



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

February 28, 2007

400 Seventh St., S.W.  
Washington, DC 20590

In Reply Refer To:  
HSSD/SS-123  
Amendment #1

Mr. Jim Anderson  
Designovations, Inc.  
339 Wildwood Road  
Stillman Valley, IL 61084

Dear Mr. Anderson:

Thank you for your correspondence requesting Federal Highway Administration (FHWA) acceptance of your company's 2 ¼ inch and 2 ½ inch SNAP'n SAFE™ breakaway system for square sign supports for use on the National Highway System (NHS). Accompanying your letter was a report from the Texas Transportation Institute. You requested that we find these devices acceptable for use on the NHS under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

### **Introduction**

Testing of the supports was in compliance with the guidelines contained in the NCHRP 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' Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

The Designovations, Inc., Break-Away device is a cast iron frangible coupling connecting a ground stub and the sign post. The coupler fractures upon impact at a predetermined scored line in the coupling, releasing the sign post from the ground stub. The coupler, shown in the attached drawing for reference, is fabricated of ASTM A48 gray iron, class 35. The coupler is notched on each corner to an approximate depth of an eighth of an inch. This letter deals with both 2 ¼ inch and 2 ½ inch couplers designed for perforated square steel posts.

### **Testing**

One sign support using the 2 ½ inch coupler was crash tested. For the test DES P7, the coupler was installed approximately 3 inches above grade and was anchored inside a 3 foot long, 3 inch by 3 inch perforated tube embedded in NCHRP Report 350 Soft Soil. The coupler was used to



support a 10 foot long 2 ½ inch by 2 ½ inch perforated steel tube post. One 3 feet by 3 feet square sign panel was attached to the perforated steel tube post approximately 7 feet above grade.

Test #	Speed	Version	Article	Occup. Speed	Delta V
400001-DES P7	34.8 km/hr	2.5 inch top	PSST	None	0.7 m/s

Occup. Speed: Occupant Impact Speed: Speed at which a theoretical front seat occupant will contact the windshield, in meters per second.

Delta V: Speed change of the test vehicle. In meters per second.

### Findings

Results of the test show the stub moved through the weak soil and deformed below the ground line, but the coupler still sheared as designed. Velocity change and deceleration are both within acceptable limits. There was no appreciable remains of the coupler left to protrude above the top of the stub, which had been installed such that the top of the stub would be at a height less than 4 inches above the ground. We agree in the assumption that the smaller 2 ¼ inch coupler would perform identically to the larger 2 ½ inch coupler. The results of testing met the FHWA requirements and, therefore, the SNAP'n SAFE™ devices described above and shown in the enclosed drawing for reference are acceptable for use as Test Level 3 devices on the NHS under the range of conditions tested, when proposed by a State.

Please note the following standard provisions that apply to the FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number SS-123#1, shall not be reproduced except in full. As this letter and the supporting documentation which support it become public information, it will be available for inspection at our office by interested parties.
- The Designovations, Inc., SNAP'n SAFE™ Device is a patented product and is considered "proprietary." When proprietary devices are *specified by a highway agency* for use on Federal-aid projects 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 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. These provisions do not apply to exempt non-NHS projects. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device. Patent issues are to be resolved by the applicant and the patent owner.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "John R. Baxter".

