



U.S. Department
of Transportation

**Federal Highway
Administration**

AUG 15 2000

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

Refer to: HSA-1

Mr. H. Mike Jordan
Sales Manager
Poz-Loc Traffic Systems
Northwest Pipe Company
P.O. Box 2002
Houston, Texas 77252-2002

Dear Mr. Jordan:

Thank you for your April 25 letter requesting acceptance of your company's nonproprietary square post slipbase system as a breakaway support for use on the National Highway System (NHS). Accompanying your letter was a report of crash testing done at Texas Transportation Institute dated April 2000, and videos of the crash tests.

Introduction

Testing of the supports was in compliance with the guidelines contained in the National Cooperative Highway Research Program (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' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

The test articles were cast-iron slip bases for square tube sign supports. They are designed as a slip-on collar that adapts thin-walled square tubing (nonperforated) to the triangular shaped slip-base. The adapter collar allows square tubing to be attached to triangular slip-base foundations that were originally intended for use with round pipe supports. Details for the slip-on collar are shown in Enclosure 1. The casting is fabricated from ASTM A-536 Grade 65-45-12 ductile iron. Assembly of the slip base system is illustrated in Enclosure 2. The collar of the slip base casting slides over the end of a thin-walled square tube support. A 30 gage galvanized slip plate, shown in Enclosure 3, is inserted into the end of the square tube. The casting, slip plate, and thin walled square tube support are then connected with a 13 mm galvanized steel locking pin.

The triangular slip-base plates for the support and the ground stub (shown in Enclosure 4) are clamped together using three 13 mm diameter x 64 mm long ASTM A-325 hex bolts with a washer under the head and nut of each bolt. The bolts were torqued to 40 foot-pounds. A galvanized bolt keeper plate is placed between the slip planes. Enclosure 5 shows the installed dimensions for single and dual support installations. The single-post installation as tested is shown in Enclosure 6.

The ASTM A-500 Grade B steel posts were 63.5 mm square, with a wall thickness of 3.3 mm (10 gage). You also requested acceptance for dual support installations based upon a comparison of tests using two round pipe posts on a similar slip-base system.

Testing

A summary of the crash tests of the single square tube posts is presented in the following table.

Test #	400001-PHT3	400001-PHT4
NCHRP 350 Designation	3-60	3-61
Vehicle Mass	820 kg	820 kg
Vehicle Impact Speed	35.0 km/hr	99.7 km/hr
Soil Type	Standard	Standard
Impact Angle	0 degrees	0 degrees
Test Article Mass	41 kg	41 kg
Occupant Impact Speed	None	0.9 m/s
Vehicle Velocity Change	0.75 m/s	0.81 m/s
Windshield Damage	None	No contact
Vehicle Deformation	20 mm roof dent	160 mm dents to bumper
Stub Height	86 mm	86 mm

Findings

The tested supports met the change in velocity and stub height requirements of the AASHTO Standard Specifications and NCHRP Report 350. There were no excessive deformations of the passenger compartment and no damage to the windshield. Therefore, these slip-base supports are acceptable for use on the (NHS) within the range of conditions tested, when requested by a State. Because the supports were tested in standard soil and there was little or no motion of the stubs in the soil as a result of the test, this breakaway support will be acceptable when placed in a concrete foundation in standard soil.

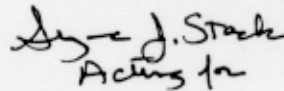
The tested square steel tube posts have a larger cross-sectional area and section modulus than many square tubes used as sign supports. Smaller tubes could behave differently when struck, that is, they could begin to bend before the slip base is activated. Therefore, this slip base should be used with posts of comparable stiffness to the tested post to ensure that the energy of the impacting vehicle will be transferred directly into activating the slip base.

The test report also presents a comparison of the single square tube support versus the single and dual schedule 80 pipe support. The researchers conclude that based on the current testing covered by the table above and the previous testing conducted on the similar Poz-Loc slip base system for round pipe supports the new slip base collar for square tubing will perform satisfactorily in both single and dual post application. We concur in that finding and find these single or dual supports acceptable in standard soil.

