume that you plan eventually to manufacture the GPLINK barrier in this country. Since it is a proprietary product, its use on Federal-aid projects, except exempt, non-NHS projects, is subject to the conditions listed in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed (Enclosure 2) for your reference. Please do not hesitate to contact Mr. Powers by e-mail at richard.powers@fhwa.dot.gov or call him at (202) 366-1320 if you have any questions regarding this letter.

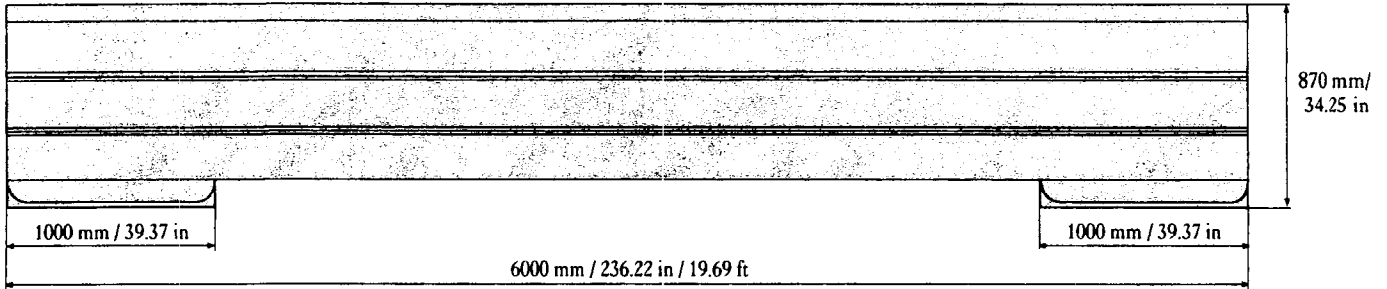
Sincerely yours,

A handwritten signature in cursive script that reads "Dwight A. Horne".

Dwight A. Horne
Director, Office of Highway Safety Infrastructure

2 Enclosures

Technical description -- road barrier



Reinforcement – beam

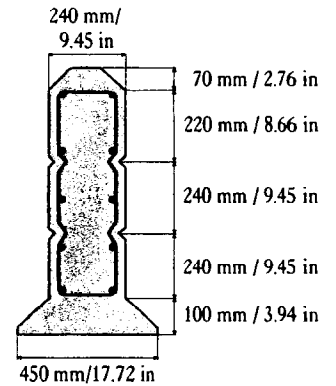
Longitudinal \varnothing 16 mm/0.63 in – 10 pcs.
 Quality of steel in Swedish standard:
 KS 60 S (SIS 21 25 15)
 Distributional reinforcement profile
 \varnothing 8 mm/0.31 in – 8 pcs.
 Quality of steel in European standard:
 B 500 BT (ENV 10 080:1995)

Concrete

Frostresistant with deicing salt.
 Strength class K40 MPa (cube)
 equal to 4300 psi (cylinder)

Weight per section

Approx. 2800 kg/6222 lb.



Reinforcement – base

Anti-fissure reinforcement \varnothing 8 mm/0.31 in.

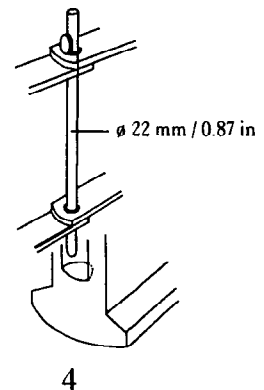
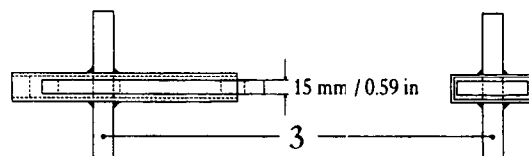
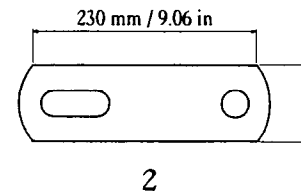
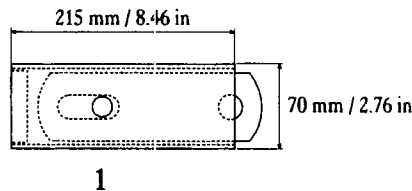
Distance blocks

Coating layer 35 mm/1.38 in.
 Plastic spacer.

Steel

The steel used in the joint are equal to U.S. standard as follows.

1. A283 - 84GR.C
2. A572 - 85GR.C
3. A615
4. NF 25CD4u



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.