



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-142

Mr. Clifford Dent, President
Dent Breakaway Industries, Inc.
P.O. Box 6007
Farmington, NM 87499

Dear Mr. Dent:

This is in response to Roger Bligh's letter of September 28, 2006, requesting the Federal Highway Administration's (FHWA) acceptance of your company's Dent Breakaway omni directional slip base castings for use with breakaway sign supports on the National Highway System (NHS). Accompanying the letter was a summary report from the Texas Transportation Institute and video documentation of the pendulum testing. You requested that we find dual post supports using the Dent Breakaway omni directional slip base castings acceptable for use on the NHS under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features." Additional information, including the full test report, was received on December 6, 2006.

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 dimensions of the triangular plate and the orientation, angle, and size of the slots into which the slip bolts are inset appear to conform to those used in the successfully tested Texas Department of Transportation universal triangular slip base system. Four set screws incorporated into the collar of the casting are used to secure the casting to the support post. The unique aspect of the design is the interior shape of the cast collar. It is designed to accommodate both the standard 2 7/8-inch outside diameter (O.D.) pipe supports as well as a 2 1/2 inch square tube support.



For the pendulum test, the lower slip plate assemblies were welded to a common steel base plate which was bolted to a steel reaction plate spanning our pendulum pit. The top surface of the lower triangular slip plate was 3 inches above the steel base plate. The pendulum was outfitted with an FHWA-approved staged honeycomb nose assembly and weighed 839 kg (1849 lb). A bolt keeper plate and washer (one at each slip bolt location) were placed between the upper and lower triangular slip plates. The 5/8 inch diameter, A325 high strength slip bolts were tightened to a torque of 40 ft-lb. A 2 7/8 inch O.D. schedule 80 pipe support was placed inside the collar of each slip base casting and rested on a lip formed by the triangular plate. The set screws were tightened to a torque of 60 ft-lb. The two schedule 80 pipe supports were spaced 10 inches apart so that they would both be contacted by the pendulum nose plate. A 4 ft x 8 ft x 5/8 inch thick plywood sign panel was mounted 7 ft from the ground to the lower edge of the panel.

Testing

Pendulum testing was conducted on your company's devices. The mass of the test bogie was 820 kg in all tests. The complete devices as tested are shown in the enclosures. The pendulum impacted the dual sign supports at a speed of 34.5 km/h (21.4 mph) at a height of 18.5 inches from the top of the base plate to the middle of the pendulum nose. The slip bases activated as designed. There was no damage noted to the slip base castings or schedule 80 support posts. The set screws held the casting in place without slippage on the pipe supports.

| Test # | NCHRP 350 | Speed | Version | Article | Occup. Speed |
|--------|-----------|------------|-----------|-----------------------|--------------|
| 1 | 3-60 | 34.5 km/hr | Dual Post | Omni Directional Base | 2.3 m/s |

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

Findings

The results of the pendulum testing met the FHWA requirements. High speed testing was not required by the FHWA because similar dual post slip base systems have been tested previously and the low speed test is considered the "worst case scenario."

Therefore, the devices described above and shown in the enclosed drawings for reference, using one or two posts to support a sign in standard soil or on concrete, 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-142, 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 Dent Breakaway omni directional slip base casting is a patented device and is considered "proprietary." When proprietary devices are *specified by a highway agency* for use on Federal-aid projects: (a) they 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; (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.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

