



U.S. Department
of Transportation

**Federal Highway
Administration**

March 11, 1997

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

Refer to: HNG-14

Mr. David L. Tarrant
Plant Manager
Mondo Polymer Technologies, Inc.
State Route 7
P.O. Box 250
Reno, Ohio 45773

Dear Mr. Tarrant:

Your February 18 letter to Mr. James Hatton, Jr., of my office provided the Federal Highway Administration (FHWA) information on the crash-test performance of your company's w-beam guardrail offset blocks made from recycled plastics. These *Polymer Offset Blocks* consist of 70 percent low density polyethylene and approximately 30 percent high density polyethylene with a trace of other plastics. Details of the crash test and the physical properties of the *Polymer Offset Blocks* are contained in a Texas Transportation Institute February 1997 report, "Testing and Evaluation of a Modified Steel Post W-beam Guardrail with Recycled Polyethylene Blockouts."

Your blockout was tested on a standard guardrail installation using W150 x 13.5 steel posts on 1905-mm centers and with a 550-mm mounting height to the center of the 12-gauge (2.67 mm) w-beam rail element. The blockouts measure 152 mm x 200 mm x 356-mm long. A 106-mm wide x 7-mm deep channel was molded into one of the 152-mm faces of the blockout to fit over the flange of the steel post to prevent rotation of the blockout. A 19-mm diameter attachment bolt hole is drilled through the block 178 mm from the top and 108 mm from one edge of the blockout. These dimensions are shown in Enclosure 1.

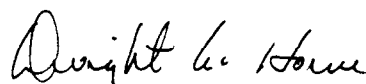
The National Cooperative Highway Research Program Report 350 requires two tests to determine the adequacy of a traffic barrier at test level 3 (TL-3): an 820-kg car at 20 degrees and 100 km/h (test 3-10) and a 2000-kg pickup truck at 25 degrees and 100 km/h (test 3-11). Since the former test has been successfully run on the standard G4(1S) guardrail and the increased depth of the *Polymer Offset Blocks* over the steel blockout should enhance small car performance by minimizing wheel-to-post contact, test 3-10 is not considered necessary. The results of test 3-11 are summarized in Enclosure 2. We note that vehicular redirection

was smooth and there was less damage to the truck than has been seen in comparable tests with equivalent barriers. Occupant impact velocities and subsequent ridedown decelerations were 6.74 m/s and 9.80 g's, respectively, significantly below the preferred limits of 9m/s and 15 g's. Maximum dynamic deflection of the barrier was 1130 mm.

Based on our review of the above information, we conclude that your *Polymer Offset Block* is acceptable for use on projects on the National Highway System (NHS) when selected by a State highway agency. We also concur with the conclusion in the TTI Report that the *Polymer Offset Block*, without the formed channel and with the bolt hole centered, is acceptable for use as a substitute for the timber block on the standard G4(2W) guardrail system. The guardrail back-up plates required at non-splice posts when steel blockouts are used will not be required when *Polymer Offset Blocks* are used.

Since your product is proprietary, its use on Federal-aid highway projects, except exempt, non-NHS projects, is subject to the conditions stated in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed for your information. We anticipate also that most State highway agencies will require certification that the blockouts you furnish have essentially the same chemical composition, mechanical properties, and geometry as those used in the testing and that the quality control program you reported to us remains in effect. By a copy of this letter, we will advise our FHWA field offices of this action. If you have any questions, please call Mr. Hatton at (202) 366-1329 or Mr. Richard Powers at (202) 399-1320.

