U.S. Department of Transportation
Federal Highway Administration

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

January 14, 2022

In Reply Refer To:
HSST-1/SS-186

Nate Kolmodin
Allied Tube and Conduit Corporation
16100 S. Lathrop Avenue
Harvey, Illinois 60426
USA

Dear Mr. Kolmodin:

This letter is in response to your October 19, 2021 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number SS-186 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

Decision

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

- SafeSign Support System

Scope of this Letter

To be found eligible for Federal-aid funding, new roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials'(AASHTO) Manual for Assessing Safety Hardware (MASH). However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

Eligibility for Reimbursement

Based solely on a review of crash test results and certifications submitted by the manufacturer, and the crash test laboratory, FHWA agrees that the device described herein meets the crash test and evaluation criteria of the AASHTO's MASH. Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions.

- Name of system: SafeSign Support System
  Type of system: Sign Support
  Test Level: Test Level 3
  Testing conducted by: Texas A&M Transportation Institute
  Date of request: October 19, 2021

FHWA concurs with the recommendation of the accredited crash testing laboratory on the attached form.

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

This eligibility letter is issued for the subject device as tested. Modifications made to the device are not covered by this letter. Any modifications to this device should be submitted to the user (i.e., state DOT) as per their requirements.

You are expected to supply potential users with sufficient information on design, installation and maintenance 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 test and evaluation criteria of AASHTO's MASH.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.

Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number SS-186 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 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.

- This FHWA eligibility letter is not an expression of any Agency view, position, or determination of validity, scope, or ownership of any intellectual property rights to a specific device or design. Further, this letter does not impute any distribution or licensing rights to the requester. This FHWA eligibility letter determination is made based solely on the crash-testing information submitted by the requester. The FHWA reserves the right to review and revoke an earlier eligibility determination after receipt of subsequent information related to crash testing.

Sincerely,

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:	October 19, 2021	◉ New ○ Resubmission
	Name:	Nate Kolmodin	
	Company:	Allied Tube and Conduit Corporation	
	Address:	16100 S. Lathrop Avenue, Harvey, Illinois 60426	
	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.

Device & Testing Criterion - Enter from right to left starting with Test Level

! - ! - !

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'SS': Breakaway Sign Supports, Mailboxes, & other small sign supports	◉ Physical Crash Testing ○ Engineering Analysis	SafeSign Support System	AASHTO MASH	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 AASHTO Manual for Assessing Safety Hardware and that the evaluation results meet the appropriate evaluation criteria in the MASH.

Individual or Organization responsible for the product:

Contact Name:	Nate Kolmodin	Same as Submitter ☒
Company Name:	Allied Tube and Conduit Corporation	Same as Submitter ☒
Address:	16100 S. Lathrop Avenue, Harvey, Illinois 60426	Same as Submitter ☒
Country:	USA	Same as Submitter ☒

Enter below all disclosures of financial interests as required by the FHWA `Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.

Texas A&M Transportation Institute (TTI) was contracted by Allied Tube & Conduit Corporation to perform full-scale crash testing of the SafeSign Support System. There are no shared financial interests in the SafeSign Support System, or between Allied Tube & Conduit Corporation and TTI, other than the costs involved in the actual crash tests and reports for this submission to FHWA.

690900-ATC 21-22-23

PRODUCT DESCRIPTION

(●) New Hardware or Significant Modification ( ) Modification to Existing Hardware

The SafeSign Support System test installation consisted of a 72-inch × 144-inch extruded aluminum sign mounted 84 inches above grade on two sign post assemblies spaced 88 inches center to center. The post assemblies were constructed of 4-inch, 8-gauge ASTM 500 Gr C square steel tubing with a hinge connection joining the upper square tubing (attached to the sign) with the lower square tubing that extended upward from the slip base that was located near grade. The interface of the slip base was located approximately 3 inches above grade. From the slip base, a 96-inch long section of 4½-inch, 7 gauge ASTM 500 Gr B square tubing was embedded into the soil.

The SafeSign Support Hinge Post Receivers and Cylinder Sleeve are fabricated from ASTM A153 steel, and are galvanized in accordance with ASTM A653.
The SafeSign Support Slip Bases are fabricated from ASTM A1011 steel and are galvanized in accordance with ASTM A653.