Please note the following standard provisions which apply to Federal Highway Administration (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 FHWA and NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number SS-88, shall not be reproduced except in full.

Sincerely yours,



Frederick G. Wright, Jr.
Program Manager, Safety

6 Enclosures

FHWA:HSA-1:NArtimovich:lb:x61331:8/3/00

cc: Chron Reader 3407
HSA-1(NArtimovich)

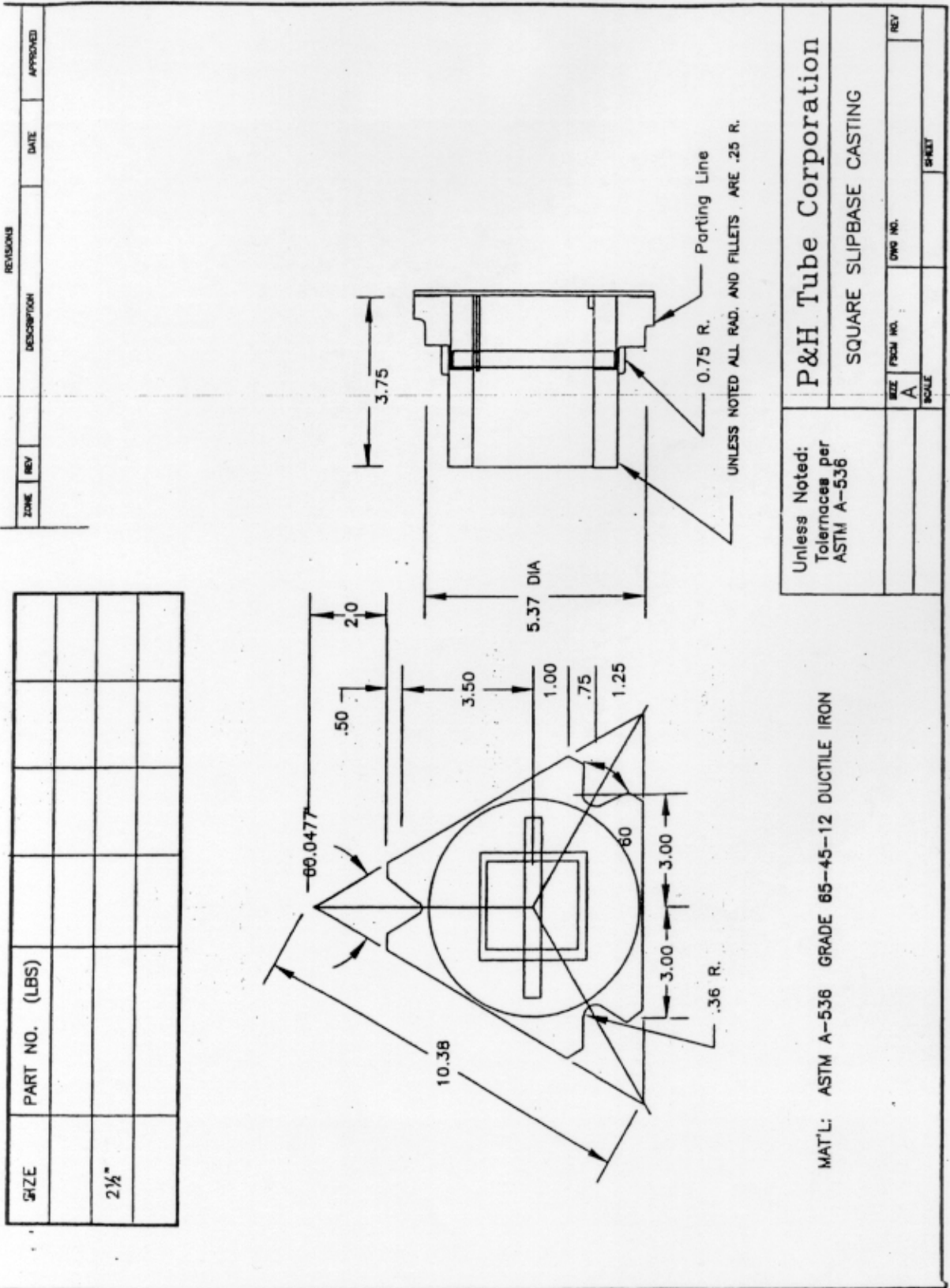


Figure 1. Details of the square slip-base casting.