John R. Baxter, P.E.  
Director, Office of Safety Design  
Office of Safety

Enclosures

### APPENDIX C. DETAILS OF TEST ARTICLES

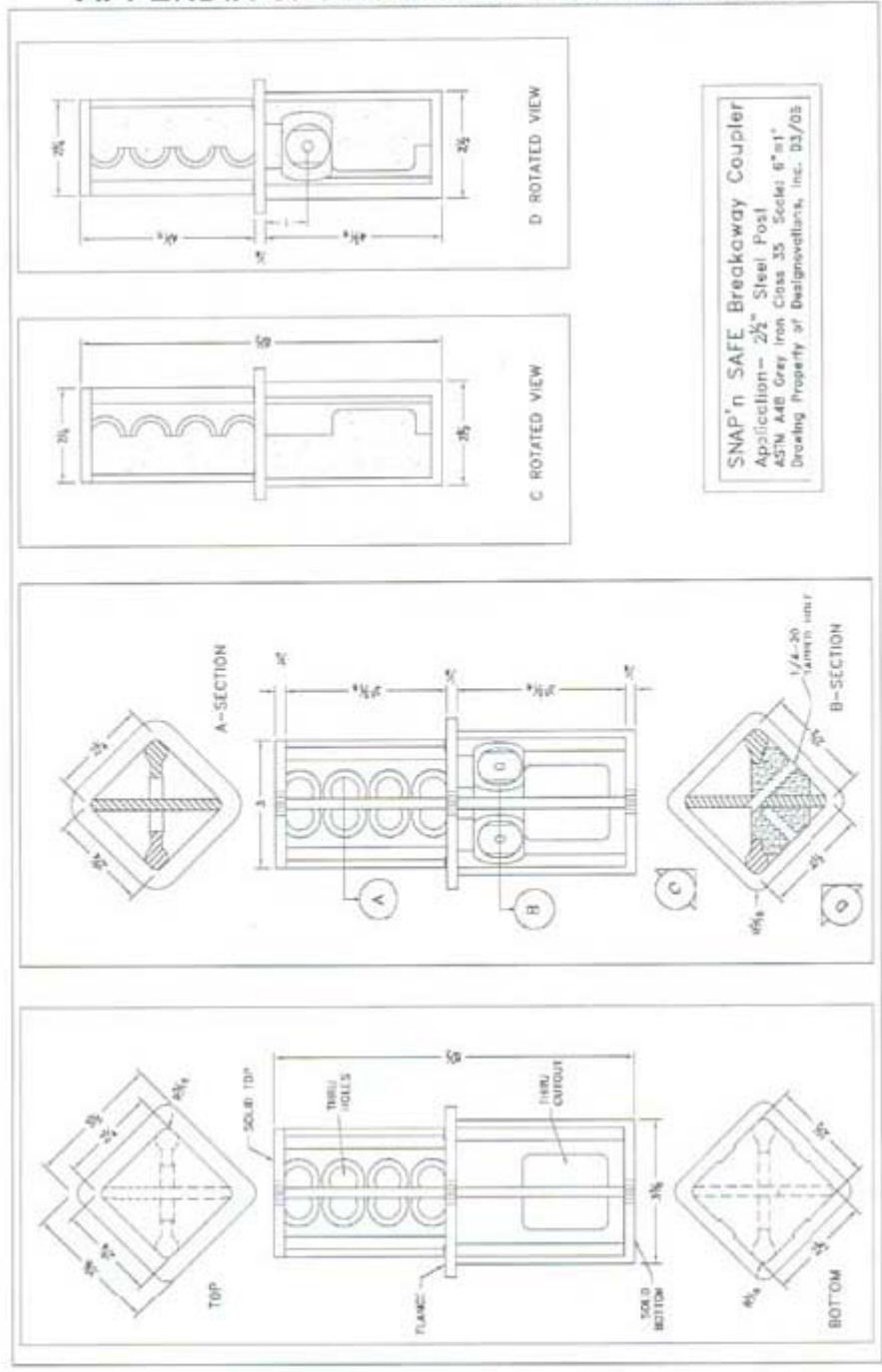
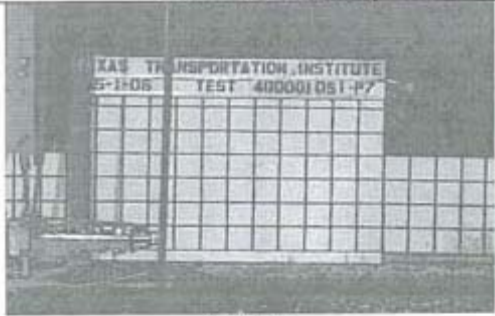
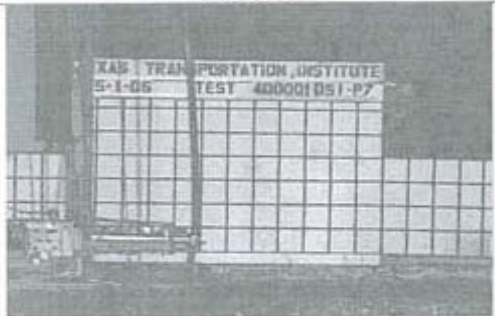

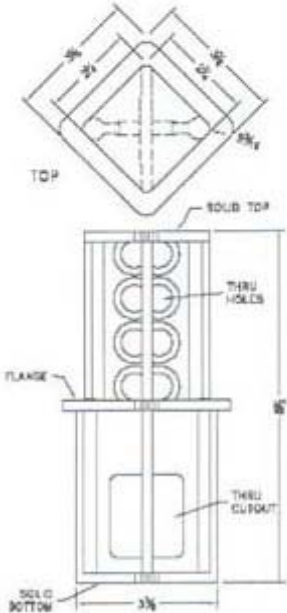
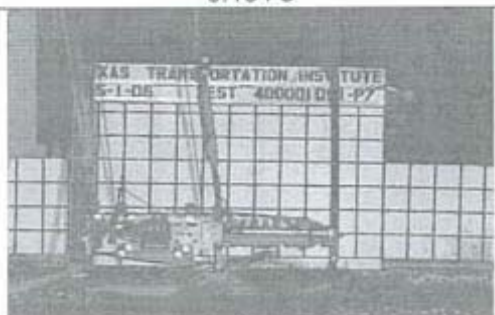


Table D1. Summary of results for pendulum test 400001-DES P7.

 <p>0.000 s</p>	<p><b>General Information</b> Test Agency..... Texas Transportation Institute Test No..... 400001-DES P7 Date..... 05-01-2006</p> <p><b>Test Article</b> Type..... Single Sign Support Name..... Designation Sign Support Installation Height (m)..... 2.1 m (7 ft) Material of Key Element.....</p> <p><b>Soil Type</b>..... Soft Soil</p>
 <p>0.046 s</p>	<p><b>Test Vehicle</b> Type..... Bogie Designation..... Pendulum Test Inertia Mass..... 839 kg</p> <p><b>Impact Conditions</b> Speed..... 34.8 km/h Angle..... 90 deg</p> <p><b>Occupant Risk Values</b> Impact Velocity Longitudinal direction..... No contact Ridedown Accelerations Longitudinal direction..... N/A</p> <p><b>Maximum change in Velocity</b>..... 0.7 m/s</p>
 <p>0.104 s</p>	
 <p>0.174 s</p>	