



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

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

March 19, 1996

Refer to: HNG-14/SS-53A

Mr. Robert H. Green
President
Lancaster Composite
1000 Houston Street
P.O. Box 247
Columbia, Pennsylvania 17512-0247

Dear Mr. Green,

This is in response to your February 19 letter to Mr. Nicholas Artimovich requesting Federal Highway Administration's (FHWA) acceptance of your company's 102-mm diameter lightweight concrete-filled fiber-reinforced plastic sign supports set into "standard" soil. Your letter was accompanied by videotape and a crash test report from the Southwest Research Institute (SwRI) dated February 1996. Pendulum crash testing was conducted to assess the breakaway performance of the dual-post support embedded into standard soil without drive sleeves. Single support installations using sleeves were found acceptable in our letter dated February 8, 1995.

Testing was done in accordance with the National Highway Cooperative Research Program Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features. Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. A drawing of the test installation is enclosed.

The two supports were spaced at 356-mm on center to facilitate testing with the pendulum. Pendulum testing is usually not permitted for qualifying base-bending/yielding small sign supports. In this case, however, previous high and low speed vehicle testing of single-post supports in standard soil (using drive sleeves) and in weak soil (using sleeves in a concrete foundation) revealed support breakaway mechanisms and vehicle responses that suggested the acceptability of using pendulum tests for evaluating design variations using the basic support posts. Based on the previous testing, the low occupant impact speed in the test under review here, and the breakaway characteristics of the posts, we conclude that the pendulum test report you submitted is sufficient to evaluate the acceptability of the dual-post support directly embedded in soil.

A summary of the crash test is presented below:

| | |
|------------------------------------|--------------------------|
| Test Number | BG-110 |
| Soil Type | Standard |
| Foundation Condition* | Direct Embedment in Soil |
| Sign Size mm (in) | 1118 x 3658 (44 x 144) |
| Sign and Support Mass Kg (wt, lbs) | 202.7 (447) |
| Support Diameter, mm (in) | 102 (4.0) |
| Pendulum Mass, KG (wt, lbs) | 816 (1800) |
| Vehicle Impact Speed, km/h (mph) | 35.3 (21.9) |
| Vehicle Velocity Change, m/s (fps) | 2.3 (7.5) |
| Stub Height, mm (in) | 0** |

*In all previous tests of single supports a sleeve driven into standard soil or encased in a concrete foundation in weak soil was used. This test of dual supports used no drive sleeves.

**The below-ground portions of the posts were shattered as they were pulled entirely out of the ground.

The results of this test met the change-in-velocity and stub-height requirements adopted by the FHWA. Your company's dual-post 102-mm diameter lightweight concrete-filled, fiber-reinforced plastic sign supports are therefore acceptable for use in standard soil on projects on the National Highway System (NHS) where breakaway systems are required if proposed by a State. Because this dual posttest without drive sleeves was successful, we will also consider single post installations in standard soil to be acceptable without drive sleeves. Dual-post installations in weak soil are not acceptable unless demonstrated through further crash testing.

Our acceptance is limited to the breakaway characteristics of the sign supports and does not cover the structural features. Presumably, you will supply potential users with sufficient information on design and installation requirements to ensure proper performance. We anticipate that the States will require certification from Lancaster Composite that the posts furnished has essentially the same chemistry, mechanical properties, and geometry as that used in the crash testing, and that they will meet the FHWA change in velocity requirements.

It is our understanding that you are attempting to patent your company's composite sign supports. If you are ultimately successful, the signposts would be proprietary products and to be used in projects on the NHS: (a) they would have to be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency would have to certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternate exists; or (c) they would have to 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.

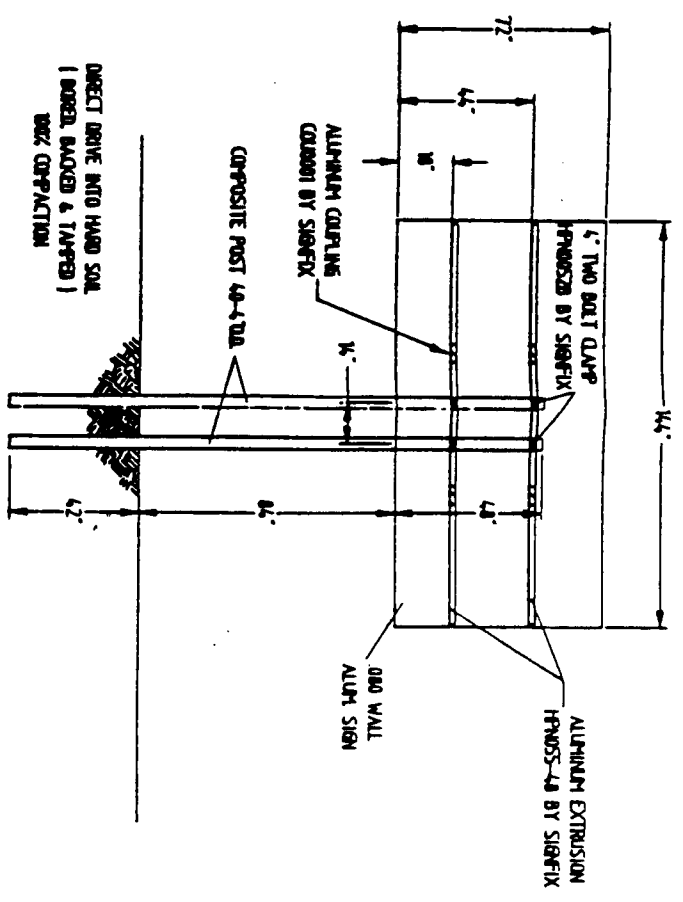
Sincerely yours,

Seppo I. Sillan, Acting Chief
Federal-Aid and Design Division

2 Enclosures

Supplement to Geometric and Roadside Design Acceptance Letter No. SS-53A

TEST I.D. - 86-110
 TEST DATE - 1/04/96



STRONG SOIL PIT AS PER
 MOHRP REPORT #350 (MODIFIED BASE MATERIAL)

| | |
|------------------------------|----------------------------|
| LANCASTER COMPOSITE | |
| PONDULUM TEST CONDUCTED AT | |
| SOUTHWEST RESEARCH INSTITUTE | |
| COMPOSITE POST 40 | |
| SIGN SUPPORT SYSTEM | |
| DESIGNED BY S. SHANNON | DRAWN BY K.W.J. |
| SCALE E36 | DATE 11/21/85 SHEET 1 OF 1 |

Figure 2. Manufacturer's Drawing of Test Article