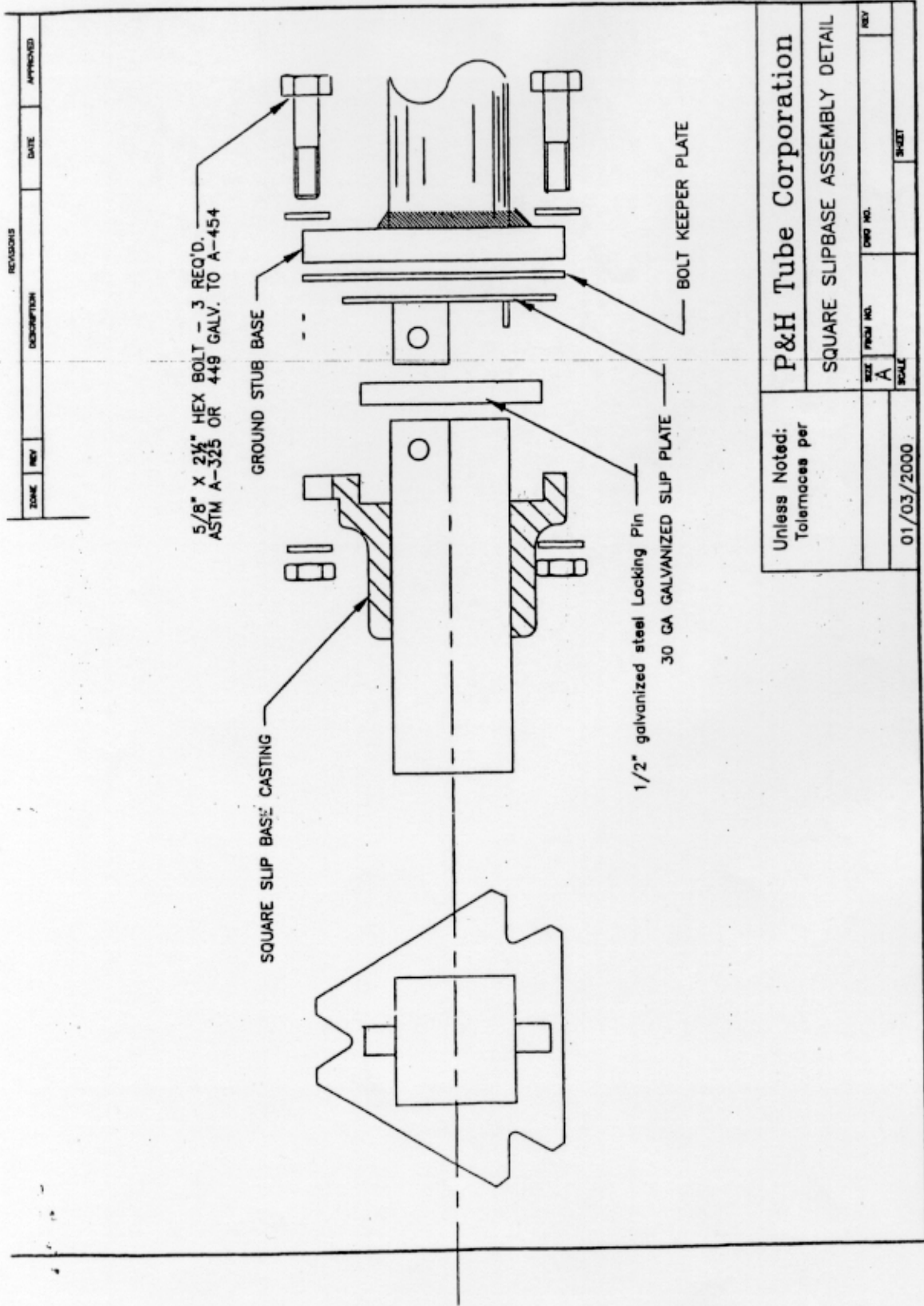


Figure 2. Details