U.S. Department of Transportation
Federal Highway Administration

1200 New Jersey Ave., SE
Washington, D.C. 20590

May 6, 2014

In Reply Refer To:
HSST/SS-126B

Mr. Bret Eckert
Trinity Highway Products
3617 Cincinnati Avenue
Rocklin, California 95765

Dear Mr. Eckert:

This letter is in response to your request for the Federal Highway Administration (FHWA) to review a roadside safety system for eligibility for reimbursement under the Federal-aid highway program.

Name of system:	Perforated Square Steel Tube Sign Supports
Type of system:	Generic Breakaway Sign Supports
Test Level:	NCHRP Report 350 Test Level 3
Testing conducted by:	Texas A&M Transportation Institute
Task Force 13 Designator:	PTP12a, PTP20a-24b
Date of request:	November 15, 2013

Decision
The following device is eligible, with details provided in the form which is attached as an integral part of this letter:

- Generic Perforated Square Steel Tube Breakaway Sign Supports with modified materials specified.

Based on a review of crash test results certifying the device described herein meets the crash test and evaluation criteria of the National Cooperative Highway Research Program (NCHRP) Report 350, the device is eligible for reimbursement under the Federal-aid highway program. Eligibility for reimbursement under the Federal-aid highway program does not establish approval or endorsement by the FHWA for any particular purpose or use.

The FHWA, the Department of Transportation, and the United States Government do not endorse products or services and the issuance of a reimbursement eligibility letter is not an endorsement of any product or service.

Requirements
To be found eligible for Federal-aid funding, roadside safety devices should meet the crash test and evaluation criteria contained in the NCHRP Report 350 or the American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH).

Description
This letter modifies SS-126(Revised) by removing the ASTM A653 mechanical requirement that the ultimate tensile strength of the steel coil used to produce the perforated square steel tube should not exceed 550 MPa (79,800 psi) or have an elongation measured over 50mm (2 inches) greater than 28%. The crash test laboratory concurs in this change. The device and supporting documentation are described in the attached form.

Summary and Standard Provisions
Therefore, the system described and detailed in the attached form is eligible for reimbursement and may be installed under the range of conditions tested.

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

- This letter provides a AASHTO/ARTBA/AGC Task Force 13 designator that should be used for the purpose of the creation of a new and/or the update of existing Task Force 13 drawing for posting on the on-line 'Guide to Standardized Highway Barrier Hardware' currently referenced in AASHTO Roadside Design Guide.
- This finding of eligibility does not cover other structural features of the systems, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may influence system conformance with NCHRP Report 350 criteria will require a new reimbursement eligibility letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals safety problems, or that the system is significantly different from the version that was crash tested, we reserve the right to modify or revoke this letter.
- You are expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the crash test and evaluation criteria of the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of eligibility is designated as number SS-126B and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.
- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.

The FHWA does not become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

Sincerely yours,

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility Of Highway Safety Hardware

Submitter	Date of Request:	November 15, 2013	(•) New ( ) Resubmission
	Name:	Bret Eckert, P.E.	Signature: Bret Eckert
	Company:	Trinity Highway Products	
	Address:	3617 Cincinnati Ave., Rocklin, CA 95765	
	Country:	USA	
	To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies	

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

Help

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'SS': Breakaway Sign Supports, Mailboxes, & other small sign supports	(•) Physical Crash Testing ( ) FEA & V&V Analysis	Perforated Square Steel Tube	NCHRP Report 350	TL3

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the NCHRP Report 350 (Report 350) and that the evaluation results meet the appropriate evaluation criteria in the Report 350.