CRASH TESTING

By signature below, the Engineer affiliated with the testing laboratory, agrees in support of this submission that all of the critical and relevant crash tests for this device listed above were conducted to meet the MASH test criteria. The Engineer has determined that no other crash tests are necessary to determine the device meets the MASH criteria.

Engineer Name:	Roger P. Bligh	
Engineer Signature:	Roger Bligh — Digitally signed by Roger Bligh Date: 2021.10.20 09:16:16 -05'00'	
Address:	1254 Avenue A, Bldg 7091, Bryan, Texas 77807	Same as Submitter ☐
Country:	USA	Same as Submitter ☐

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-60 (1100C)	MASH Test 3-60 was successfully performed on the SafeSign Support System at 0 degrees. In this test (690900-ATC 21), the support readily activated by slipping away and allowing the vehicle to pass. The vehicle remained stable and upright. The sign rotated 25 degrees about the non-impact post, but the components of the sign support system remained intact other than one of the brackets connecting the sign to the impacted support post becoming detached. The vehicle sustained a small indentation in the bumper at the at the location of impact, but it was so minimal as to be not measurable. Occupant risk indices (occupant impact velocity and ridedown acceleration) were within MASH thresholds. No occupant compartment deformation or intrusion was observed.	PASS

Required Test Number	Narrative Description	Evaluation Results
3-61 (1100C)	MASH Test 3-61 was successfully performed on the SafeSign Support System at 0 degrees. In this test (690900-ATC 22) the support readily activated by slipping away and allowing the vehicle to pass. The vehicle remained stable and upright. The impacted support post separated from its base and the sign panel, but the components of that sign post remained intact. The non-impact post remained intact, vertical, and attached to its base. The sign panels detached from the posts. The vehicle sustained bumper and hood damage, including an 8-inch deep indentation in the hood. Occupant risk indices (occupant impact velocity and ridedown acceleration) were within MASH thresholds. No occupant compartment deformation or intrusion was observed.	PASS
3-62 (2270P)	MASH Test 3-62 was successfully performed on the SafeSign Support System at 0 degrees. In this test (690900-ATC 23) the support readily activated by slipping away and allowing the vehicle to pass. The vehicle remained stable and upright. The impacted support post separated from its base and the sign panel, but the components of that sign post remained intact. The non-impact post remained intact, vertical, and attached to its base. The sign panels detached from the impact post, and one section remained connected to the non-impact post. The vehicle sustained bumper and hood damage, with a 6-inch deep indentation in the bumper and a 4-inch deep indentation in the hood. Occupant risk indices (occupant impact velocity and ridedown acceleration) were within MASH thresholds. No occupant compartment deformation or intrusion was observed.	PASS

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

Laboratory Name:	Texas A&M Transportation Institute	
Laboratory Signature:	Digitally signed by Darrell L. Kuhn 'Date: 2021.10.19 12:40:12 -05'00	
Address:	1254 Avenue A, Bldg 7091, Bryan, Texas 77807	Same as Submitter ☐
Country:	USA	Same as Submitter ☐
Accreditation Certificate Number and Dates of current Accreditation period :	ISO 17025-2017 Laboratory A2LA Certificate Number: 2821.01 Valid To: April 30, 2023	

Submitter Signature*: Kolmodin, Nate Digitally signed by Kolmodin, Nate
Date: 2021.10.20 10:45:51 -05'00'

Submit Form

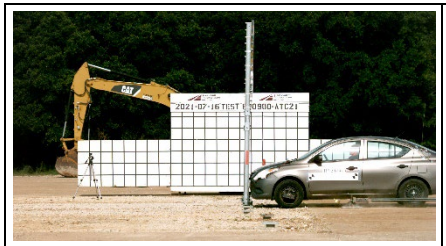
ATTACHMENTS

Attach to this form:

1) Additional disclosures of related financial interest as indicated above.
2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [Hardware Guide Drawing Standards]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words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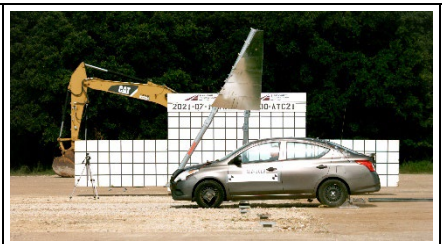
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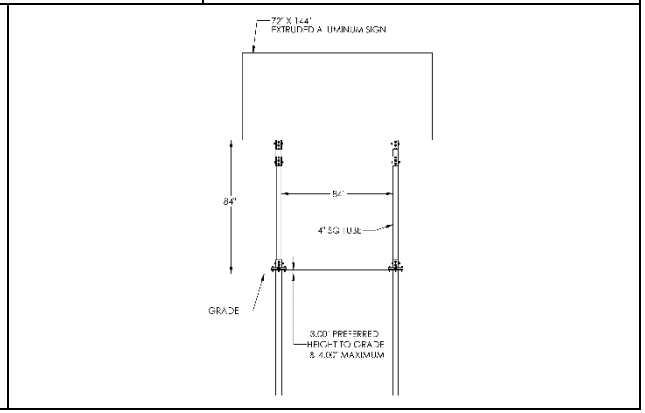


General Information
- Test Agency ..... Texas A&M Transportation Institute (TTI)
- Test Standard Test No. ..... *MASH* Test 3-60
- TTI Test No. 690900-ATC21
- Test Date 2021-07-16

Test Article
- Type ..... Support Structure—Sign Support
- Name ..... SafeSign™ Support System
- Installation Height ..... 84 inches to bottom of sign panel
- Material or Key Elements ... 72 x 144-inch Aluminum multi-panel sign 4-inch square tube supports

Soil Type and Condition ..... AASHTO M147-65(2004), grading D Soil (crushed concrete), damp

Test Vehicle
- Type/Designation 1100C
- Make and Model ..... 2015 Nissan Versa
- Curb ..... 2361 lb
- Test Inertial ..... 2449 lb
- Dummy ..... 165 lb
- Gross Static ..... 2614 lb

Impact Conditions
- Speed ..... 19.4 mi/h
- Angle ..... 0°
- Location/Orientation ..... 13 inches to right of vehicle centerline

Kinetic Energy ..... 31 kip-ft

Exit Conditions
- Speed ..... 17.3 mi/h
- Exit Angle ..... 0°

Occupant Risk Values
- Longitudinal OIV ..... 2.4 ft/s
- Lateral OIV ..... 0.9 ft/s
- Longitudinal Ridedown ..... 0.3 g
- Lateral Ridedown ..... 0.3 g
- THIV ..... 0.8 m/s
- ASI 0.1

Max. 0.050-s Average
- Longitudinal ..... −1.0 g
- Lateral ..... −0.3 g
- Vertical ..... 0.8 g

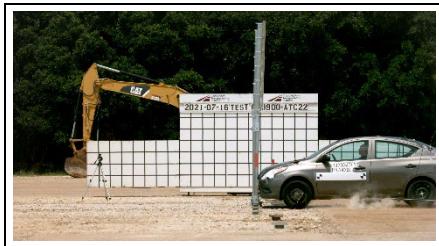
Post-Impact Trajectory
- Stopping Distance ..... 82 ft downstream and inline

Vehicle Stability
- Maximum Roll Angle ..... 2°
- Maximum Pitch Angle ..... 4°
- Maximum Yaw Angle ..... <1°

Test Article Debris Scatter
- Longitudinal ..... Remained at impact
- Lateral ..... Remained at impact

Vehicle Damage
- VDS 12FR1
- CDC 12FREN1
- Max. Exterior Deformation ..... None
- OCDI RF0000000
- Max. Occupant Compartment Deformation ..... None

Figure 5.6. Summary of Results for *MASH* Test 3-60 on SafeSign™ Support System.



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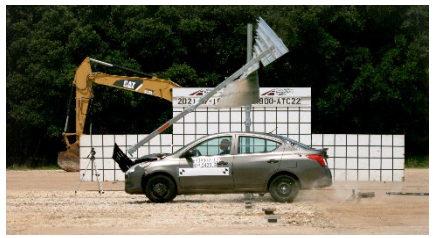