of the square slip-base assembly.

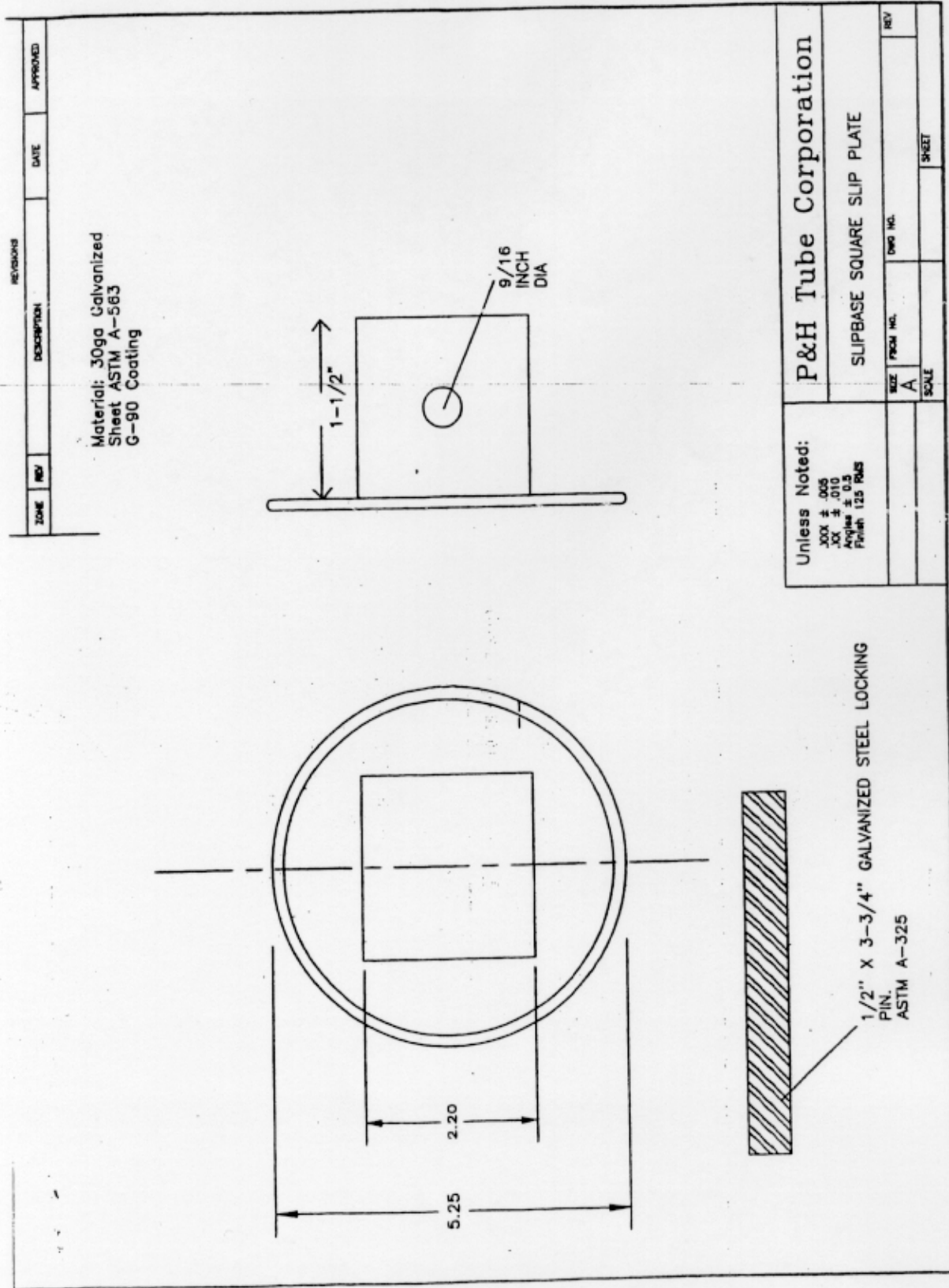
