



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

1200 New Jersey Ave., S.E.  
Washington, DC 20590

September 5, 2008

In Reply Refer To:  
HSSD/SS-150 Revised

Mr. Raymond Kisiel  
Northwest Pipe Company  
6307 Toledo Street  
P.O. Box 2002  
Houston, TX 77252-2002

Dear Mr. Kisiel:

Thank you for your letter of April 30, 2007 requesting the Federal Highway Administration's (FHWA) acceptance of your company's Poz-Loc 8 inch square slip base system to be used with solid or perforated square steel tubes as breakaway sign supports for use on the National Highway System (NHS). Accompanying your letter was a report from the Texas Transportation Institute (TTI) of the crash test conducted and drawings of the device. You requested that we find your company's Poz-Loc 8 inch square slip base systems 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."

### **Introduction**

Testing of the device 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.

### **Testing**

A bogie pendulum test was recently conducted on your company's device. The mass of the bogie pendulum was 820 kg. The test was conducted at the typical 18-inch bumper height for small cars. The test article consisted of an 8 inch square slip base system with a single 2-1/2 inch, 12 gauge perforated square steel tube tightened to 40 foot-pounds of torque in standard soil with a winged 7 gauge anchor in standard NCHRP Report 350 soil. A 48 x 48 inch by 5/8 inch thick plywood sign panel was attached to the post at a height of 7 feet from ground level.



## Findings

The pendulum bogie, traveling at a speed of 21.5 mph (34.6 km/hr), impacted the sign support at 18 inches above ground level. Upon impact, the support slipped away from the base at the designated slip plane and came to rest 50 feet downstream of the impact point. The total crush to the pendulum nose (surrogate bumper) was 1.8 inches. The pendulum bogie test impact displayed a low potential for intrusion into the occupant compartment, measured a maximum acceleration of -0.9 g's, and a velocity change of -0.2 m/s. The measured velocity and acceleration changes were within acceptable limits, and the remaining stub height was less than 4 inches. The results of testing met the FHWA requirements and, therefore, the device described above and shown in the enclosed drawings 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.

FHWA accepts the results of testing conducted on torque values for slip base systems performed by TTI in 2001 that revealed the torque values for the keeper bolts may be increased from 38 foot-lbs. to 80 foot-lbs. The use of these increased torque values for keeper bolts is acceptable with the Poz-Loc 8-inch and 10-inch square slip base systems and this modification applies to FHWA Acceptance letter SS-130 as well. FHWA also accepts the use of the bolt down stub (Part # SB 2708) for the Poz-Loc 8-inch and 10-inch square as well as the Poz-Loc 10-inch round post slip base systems.

Additionally, you submitted requests for this system to be used with:

- 2-1/2 inch, 10 gauge posts (section modulus 0.79).
- 2-1/4 inch, 12 gauge posts with a 30 inch outer sleeve (section modulus 1.11).
- A concrete footing measuring 12 inches in diameter by 42 inches deep in either strong or weak soil.
- One, two, or three supports in a 7 foot span.
- Compatible 8 inch foundation slip plates (stubs).
- One piece welded or two piece bolted slip plates (stubs).

The additional requests listed above are acceptable. The section modulus of the tested post was 0.62. Your first two additional requests are acceptable because sign supports with a larger section modulus will increase the rigidity of the support and therefore increase the efficiency of the slip base system. The concrete footing requested above was tested and accepted for a similar slip base when installed in standard or weak soil in an FHWA acceptance letter issued to the NW Pipe Company on January 5, 2006 (coded SS-130) and is deemed acceptable for this device. Your request to use one, two, or three supports in a 7 foot span is acceptable based on extrapolation of the measured velocity and acceleration changes reported in the pendulum bogie crash test results. Your final two requests to use this system with compatible slip plates (stubs) are acceptable because a secure slip plate foundation will likely have no effect on the breakaway system performance when the 8 inch square slip base system is properly installed.

