



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

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

December 6, 2000

Refer to: HSA-1\HSA-B76

Mr. Dwight Smith-Gander  
President, Amity Plastics, Ltd.  
P.O. Box 59  
Clyde, Alberta  
Canada TOG OPO

Dear Mr. Smith-Gander:

In your October 19 letter to Mr. Richard Powers of my staff, you requested acceptance of a recycled plastic guardrail post as a direct replacement for the 150 mm x 200 mm wood post currently used with the G4(2W) guardrail system. To support your request, you also sent him a copy of the Texas Transportation Institute's October 2000 report entitled "NCHRP Report 350 TEST 3-11 on the G4 Guardrail with Amity Recycled Plastic Posts and Wood Blockouts" and a copy of the crash test video tape.

The Amity recycled plastic guardrail post that was tested was an H-shape cross-section design with exterior dimensions of 152 mm x 191 mm. Recesses measuring approximately 92-mm wide x 35-mm deep were formed on the wide sides of each post. The tested posts were 1486-mm long. Each post contains two 16-mm hooked reinforcing bars, as shown in Enclosure 1. The posts are made from recycled medium and high density polyethylene containers.

These posts were tested with standard wood blocks and 12-gauge w-beam rail elements with a 2000-kg pickup truck impacting at the nominal speed of 100 km/h and an impact angle of 25 degrees. As noted in the test summary sheet (Enclosure 2), the test vehicle was contained and smoothly redirected. Occupant risk values were well below the maximum allowable limits. When compared to the test results with the standard G4(2W) guardrail system, the Amity post design resulted in lower occupant impact velocities and ridedown accelerations and significantly better post-impact vehicle trajectory. However, six Amity posts were broken at the ground line and the dynamic deflection of the barrier system was 1.36 m or approximately 4.5 feet. We concur with the researchers conclusion that the Report 350 severity test with the 820-kg car may be waived in light of the barrier's performance with the pickup truck, but would recommend that initial installations of the barrier be closely monitored to verify its in-service performance.

Based on the information you provided, I agree that the Amity recycled guardrail post may be considered acceptable for use on the National Highway System as a substitute for the wood post currently used in the G4(2W) barrier system when such use is requested by the contracting highway agency. As with other recycled plastic products used in roadside hardware, this acceptance is based on the demonstrated crash performance of the barrier system and does not address the long-term performance or durability of your posts. Also, this acceptance is for the use

of these posts in the barrier proper. They cannot be used in guardrail terminals or in guardrail transitions unless specifically tested for those applications. Since your post contains steel and is a proprietary design, the provisions of Section 635.410 (Buy America requirements) and Section 635.411 (Material or product selection) of Title 23, Code of Federal Regulations both apply. A copy of these regulations is provided for your ready reference (Enclosure 3).