Identification of the individual or organization responsible for the product:

Contact Name:	John Intagliata	Same as Submitter ☐
Company Name:	Trinity Highway Products	Same as Submitter ☒
Address:	3617 Cincinnati Ave., Rocklin, CA 95765	Same as Submitter ☒
Country:	USA	Same as Submitter ☒

PRODUCT DESCRIPTION

( ) New Hardware	(•) Modification to Existing Hardware	Non-Significant - Effect is positive or Inconsequential

The perforated square steel tube used for breakaway sign supports was originally accepted in FHWA Eligibility letters HSSD/SS-126 (REVISED) and HSSI/SS-126A. The material described in the test reports for HSSD/SS-126 (REVISED) and for HSSI/SS-126A state, respectively, that ASTM A653 SS Grade 50 and HSLAS Grade 50 was used. Footnote 1 in the Accepted Uses table in FHWA letter SS-126 (REVISED) says, "The ultimate tensile strength of the steel coil used to produce the tube should not exceed 550 MPa (79,800 psi) or have an elongation measured over 50 mm (2 inches) greater than 28%". This sentence is in conflict with ASTM A653 mechanical requirements that specify minimum values for yield, tensile and elongation. Tensile strength and elongation values are not constrained to maximum limits in this ASTM material standard.

This FHWA Eligibility request is to amend footnote 1 shown in Acceptable Uses Table in FHWA Acceptance Letter HSSD/SS-126 (REVISED) by removing the sentence discussing maximum tensile and elongation limits. This modification is considered Non-significant and inconsequential.

WE CONCUR WITH THIS ASSESSMENT.

04/11/2014

DEAN C ALBERSON
TTI

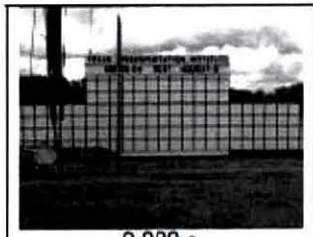
Acceptable Uses of Perforated Square Steel Tube Sign Posts, Per Request of Trinity Industries, Inc. Company

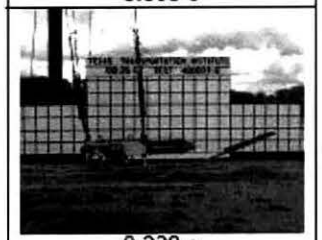
Posts are fabricated from ASTM A653 SQ Grade 50, Modified to "Grade 55", certified to 414 MPa min yield[1].

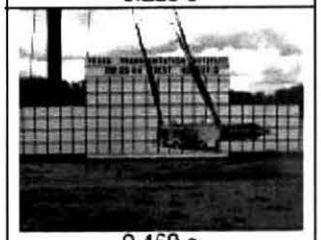
Post Size mm x mm (in x in)	One Post in a 2.1-m Path								Two Posts in a 2.1-m Path							
	Standard Soil				Weak Soil				Standard Soil				Weak Soil			
	With Anchor Base[(1)]		Direct Burial		With Anchor Base[(1)]		Direct Burial		With Anchor Base[(1)]		Direct Burial		With Anchor Base[(1)]		Direct Burial	
	2.10 mm	2.66 mm	2.10 mm	2.66 mm	2.10 mm	2.66 mm	2.10 mm	2.66 mm	2.10 mm	2.66 mm	2.10 mm	2.66 mm	2.10 mm	2.66 mm	2.10 mm	2.66 mm
63.5x63.5 (2.5x2.5)	---	yes	---	---	---	yes	---	---	---	---	---	---	---	---	---	---
57.2x57.2 (2.25x2.25)	yes	yes	yes	yes	yes	yes	yes	yes	---	---	---	---	---	---	---	---
50.8x50.8 (2.0x2.0)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	---	yes	yes	yes	---
44.5x44.5 (1.75x1.75)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
38.1x38.1 (1.5x1.5)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

1. 413.69 MPa = 60,000 psi.
2. The anchor base may or may not have a strengthening sleeve at ground line. The anchor bases shall be sized to fit closely around the post. For 63.5x63.5 posts of both wall thicknesses and 57.2x57.2x2.66 posts the anchor bases shall be made of steel comparable to that of the posts and have wall thicknesses equal 4.55 mm (7 ga) or greater. For 57.2x57.2x2.10 posts and all 55.6x55.6 and smaller posts the anchor bases shall be made of steel comparable to that of the posts and have wall thicknesses equal 2.66 mm (12 ga) or greater.

Table D1. Summary of results for pendulum test 400001-NWP P5.







