



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

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

April 9, 1997

Refer to: HNG-14/SS-75

Mr. Donnie L. Reagan
Vice President
Sales/Marketing
Universal Anchor Systems, L.L.C.
110 W. 22nd Street
Big Spring, Texas 79721-3010

Dear Mr. Reagan:

This is in reply to your letter of March 24 to Mr. Nicholas Artimovich requesting Federal Highway Administration's (FHWA) acceptance of HwyCom fiberglass posts and Poz-Loc thin walled tubes mounted in a Universal Anchor System (UAS) foundation. Accompanying your letter was a December 17, 1996, report on crash testing conducted by the Texas Transportation Institute, a video of the tests, and a set of the photographs used in the report, plus others.

Full-scale testing was done in accordance with the NCHRP Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features. Requirements for breakaway supports are those found in the American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals. Drawings of the tested anchors and fiberglass post installations are enclosed.

The fiberglass sign supports consisted of HwyCom posts inserted 254 mm into UAS anchors. The UAS consist of a 76 mm Schedule 40 anchor sleeve and steel ring, which "locked" the fiberglass tubes in place. The thin wall tubing sign supports consisted of single 60 mm OD steel pipe per AASHTO/ARTBA/AGC designation PTP01a and were also tested in UAS anchors.

A summary of the crash testing using the same 820 kg car for all tests is presented below:

Test # 270687	...MOR1	...MOR2	...MOR	...MOR4	...MOR5	...MOR6
Number of	Single	Dual	Dual	Dual	Single	Single

Posts						
Post Material	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Sched. 40	Sched. 40
Post Outside Diameter, mm	76	76	76	76	60	60
Post Wall Thickness, mm	3.2	3.2	3.2	3.2	(Note 1)	(Note 1)
Foundation Condition for Sleeve	Concrete*	(Note 2)	Std. Soil	Std. Soil	Std. Soil	Std. Soil
Shown in Enclosure as:	Figure 1	Figure 3	Figure 3	Figure 3	Figure 5	Figure 5
Impact Point	Right ¼	Centerline	Centerline	Centerline	Right ¼	Left ¼
Test Impact Speed, km/h	99.29	100.43	33.97	34.75	34.91	100.24
Vehicle Velocity Change, m/s	0.19	0.24	3.50	.384	2.72	2.46
Occupant Impact Speed, m/s	None	0.99	5.16	3.74	3.19	2.64
Breakaway Mechanism	Pullout	(Note 3)	Bent	(Note 4)	Bent	(Note 5)
Stub Height	(There were no significant elements extending above the anchors, which were installed with a maximum height of 100 mm above the ground.)					

* The concrete foundations measured 460 mm in diameter and the posts were embedded 515 mm in standard soil.

Note 1: Steel pipe supports conform to AASHTO/ARTBA/AGC drawing PTP01a.

Note 2: One post was embedded into a concrete foundation and the other post was buried directly into the soil for this test only.

Note 3: During the test both posts pulled out of their anchors. The anchor holding the post in soil moved 10 mm while there was no movement to the sleeve embedded in concrete.

Note 4: One post pulled completely out of the anchor while the other fractured at the top of the base.

Note 5. The post was partially pulled out of the anchor, and then was bent over.

The results of tests 270687 MOR1, 2, 3, 4, 5, and 6 met the change-in-velocity and stub-height requirements adopted by the FHWA. (Test MOR3 failed because the sign panel snagged on the underside of the test vehicle. To correct this problem on subsequent tests, the panel was attached to the post only 76.2 mm above the bottom of the panel, approximately half of the distance to the attachment point in the failed test.) The sign support systems using HwyCom fiberglass posts, Poz-Loc thin walled tubes, and UAS foundations as shown in the enclosed drawings are therefore acceptable for use on projects on the National Highway System (NHS), in "standard" soil within the range of conditions tested, where breakaway systems are required if proposed by a State. The bottom connection of the sign panel to the post(s) should be no higher than 80 mm above the bottom of the panel.

Our acceptance is limited to the breakaway characteristics of the supports systems and does not cover their 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 HwyCom, Poz-Loc, and UAS that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as those you have described to us, and that they will meet the Federal Highway Administration change in velocity requirements.

Some of the hardware tested are proprietary products. To be used in Federal-Aid projects, except exempt, non-NHS projects: (a) must be supplied through complete bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities for that no equally suitable alternative 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,

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

5 Enclosures

FHWA: HNG-14: N Artimovich: 366-1331:gm: 4-9-97:DREAGAN
Copies to:

HNG-1 HNG-10 HNG-14 Reader, 3128 File, 3128
Ras HFL-1 HHS-1 HRS-1 HNG-20

Geometric and Safety Design Acceptance Letter SS-75