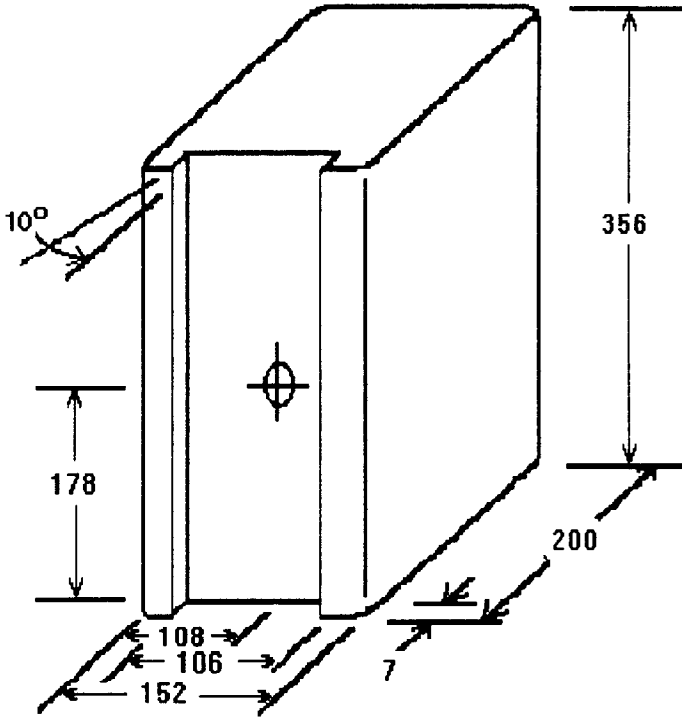
Sincerely yours,



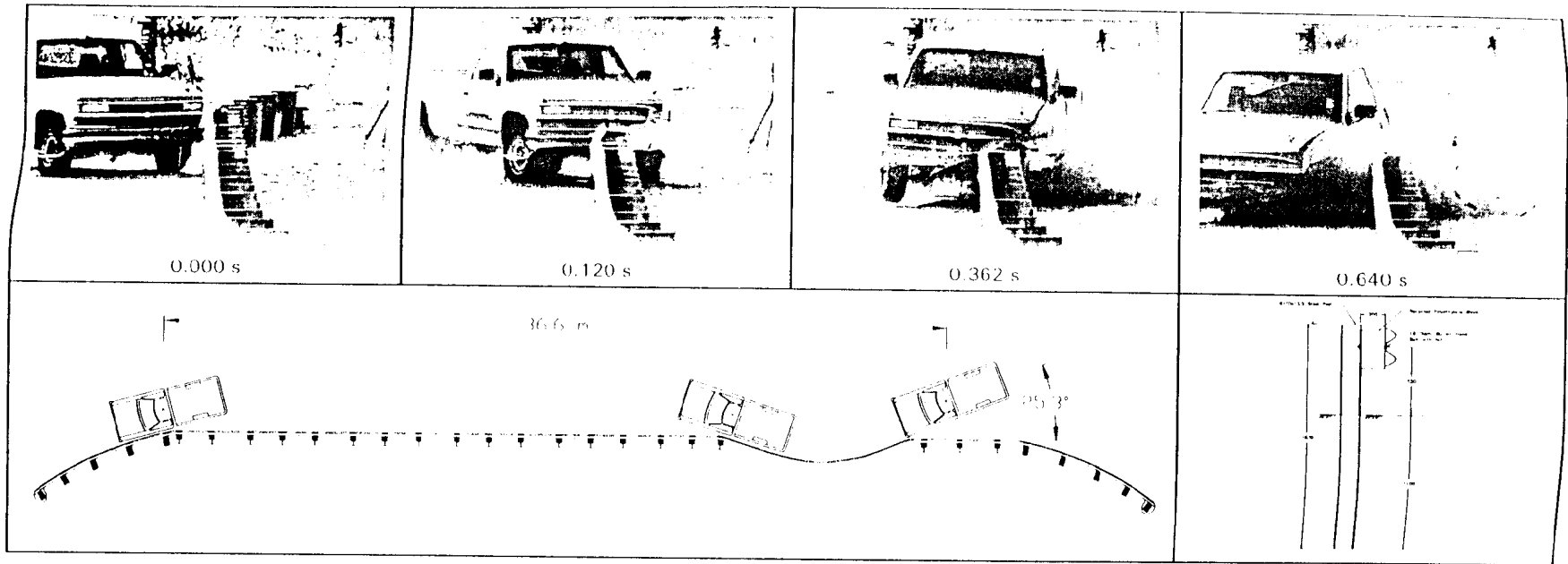
Dwight A. Horne, Chief
Federal-Aid and Design Division