General Information

Test Agency	Texas Transportation Institute
Test No.	400001-NWP P5
Date	08/25/2004

Test Article

Type	Single Sign Support
Name	NorthWest Pipe Company
Installation Height (m)	2.1 m (7 ft)
Material of Key Element	3 inch x 3 inch x 7-gauge x 36 inch long anchor

Soil Type ..... Standard Soil

Test Vehicle

Type	Bogie
Designation	Pendulum
Test Inertia Mass	816 kg

Impact Conditions

Speed	35.0 km/h
Angle	0 deg

Occupant Risk Values

Impact Velocity	
Longitudinal direction	No contact
Ridedown Accelerations	
Longitudinal direction	N/A
Maximum change in Velocity	3.3 m/s

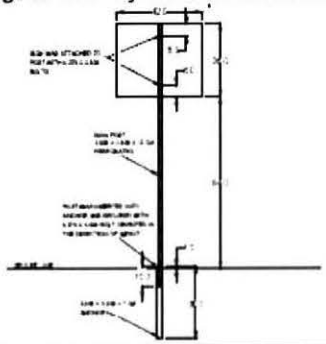
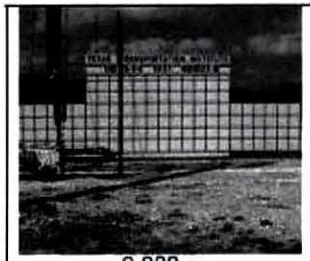


Table D2. Summary of results for pendulum test 400001-NWP P6.



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0.080 s

0.220 s

0.460 s

General Information

Test Agency ..... Texas Transportation Institute
Test No. 400001-NWP P6
Date 08/25/2004

Test Article

Type ..... Single Sign Support
Name ..... NorthWest Pipe Company
Installation Height (m) ..... 2.1 m (7 ft)
Material of Key Element ..... 3 inch x 3 inch x 7-gauge x 36 inch long wing anchor

Soil Type ..... Weak Soil

Test Vehicle

Type ..... Bogie
Designation ..... Pendulum
Test Inertia Mass ..... 816 kg

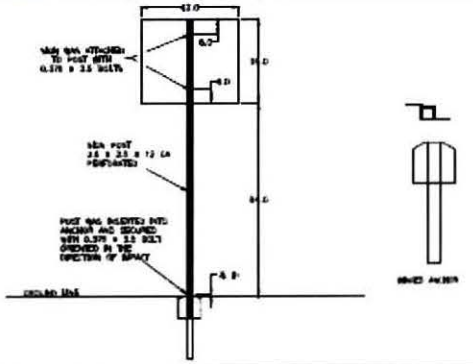
Impact Conditions

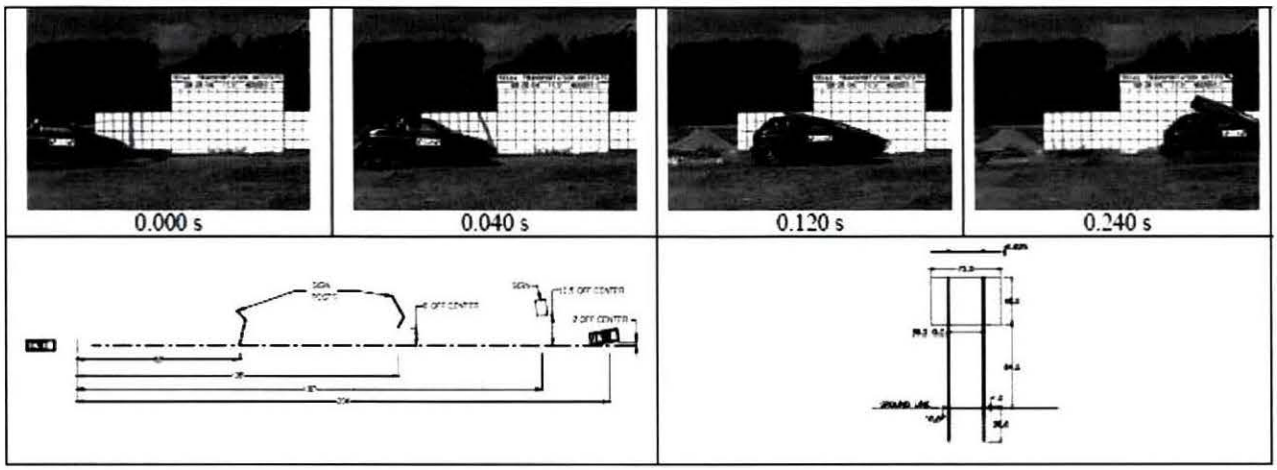
Speed ..... 35.2 km/h
Angle ..... 0 deg

Occupant Risk Values

Impact Velocity
Longitudinal direction ..... No contact
Ridedown Accelerations
Longitudinal direction ..... N/A