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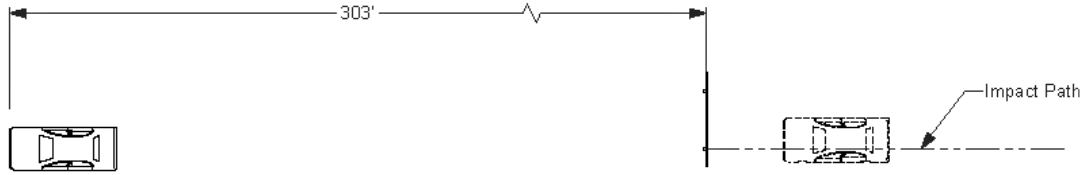
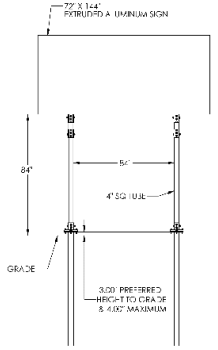




General Information
- Test Agency: Texas A&M Transportation Institute (TTI)
- Test Standard Test No.: *MASH* Test 3-61
- TTI Test No.: 690900-ATC22
- Test Date: 2021-07-16

Test Article
- Type: Support Structure—Sign Support
- Name: SafeSign™ Support System
- Installation Height: 84 inches to bottom of sign panel
- Material or Key Elements: 72 inches x 144 inches Aluminum multi-panel sign

Soil Type and Condition: 4-inch square tube supports AASHTO M147-65(2004), grading D Soil (crushed concrete), damp

Test Vehicle
- Type/Designation: 1100C
- Make and Model: 2015 Nissan Versa
- Curb: 2361 lb
- Test Inertial: 2449 lb
- Dummy: 165 lb
- Gross Static: 2614 lb

Impact Conditions
- Speed: 63.4 mi/h
- Angle: 0°
- Location/Orientation: 13 inches to right of vehicle centerline

Kinetic Energy: 329 kip-ft

Exit Conditions
- Speed: 61.3 mi/h
- Exit Angle: 0°

Occupant Risk Values
- Longitudinal OIV: 4.3 ft/s
- Lateral OIV: 2.2 ft/s
- Longitudinal Ridedown: 0.4 g
- Lateral Ridedown: 0.7 g
- THIV: 1.5 m/s
- ASI: 0.2

Max. 0.050-s Average
- Longitudinal: −2.6 g
- Lateral: 1.0 g
- Vertical: −1.3 g

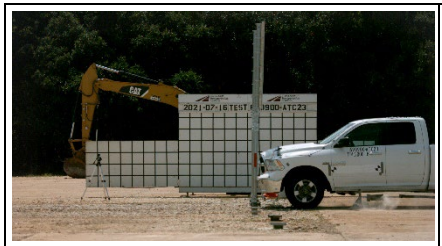
Post-Impact Trajectory
- Stopping Distance: 303 ft downstream and inline

Vehicle Stability
- Maximum Roll Angle: 3°
- Maximum Pitch Angle: 3°
- Maximum Yaw Angle: 3°

Test Article Debris Scatter
- Longitudinal: 150 ft downstream
- Lateral: 8 ft right of center

Vehicle Damage
- VDS: 12FR3
- CDC: 12FREN2
- Max. Exterior Deformation: 8.0 inches
- OCDI: RF0000000
- Max. Occupant Compartment Deformation: None

Figure 6.6. Summary of Results for *MASH* Test 3-61 on SafeSign™ Support System.



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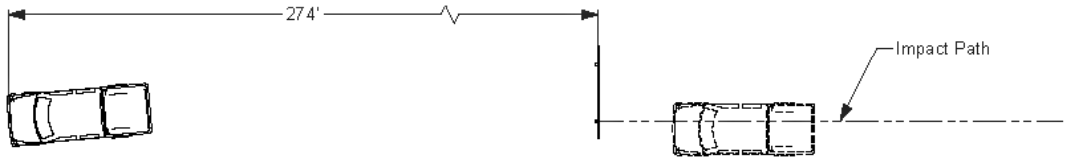
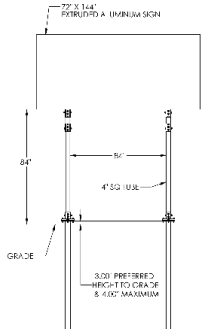




General Information
- Test Agency ..... Texas A&M Transportation Institute (TTI)
- Test Standard Test No..... *MASH* Test 3-62
- TTI Test No. 690900-ATC23
- Test Date..... 2021-07-16

