



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

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

March 9, 1995

Refer to: HNG-14/SS-53

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

Dear Mr. Green:

Thank you for your letter of February 24 requesting Federal highway Administration's (FHWA) acceptance of your company's 102-mm lightweight concrete-filled fiber-reinforced plastic sign supports set in steel sleeves. Your letter was accompanied by videotape and four crash test reports from the Southwest Research Institute dated February 1995. The full-scale and pendulum crash testing was conducted to assess the breakaway performance of single-post supports. The 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 found in the American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. These specifications have been adopted by the FHWA.

A summary of the crash testing is presented below:

Test Number	LC-1	LC-2	LC-3	LC-4
Soil Type	Weak	Standard	Weak	Standard
Foundation Condition*	Concrete	Soil	Concrete	Soil
Support Diameter, mm (in)	102 (4.0)	102 (4.0)	102 (4.0)	102 (4.0)
Vehicle Mass, Kg (wt, lbs)	845 (1863)	845 (1863)	816** (1800)	816** (1800)
Impact Speed, km/h (mph)	100.5 (62.4)	100.0 (62.1)	35.3 (22.0)	35.3 (22.0)
Velocity Change, m/s (fps)	0.6 (2.0)	2.01 (6.6)	1.49 (4.7)	1.0 (3.2)
Stub Height, mm (in)	75 (3.0) ***	75 (3.0) ***	89 (3.5)	89 (3.5)

*A sleeve was used in all tests. This sleeve consists of a 610-mm long schedule 40, 102.3-mm inside diameter steel pipe to hold the 102-mm outside diameter signpost. Three 1500-mm steel reinforcing rods are welded to the sides of the sleeve, and they

extend 610-mm below the bottom of the sleeve. The inside rim of the top of the sleeve was rounded to a 6-mm radius. The reinforcing rods permit this “drive sleeve” and post to be positioned upright during backfilling and compacting with standard soil. When the sleeves were encased in a concrete foundation for use in weak soil, the foundations were 1067-mm deep and 457-mm in diameter at the perimeter and sloping up to the top of the “set sleeve”. In all cases, the top of the sleeve was set 25-mm above the ground line.

**Pendulum tests using crushable aluminum honeycomb nose.

***Not reported, but value estimated from post-test photographs.

The results of these tests meet the change-in-velocity and stub-height requirements adopted by the FHWA. Your company’s lightweight concrete-filled fiber-reinforced plastic sign supports, up to a maximum diameter of 102 mm, are therefore acceptable for use on projects on the National Highway System (NHS) where breakaway systems are required, within the range of conditions tested, if proposed by a State. Drawings of the test installations are enclosed.

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 hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that used in the tests above, and that it 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. For proprietary products 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.

