



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

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

October 25, 1993

Refer to: HNG-14/SS-39

Mr. John Owensby
President
Recycled Plastic Products, Inc.
412A E. Williams Street
P.O. Box 1603
Apex, North Carolina 27502

Dear Mr. Owensby:

Thank you for your recent letter to Mr. Thomas O. Willett requesting the Federal Highway Administration's (FHWA) acceptance of your company's plastic sign post. Your letter was accompanied by a report dated September 1993, and a video on the crash testing that was conducted to assess the breakaway performance of the sign post. The static testing, pendulum tests, and full-scale crash tests conforming to the guidelines contained in the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safely Evaluation of Highway Features," were performed by the Texas Transportation Institute.

The acceptance requirements for breakaway supports are found in the 1985 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." These specifications have been adopted, with minor modifications by the FHWA.

The posts used in the tests were manufactured of recycled plastic and measured 89 mm x 89 mm x 3.66 m long (3.5 inches x 3.5 inches x 12 feet). Note that spliced posts were used in the crash testing but are not acceptable for use in the field. A 0.6-m x 0.9-m (2-foot x 3-foot) sign was mounted at a height of 2.1 m (7 feet) to the bottom of the sign. The post was embedded 0.6 m into "standard" soil and the top of the sign and post was at 3.0 m (10 feet).

The crash test conditions and results are summarized below:

Test Number	0491F-1	0491F-2
Soil Type	Standard	Standard
Impact Speed, km/hr (mph)	35 (21.8)	101.4 (63.0)

Velocity Change, m/s (fps)	0.625 (2.05)	1.19 (3.96)
Occupant Impact, m/s (fps)	None	N/a
Stub Height, mm (in)	None *	None *

*Post broke below ground line.

The results of these tests meet the change-in-velocity and stub-height requirements adopted by the FHWA. Therefore, your company's plastic signposts are acceptable for use in projects on the National Highway System (NHS), within the range of conditions tested, if proposed by a State. No more than one post may be used within a 2.1-m span, and use is limited to installations in soils, which approximate the "standard" soil in which they were tested.

Because of the current technology limitations in manufacturing these posts, the 3.66-m long posts were fabricated from a 2.44-m length spliced to a 1.22-m length. The long end was the one embedded in the soil. This splice, which had a strength estimated to be no greater than 1/9th the strength of the solid post, was not structurally adequate to prevent the post from coming apart during the tests. In the high-speed tests, the middle portion of the fractured post penetrated the windshield. The NCHRP Report 350 states:

"...detached elements, fragments, or other debris from the test article should not penetrate or show potential for penetrating the occupant compartment..."

From our experience with wood posts we conclude that had there not been a weak splice in the tested post, the windshield would not have been penetrated. It is our understanding that you will overcome the length limitations on your product and will only market full-length posts. Our acceptance of your breakaway post is based on this understanding. We emphasize that our acceptance of your company's post is only for full-length posts with no splices, with a maximum of one post in a 2.1-m (7 foot) path.

Our acceptance is also limited to the breakaway characteristics of the plastic posts and does not cover the structural features. Presumably, you will supply potential users with sufficient information on structural design and installation requirements to ensure proper performance. We anticipate that the States will require certification from Recycled Plastic Products, Inc., that the posts furnished have essentially the same composition, mechanical properties, and geometry (except for the splice) as those used in the tests, and that they will meet the FHWA change in velocity requirements.

We understand that your company has exclusive marketing rights to these recycled plastic posts. Therefore, we consider them to be proprietary products. In order for proprietary products to be used in Federal-aid projects on the NHS they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternate exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for

experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,

Lawrence A. Staron, Chief
Federal-Aid and Design Division

Enclosure

Federal Highway Administration
HNG-14:Nartimovich:gm:6-22-93:61331

Copies to:

HPD-1 HNG-1 HNG-10 HNG-14 Reader, 3128 File, 3128
HNG-20 HHS-10 HSR-20 RAs

Geometric and Roadside Design Acceptance Letter Number SS-39