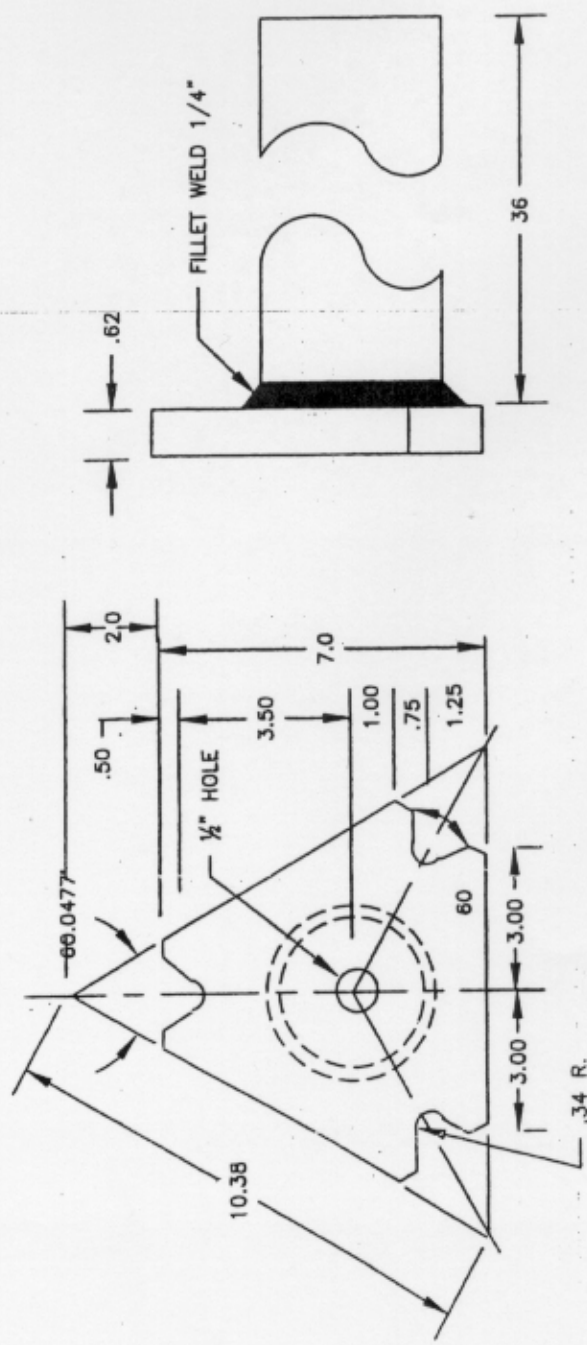