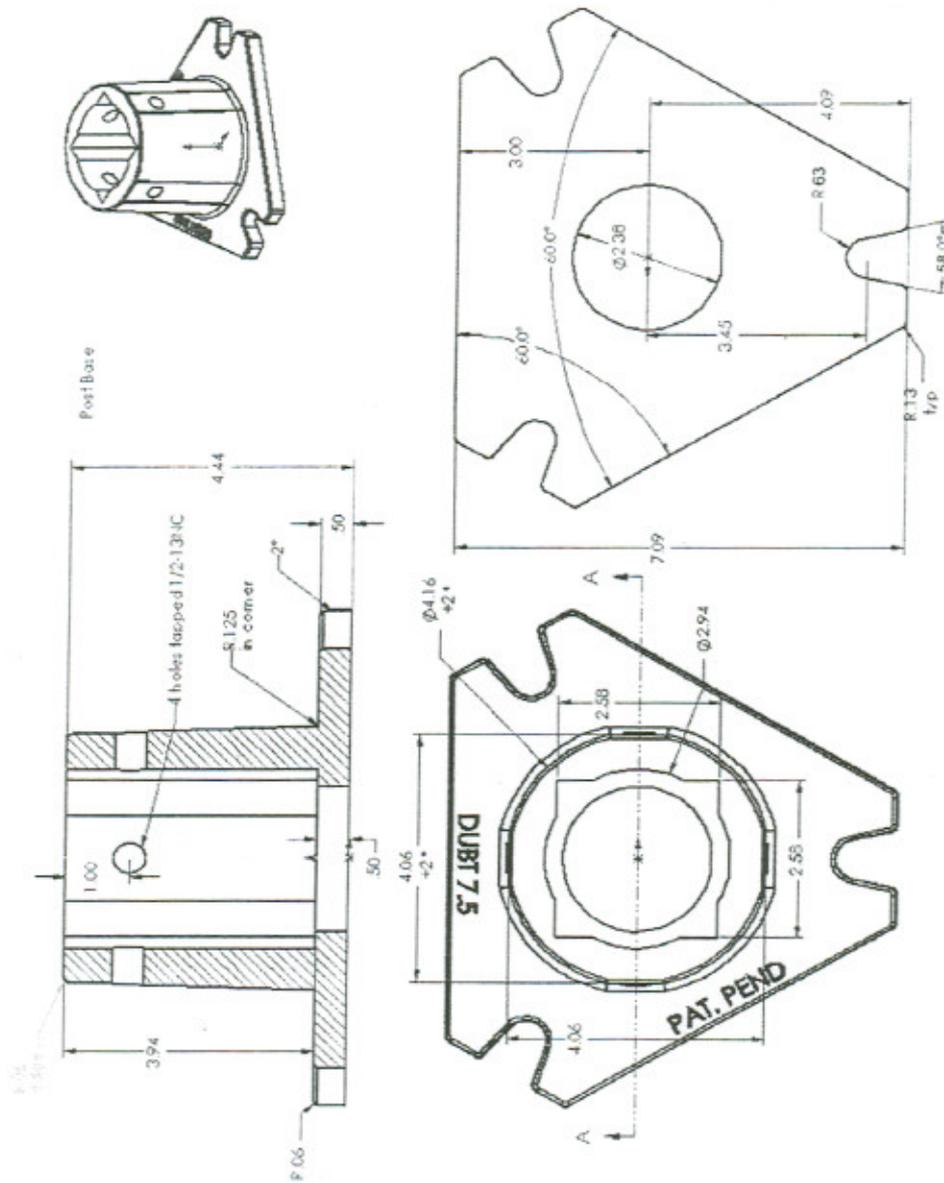
Sincerely,

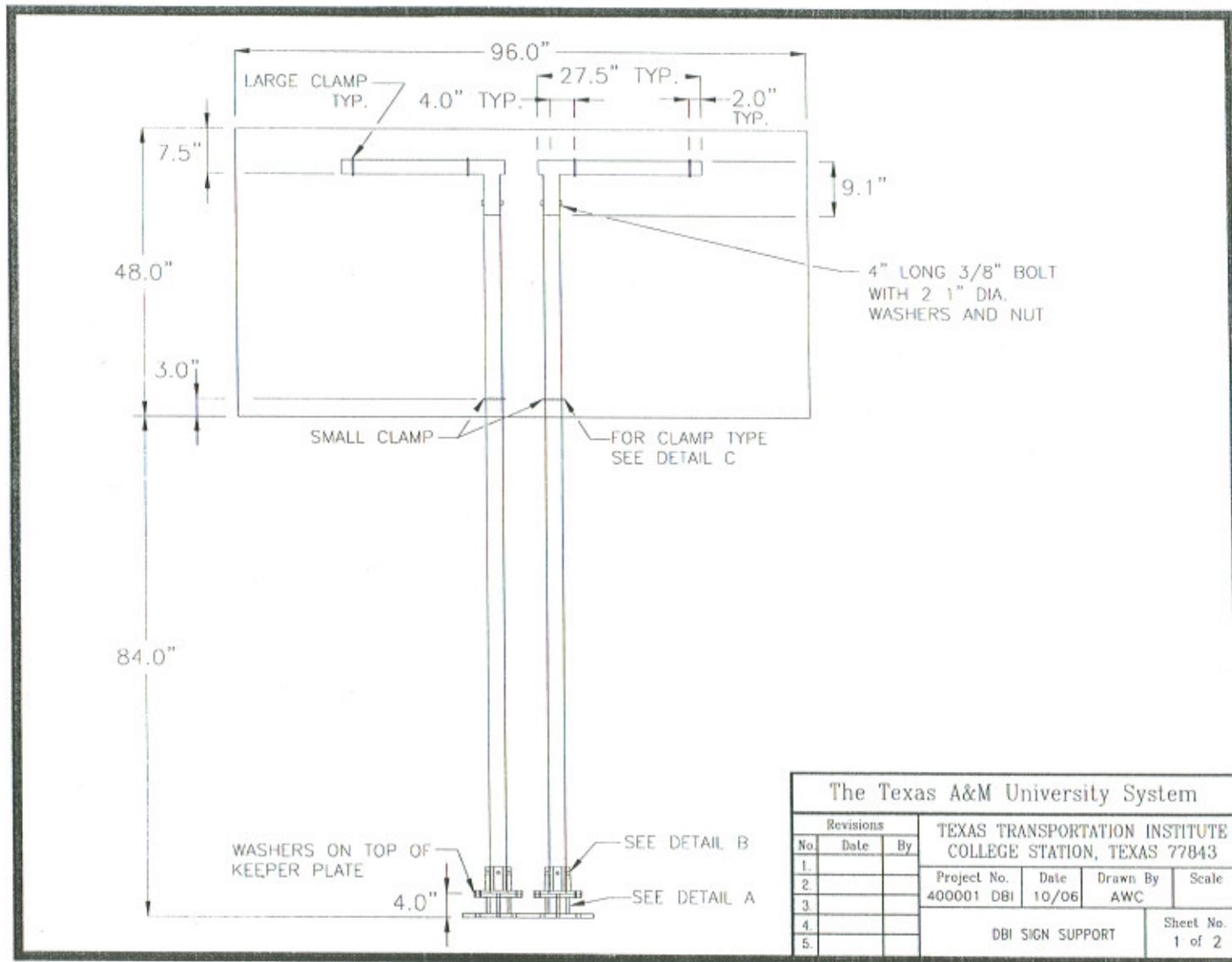


John R. Baxter, P.E.
Director, Office of Safety
Office of Safety Design

Enclosure

APPENDIX C. DETAILS OF TEST ARTICLE





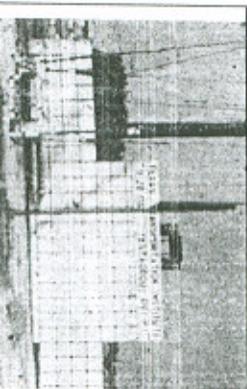
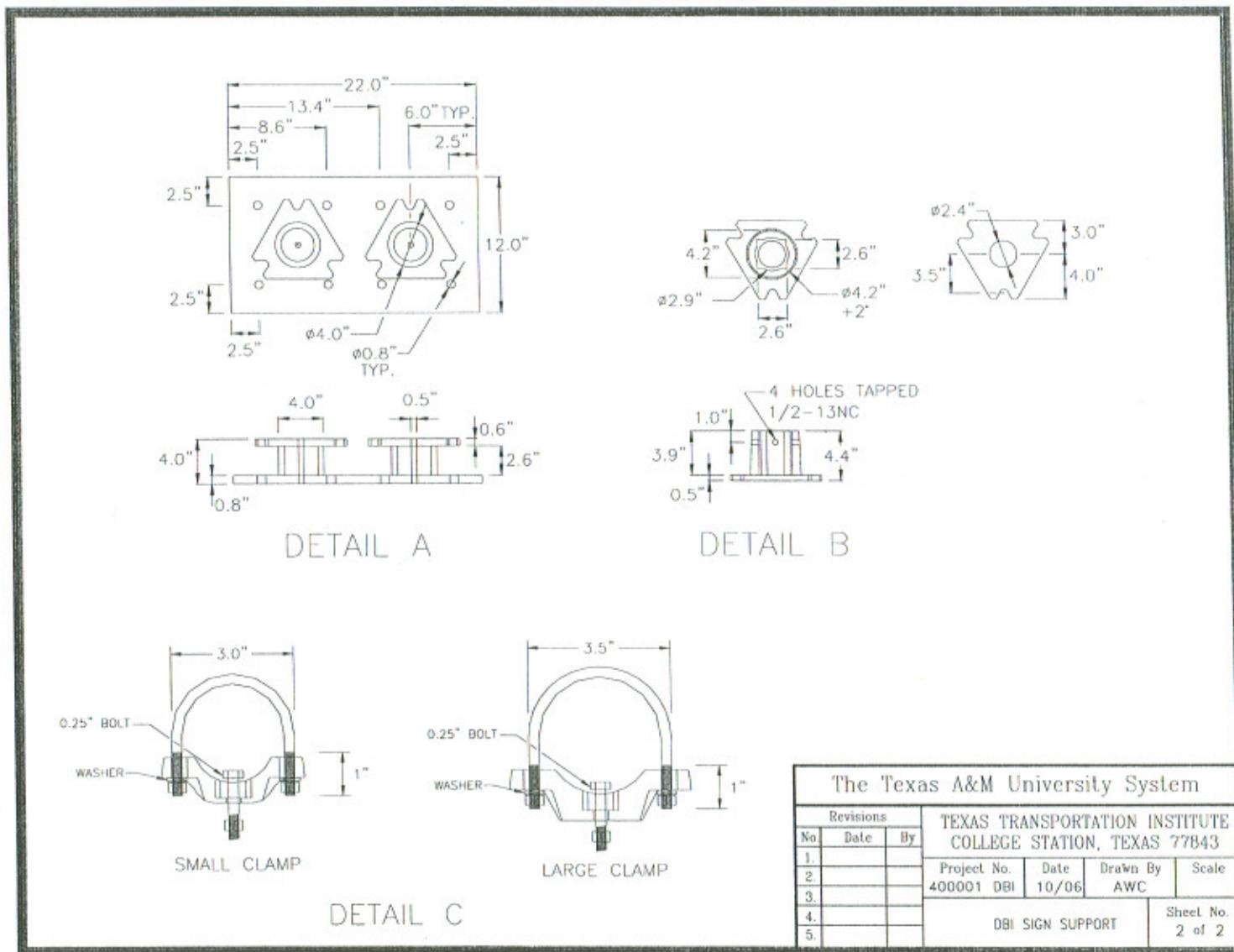


Table D1. Summary of results for pendulum test 400001-DBI P1.

General Information
 Test Agency..... Texas Transportation Institute
 Test No..... 400001-DBI P1
 Date..... 09-28-2006
Test Article
 Type..... Dual Sign Support
 Name..... Dent Breakaway Inc. omnidirectional sign base

12/5/2006

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| The Texas A&M University System | | | |
|--|------|--|------------------|
| Revisions | | TEXAS TRANSPORTATION INSTITUTE COLLEGE STATION, TEXAS 77843 | |
| No | Date | By | Scale |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Project No. 400001 DBI Date 10/06 Drawn By AWC | | | Sheet No. 2 of 2 |
| DBI SIGN SUPPORT | | | |