Test Article
- Type ..... Support Structure—Sign Support
- Name ..... SafeSign™ Support System
- Installation Height..... 84 inches to bottom of sign panel
- Material or Key Elements.... 72 inches x 144 inches Aluminum multi-panel sign

Soil Type and Condition..... 4-inch square tube supports AASHTO M147-65(2004), grading D Soil (crushed concrete), damp

Test Vehicle
- Type/Designation..... 2270P
- Make and Model..... 2015 RAM 1500 Pickup
- Curb ..... 4940 lb
- Test Inertial..... 5031 lb
- Dummy..... No dummy
- Gross Static..... 5031 lb

Impact Conditions
- Speed ..... 64.1 mi/h
- Angle ..... 0°
- Location/Orientation..... 13 inches to right of vehicle centerline

Kinetic Energy..... 691-kip ft

Exit Conditions
- Speed ..... 62.1 mi/h
- Exit Angle..... 0°

Occupant Risk Values
- Longitudinal OIV ..... 3.4 ft/s
- Lateral OIV..... 0.7 ft/s
- Longitudinal Ridedown..... 0.1 g
- Lateral Ridedown ..... 0.3 g
- THIV ..... 1.1 m/s
- ASI..... 0.2

Max. 0.050-s Average
- Longitudinal ..... −1.4 g
- Lateral ..... 0.4 g
- Vertical ..... −0.8 g

Post-Impact Trajectory
- Stopping Distance..... 274 ft downstream and inline

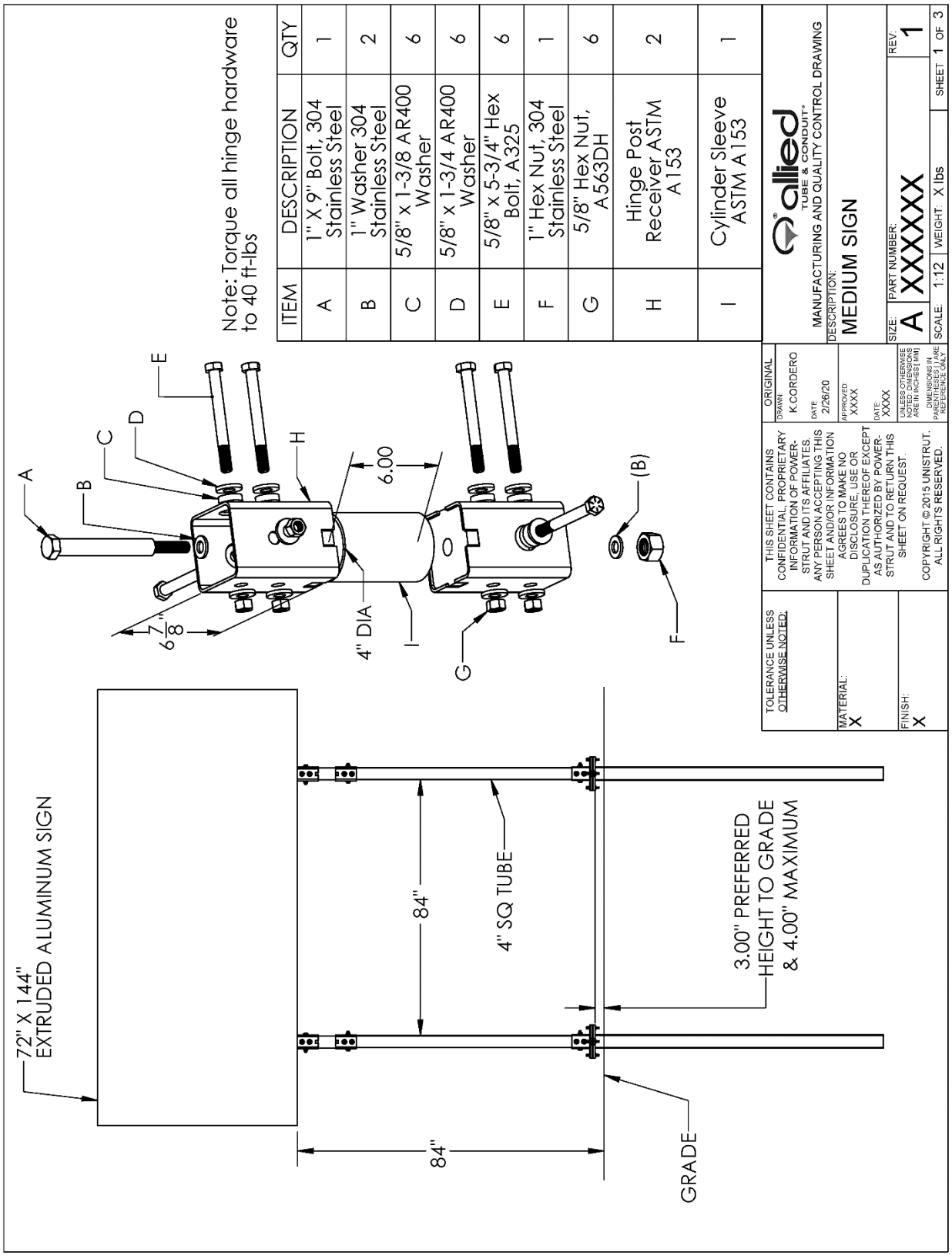
Vehicle Stability
- Maximum Roll Angle ..... 4°
- Maximum Pitch Angle ..... 1°
- Maximum Yaw Angle ..... 1°