Figure 3. Details of the slip-base square slip plate.

ZONE		REV		DESCRIPTION		DATE		APPROVED	

BASE PLATE 5/8" ASTM A-36, 441 OR 572 STEEL PLATE
 PIPE STUB 3" NOMINAL SCHEDULE 40, ASTM A-53 GRB
 FABRICATE AND GALVANIZE TO ASTM A-153



Unless Noted: Tolerances per ASTM A-536	P&H Tube Corporation			
	SLIPBASE GROUND STUB BASE			
PCL/LEP	SIZE A	FROM NO.	DWG NO. SB 6620	REV
6/2/99	SCALE NTS		SHEET	

Figure 4. Details of the slip-base ground stub base.

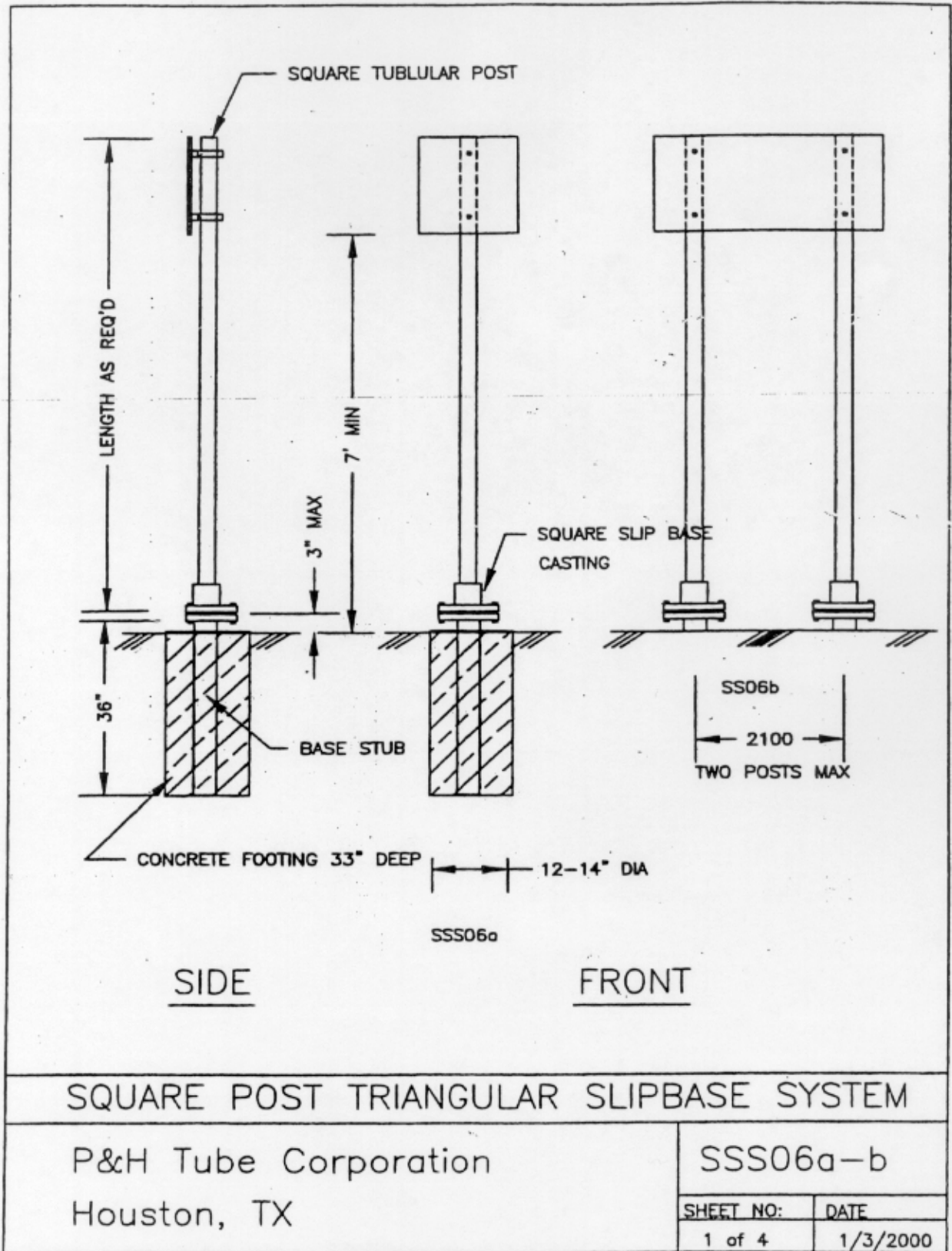


Figure 5. Square post triangular slip-base system.