Maximum change in Velocity ..... 2.4 m/s





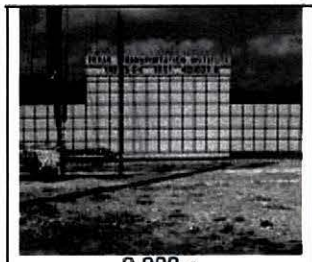
General Information	
Test Agency	Texas Transportation Institute
Test No.	400001-NWP1
Date	08/26/2004
Test Article	
Type	Sign Supports
Name	Square Tube Dual Support Sign
Installation Length (m)	N/A
Material or Key Elements	Northwest Pipe Company Square Tube Dual Support Sign With 4ft x 6ft Panel
Soil Type and Condition	Weak Soil, Dry
Test Vehicle	
Type	Production
Designation	820C
Model	1997 Geo Metro
Mass (kg)	
Curb	852
Test Inertial	866
Dummy	78
Gross Static	944

Impact Conditions	
Speed (km/h)	99.2
Angle (deg)	0
Exit Conditions	
Speed (km/h)	56.2
Angle (deg)	N/A
Occupant Risk Values	
Impact Velocity (m/s)	
Longitudinal	3.6
Lateral	0.1
THIV (km/h)	12.9
Ridedown Accelerations (g's)	
Longitudinal	-1.8
Lateral	-1.9
PHD (g's)	2.0
ASI	0.31
Max. 0.050-s Average (g's)	
Longitudinal	-3.2
Lateral	0.5
Vertical	-2.2

Test Article Deflections (m)	
Longitudinal	54.9
Lateral	3.2
Vehicle Damage	
Exterior	
VDS	12FD1
CDC	12TDHW2
Maximum Exterior Vehicle Crush (mm)	None
Interior	
OCDI	FS0100000
Maximum Occupant Cmpt. Deformation (mm)	59
Post-Impact Behavior (during 1.0 sec after impact)	
Max. Yaw Angel (deg)	-3.2
Max. Pitch Angle (deg)	7.2
Max. Roll Angle (deg)	-3.2

Figure 9. Summary of results for *NCHRP Report 350* test 3-61 on Northwest Pipe Company square tube dual support sign installation.

Table D2. Summary of results for pendulum test 400001-NWP P6.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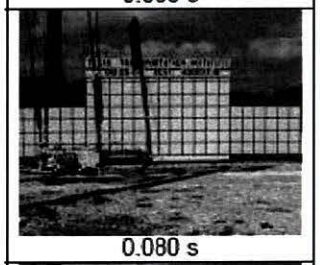
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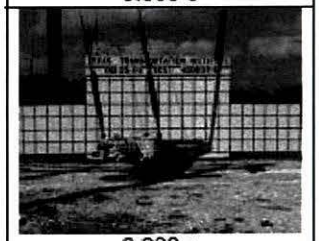
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0.460 s

General Information

Test Agency	Texas Transportation Institute
Test No.	400001-NWP P6
Date	08/25/2004

Test Article

Type	Single Sign Support
Name	NorthWest Pipe Company
Installation Height (m)	2.1 m (7 ft)
Material of Key Element	3 inch x 3 inch x 7-gauge x 36 inch long wing anchor

Soil Type ..... Weak Soil

Test Vehicle

Type	Bogie
Designation	Pendulum
Test Inertia Mass	816 kg

Impact Conditions

Speed	35.2 km/h
Angle	0 deg

Occupant Risk Values

Impact Velocity	
Longitudinal direction	No contact
Ridedown Accelerations	
Longitudinal direction	N/A

Maximum change in Velocity ..... 2.4 m/s