This letter also amends FHWA Acceptance letters SS-01, 1A, and 65A to include the fact that FHWA accepts 2-3/8 inch diameter, 17 gauge, round supports when no more than 2 are used in a 7-foot path. This acceptance includes the use of these supports in strong and weak soils using the socket and direct bury installations. Your 2-3/8 inch surface mount casting #27593 for use

with 13 through 17 gauge round posts is also acceptable for use with previously acceptable round sign posts installed per manufacturer's instruction.

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

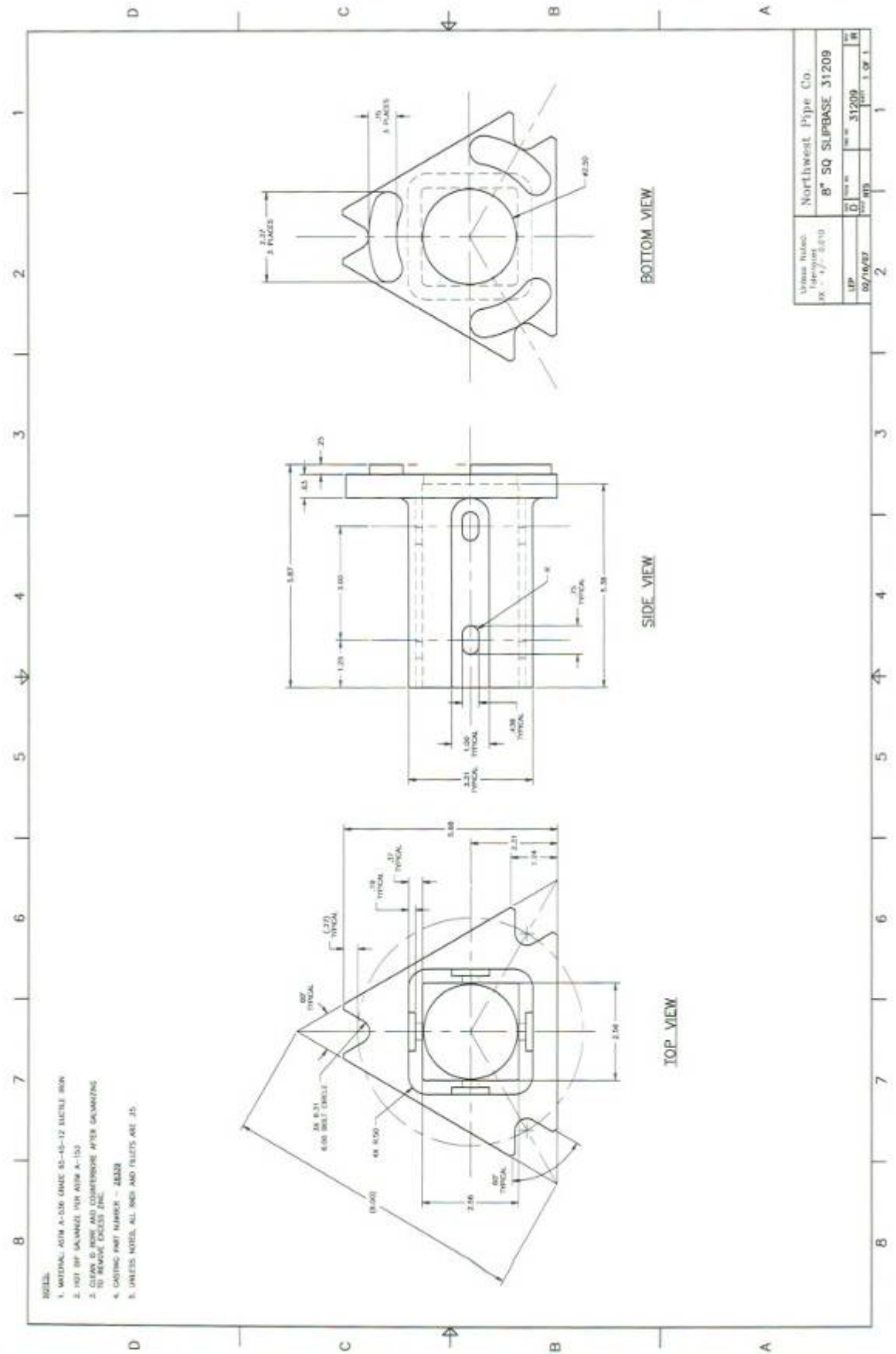
- This acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance 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-150, shall not be reproduced except in full. This letter, and the test documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.
- The device is a patented product and considered proprietary. If proprietary devices are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS 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 the 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. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.
- 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.