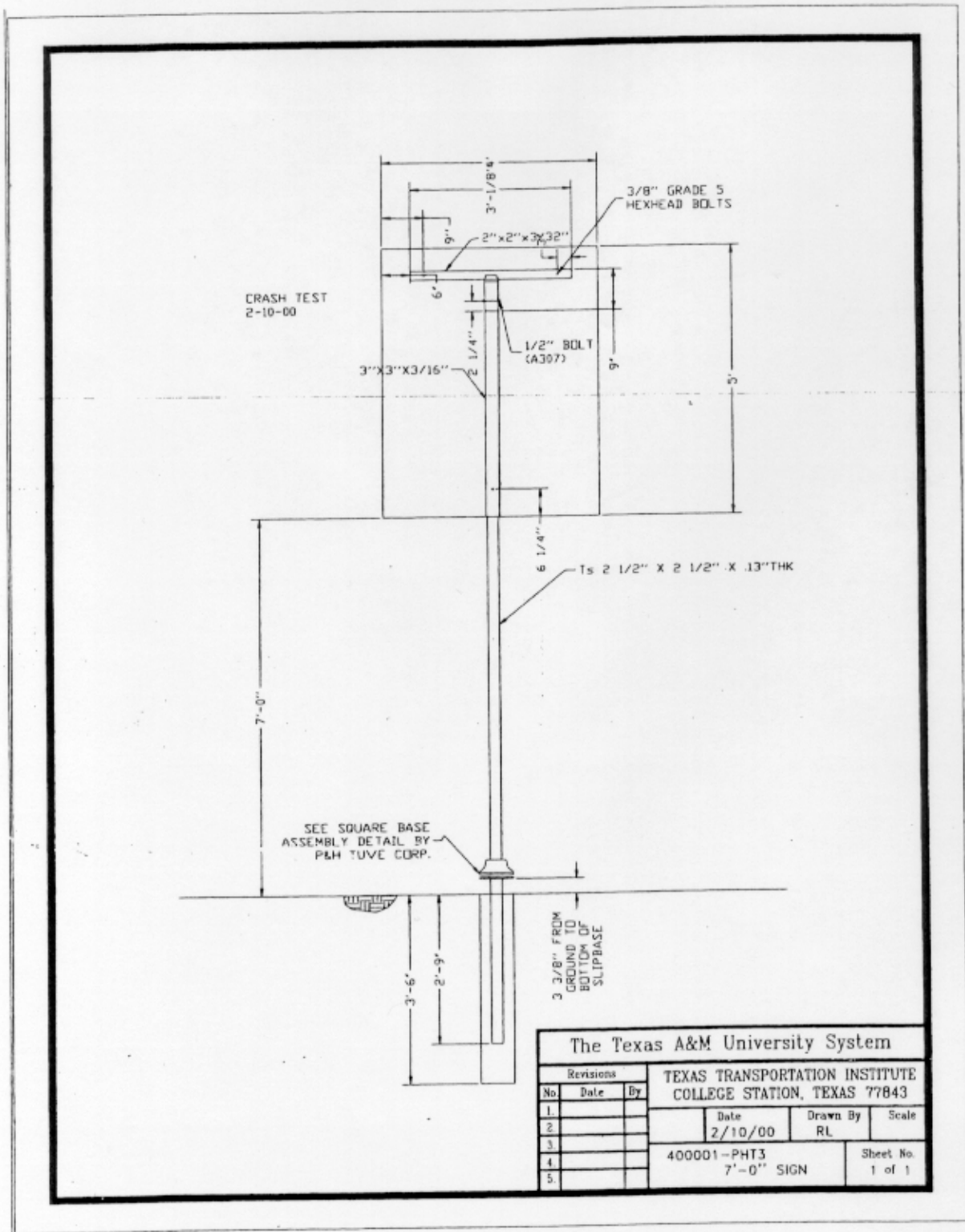


Figure 6. Details of Northwest Pipe Company's square slip-base sign support used for testing.