3 Enclosures

Mondo Polymer Technologies Recycled Polyethylene Offset Block



- Dimensions given in SSI units
- Hole is 19mm drill
- All exterior corners radiused 13mm



TC	General Information		Impact Conditions		Test Article Deflections (m)	
	Test Agency	Texas Transportation Institute	Speed (km/h)	100.93	Dynamic	1.13
	Test No.	400001-MP11	Angle (deg)	25.26	Permanent	0.72
	Date	11/13/96				
	Test Article		Exit Conditions		Vehicle Damage	
	Type	Guardrail	Speed (km/h)	46.12	Exterior	
	Name	W-beam w/polyethylene blockouts	Angle (deg)	13.40	VDS	111FQ3
	Installation Length (m)	53.3			CDC	11FLEW3
	Size and/or dimension and material of key elements	Standard W beam guardrail on steel posts with polyethylene blockouts	Occupant Risk Values		Maximum Exterior	
	Soil Type and Condition	Standard soil, dry	Impact Velocity (m/s)		Vehicle Crush (mm)	490
Test Vehicle		x direction	6.74	Interior		
Type	Production	y direction	4.30	OCDI	FS0000000	
Designation	2000P	Ridedown Accelerations (g's)		Max. Occ. Compart.		
Model	1992 Chevrolet 2500 pickup	x direction	9.80	Deformation (mm)	0	
Mass (kg) Curb	2027	y direction	6.86	Post-Impact Behavior		
Test Inertial	2000	Max. 0.050 s Average (g's)		(during 1.0 s after impact)		
Dummy	No dummy	x direction	-5.12	Max. Roll Angle (deg)	43	
Gross Static	2000	y direction	4.42	Max. Pitch Angle (deg)	3	
		z direction	3.57	Max. Yaw Angle (deg)	5	

Figure 13. Summary of results for test 400001-MP11.

these materials must occur in the United States.

(2) The State has standard contract provisions that require the use of domestic materials and products, including steel 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 materials to include alternate bid provisions for foreign and domestic steel materials which is acceptable to the Division Administrator may be used. The bidders to submit a bid based on furnishing domestic steel materials, and clearly state that the contract will be awarded to the bidder who submits the lowest total bid based on furnishing domestic steel materials unless such total bid exceeds the lowest total bid based on furnishing foreign steel materials by more than 25 percent.

(4) When steel materials are used in a project, the requirements of this section do not prevent a minimal use of foreign steel 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 in the value of the steel products as they are delivered to the project.

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

(6) A request for waiver, accompanied by supporting information, must be submitted in writing to the Region-1 Federal Highway Administrator (RPHWA) 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 RPHWA will have approval authority on the request.

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(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 RPHWA 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 RPHWA 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.

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

(9) A specific material or product quite 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 as established.

(10) Appendix A sets forth the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be purchased or obtained through

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(a) Except as provided in paragraph (b) of this section, clauses that require the contractor to guarantee or warrant materials and workmanship or to otherwise maintain the work for a specified period after the satisfactory completion by the contractor and the final acceptance by the State, will not be approved for use in Federal-aid contracts. Work performed and materials replaced under such guaranty or warranty clauses after final acceptance of work are not eligible for Federal participation.

(b) Contracts which involve furnishing and/or installing electrical or mechanical equipment should generally include contract clauses that require:

(1) Manufacturer's warranties or guaranties on all electrical and mechanical equipment consistent with those provided as customary trade practice; or

(2) Contractor's warranties or guaranties providing for satisfactory service operation of the mechanical and electrical equipment and related components for a period not to exceed 6 months following project acceptance.

(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 as established.

(d) Appendix A sets forth the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be purchased or obtained through

(e) Reference in specifications for various types of drainage installations, on plans to single trade name materials will not be approved on Federal-aid contracts.

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