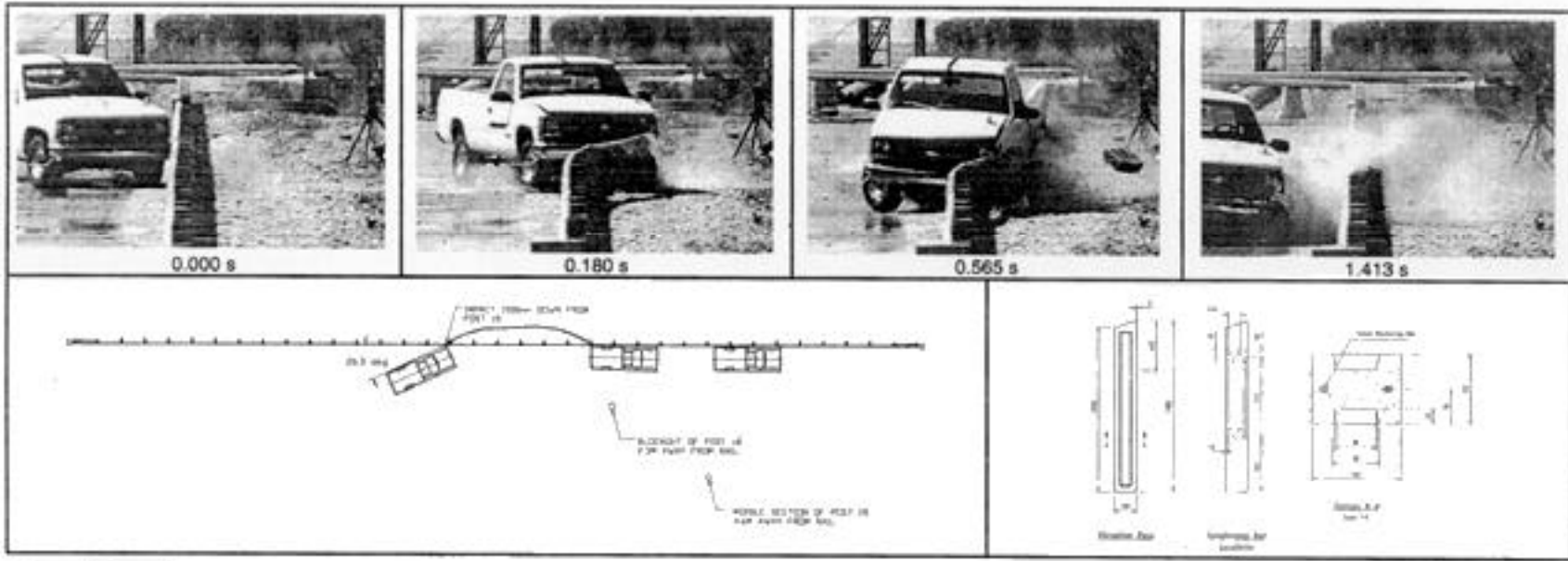
Please do not hesitate to call Mr. Powers at (202) 366-1320 if you have any questions regarding this acceptance of your product.

Sincerely yours,

Frederick G. Wright, Jr.  
Program Manager, Safety

3 Enclosures





| General Information            |                                                                         | Impact Conditions            |      | Test Article Deflections (m)        |                     |
|--------------------------------|-------------------------------------------------------------------------|------------------------------|------|-------------------------------------|---------------------|
| Test Agency                    | Texas Transportation Institute                                          | Speed (km/h)                 | 97.0 | Dynamic                             | 1.362               |
| Test No.                       | 400001-APL1                                                             | Angle (deg)                  | 26.5 | Permanent                           | 0.795               |
| Date                           | 08/24/00                                                                | <b>Exit Conditions</b>       |      | Working Width                       | 1.668               |
| <b>Test Article</b>            |                                                                         | Speed (km/h)                 | 51.5 | <b>Vehicle Damage</b>               |                     |
| Type                           | Guardrail                                                               | Angle (deg)                  | 0.0  | Exterior                            |                     |
| Name                           | G4 Guardrail with Amity Plastic's Recycled Posts                        | <b>Occupant Risk Values</b>  |      | VDS                                 | 11LFQ4              |
| Installation Length (m)        | 76.1                                                                    | Impact Velocity (m/s)        |      | CDC                                 | 11FLEK3<br>&11LDEW3 |
| Material or Key Elements       | 12 gauge W-beam Guardrail on recycled plastic posts with wood blockouts | x-direction                  | 3.8  | Maximum Exterior Vehicle Crush (mm) | 300                 |
| <b>Soil Type and Condition</b> | Standard Soil, Dry                                                      | y-direction                  | 3.6  | Interior                            |                     |
| <b>Test Vehicle</b>            |                                                                         | THIV (km/h)                  | 17.1 | OCDI                                | LF0000000           |
| Type                           | Production                                                              | Ridedown Accelerations (g's) |      | Max. Occ. Compart. Deformation (mm) | nil                 |
| Designation                    | 2000P                                                                   | x-direction                  | -9.5 | <b>Post-Impact Behavior</b>         |                     |
| Model                          | 1996 Chevrolet 2500 Pickup Truck                                        | y-direction                  | 6.4  | (during 1.0 s after impact)         |                     |
| Mass (kg)                      |                                                                         | PHD (g's)                    | 9.5  | Max. Yaw Angle (deg)                | 32                  |
| Curb                           | 1980                                                                    | ASI                          | 0.54 | Max. Pitch Angle (deg)              | 5                   |
| Test Inertial                  | 2000                                                                    | Max. 0.050-s Average (g's)   |      | Max. Roll Angle (deg)               | -7                  |
| Dummy                          | No dummy                                                                | x-direction                  | -3.2 |                                     |                     |
| Gross Static                   | 2000                                                                    | y-direction                  | 4.3  |                                     |                     |
|                                |                                                                         | z-direction                  | 3.9  |                                     |                     |

Figure 9. Summary of Results for test 400001-APL1, NCHRP Report 350 test 3-11.