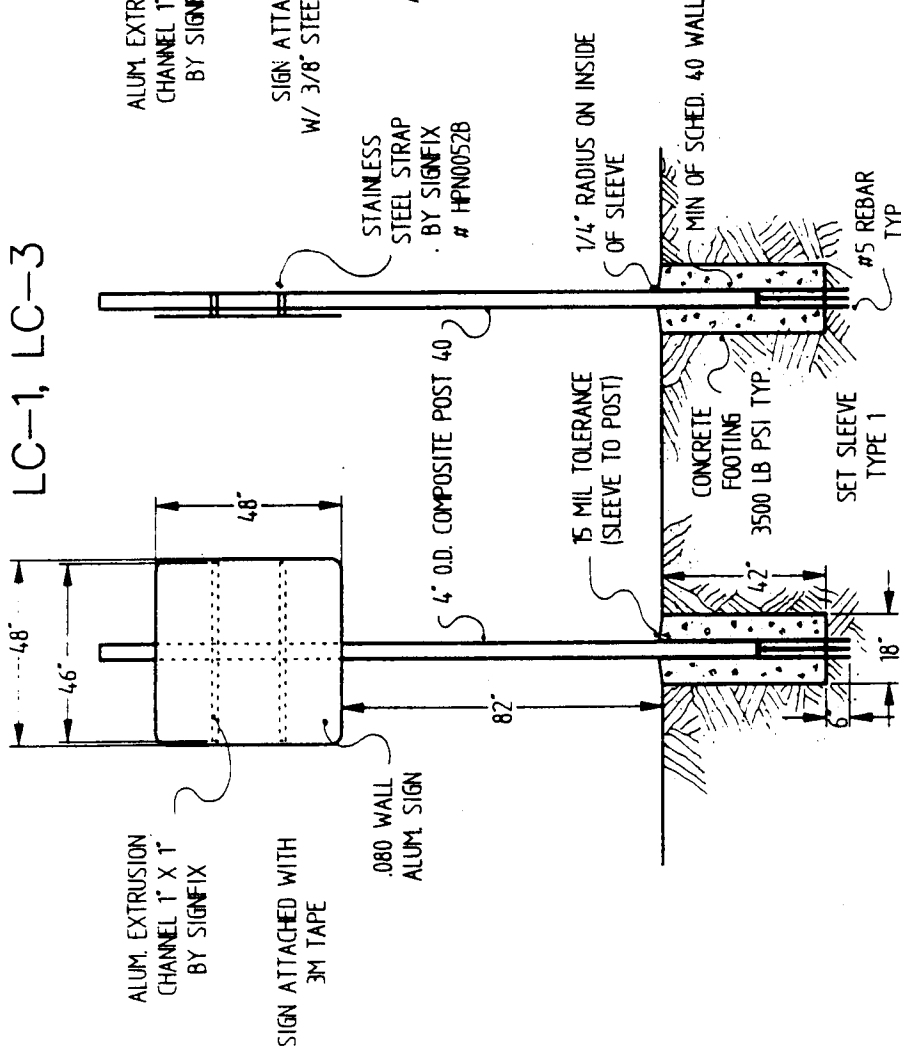
Sincerely yours,

Jerry L. Poston, Chief
Federal-Aid and Design Division

2 Enclosures

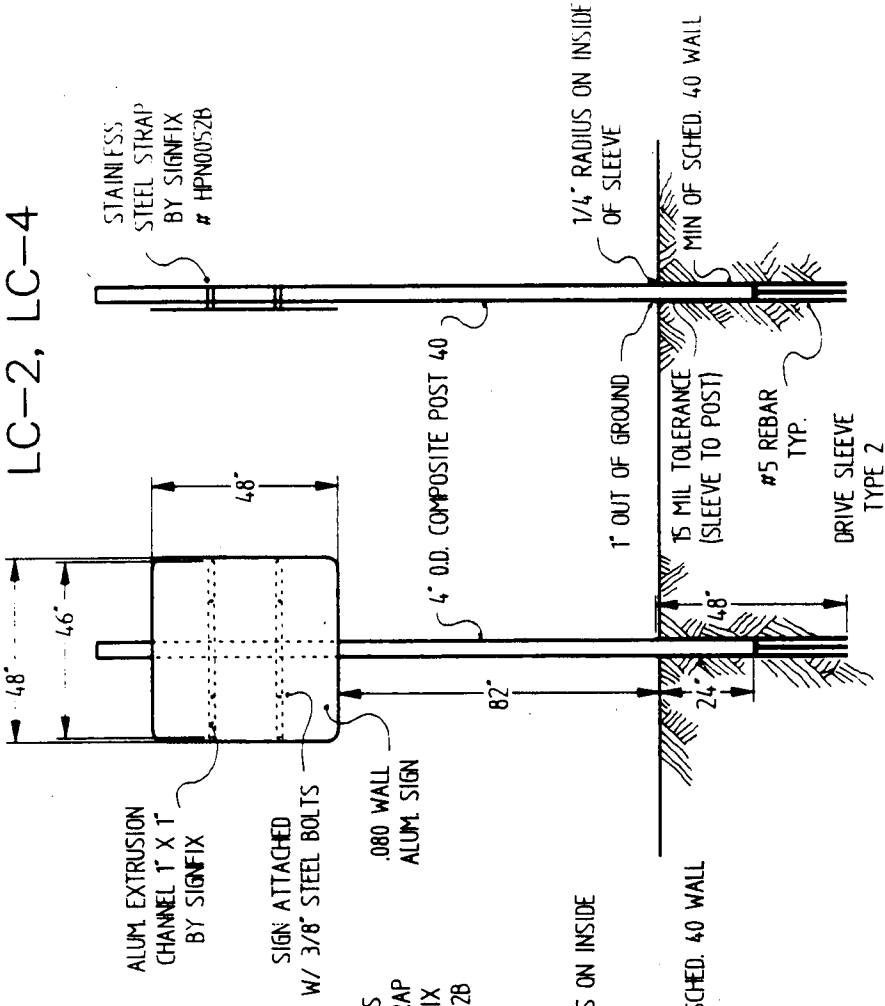
Geometric and Roadside Design Acceptance Letter No. SS-53

LC-1, LC-3



SOFT SOIL PIT AS PER
NCHRP # 350 (WASHED SAND)

LC-2, LC-4



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

LANCASTER COMPOSITE	
FULL SCALE CRASH TESTS CONDUCTED AT SOUTHWEST RESEARCH INSTITUTE	
COMPOSITE POST 40	SIGN SUPPORT SYSTEM
DESIGNED BY R. H. GREENE	DRAWN BY K.W.J.
SCALE 1:36	DATE 2/5/95
SHEET 1 OF 1	