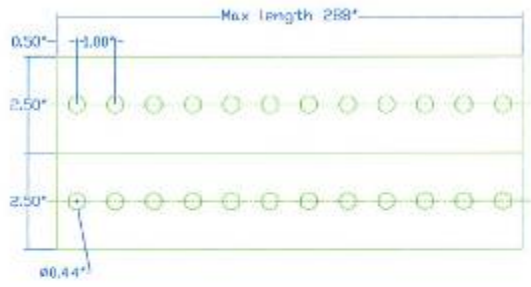
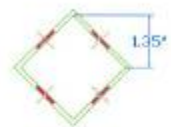
Sincerely yours,



George E. Rice, Jr.  
Acting Director, Office of Safety Design  
Office of Safety

Enclosures





**Notes:**  
**Material:** Steel pipe, finished shall conform to ASTM A53 Grade B1, Standard Specification for Steel Sheet, Zinc Coated (Electrolytic) or Zinc Iron Alloy Coated (Galvanneal) by the Hot Dip Process.  
**Shape:** The corner section of the pipe shall be carbon steel tube formed in square and without flange in the center by high frequency electric resistance welding and externally beveled to match the corner radii.  
**Finish:** The galvanized part will conform to ASTM A653, G90, Structural quality, Grade 51. The corner will be zinc coated after coating. The galvanized part has a minimum of 0.5 mil of zinc coating unless a coating application error is provable.  
**Holes:** All hole tolerances shall be  $\pm 0.015$  diameter,  $\pm 0.004$  on one each corner through the entire length of the pipe. Holes shall be on the centerline of each side, in alignment with and opposite each other, straight and square.  
**Telecooping Properties:** The finished pipe shall be straight and have a smooth, uniform finish. All consecutive sizes of square tubes shall telescope freely and be not less than ten feet in length without the need to match any end-to-end face to any other face. All holes and ends shall be free from burrs.  
**Spigot/Socket Tolerance:**  $\pm 0.015$   
**Permissible hole size per hole maximum:**  $1/16$  per 3 feet  
**Outside Tube corner chamfers (all sizes):**  $\pm 0.007$   
**Outside Dimensions:** Measurements are made at least 2' from the end of the tube.  
**Wall Thickness:** Permissible variation in wall thickness is  $\pm 0.015$ ,  $-0.007$ .  
**Length:** The length of each pipe shall have a permissible length tolerance of  $\pm 0.04$ .  
**Conformity and Conformity:** As measured in the center of the flat sides, shall not exceed  $\pm 0.015$  tolerance of corner.  
**Corner Radii:** Standard corner radii shall be  $0.02$ , with variation of  $\pm 0.007$ .  
**Straightness:** Permissible variation in straightness is  $0.007$  in a 10 foot section.

Tolerance Unless Specified ± .015 X/XX± .007 XXXXX± .010	<b>Northwest Pipe Company</b>		
	2 1/2" SQ Gage Perforated Square		
JLP	Dwg. Part No. SQP-15/12	Rev. No. SQP-15/12	Rev. 1 of 1
01/04/06	Date N/A		