**THE FOLLOWING IS EXCERPTED FROM TITLE 23 CODE OF FEDERAL REGULATIONS (HIGHWAYS) SECTION 635.410 AS AMENDED TO INCORPORATE CHANGES MADE BY THE 1991 ISTEA (FEDERAL REGISTER, JULY 21, 1993; 58 FR 38973):**

**Sec. 635.410 Buy America requirements.**

(a) The provisions of this section shall prevail and be given precedence over any requirements of this subpart which are contrary to this section. However, nothing in this section shall be construed to be contrary to the requirements of Sec. 635.409(a) of this subpart.

(b) No Federal-aid highway construction project is to be authorized for advertisement or otherwise authorized to proceed unless at least one of the following requirements is met:

(1) The project either: (i) includes no permanently incorporated steel or iron materials, or (ii) if steel or iron materials are to be used, all manufacturing processes, including application of a coating for these materials must occur in the United States. Coating includes all processes which protects or enhances the value of the material to which the coating is applied.

(2) The State has standard contract provisions that require the use of domestic materials and products, including steel and iron materials, to the same or greater extent as the provisions set forth in this section.

(3) The State elects to include alternate bid provisions for foreign and domestic steel and iron materials which comply with the following requirements. Any procedure for obtaining alternate bids based on furnishing foreign steel and iron materials which is acceptable to the Division Administrator may be used. The contract provisions must (i) require all bidders to submit a bid based on furnishing domestic steel and iron materials, and (ii) clearly state that the contract will be awarded to the bidder who submits the lowest total bid based on furnishing domestic steel and iron materials unless such total bid exceeds the lowest total bid based on furnishing foreign steel and iron materials by more than 25 percent.

(4) When steel and iron materials are used in a project, the requirements of this section do not prevent a minimal use of foreign steel and iron materials, if the cost of such materials used does not exceed one-tenth of one percent (0.1 percent) of the total contract cost or \$2,500, whichever is greater. For purposes of this paragraph, the cost is that shown to be the value of the steel and iron products as they are delivered to the project.

(c) (1) A State may request a waiver of the provisions of this section if;

(i) The application of those provisions would be inconsistent with the public interest; or

(ii) Steel and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

(2) A request for waiver, accompanied by supporting information, must be submitted in writing to the Regional Federal Highway Administrator (RFHWA) through the FHWA Division Administrator. A request must be submitted sufficiently in advance of the need for the waiver in order to allow time for proper review and action on the request. The RFHWA will have approval authority on the request.

(3) Requests for waivers may be made for specific projects, or for certain materials or products in specific geographic areas, or for combinations of both, depending on the circumstances.

(4) The denial of the request by the RFHWA may be appealed by the State to the Federal Highway Administrator (Administrator), whose action on the request shall be considered administratively final.

(5) A request for a waiver which involves nationwide public interest or availability issues or more than one FHWA region may be submitted by the RFHWA to the Administrator for action.

(6) A request for waiver and an appeal from a denial of a request must include facts and justification to support the granting of the waiver. The FHWA response to a request or appeal will be in writing and made available to the public upon request. Any request for a nationwide waiver and FHWA's action on such a request may be published in the Federal Register for public comment.

(7) In determining whether the waivers described in paragraph (c)(1) of this section will be granted, the FHWA will consider all appropriate factors including, but not limited to, cost, administrative burden, and delay that would be imposed if the provision were not waived.

(d) Standard State and Federal-aid contract procedures may be used to assure compliance with the requirements of this section.

**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.