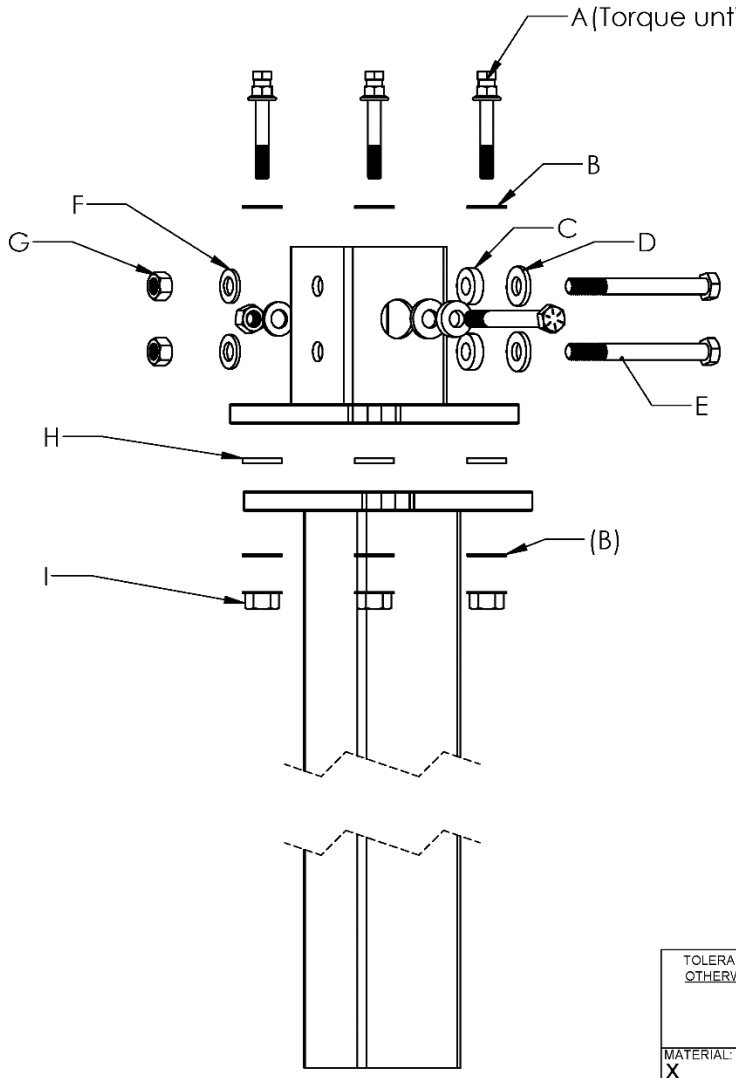
Test Article Debris Scatter
- Longitudinal ..... 228 ft downstream
- Lateral..... 10 ft to right of center

Vehicle Damage
- VDS 12FR2
- CDC..... 12FREN2
- Max. Exterior Deformation..... 6.0 inches
- OCDI..... RF0000000
- Max. Occupant Compartment Deformation ..... None

Figure 7.5. Summary of Results for *MASH* Test 3-62 on SafeSign™ Support System.

APPENDIX A. DETAILS OF SAFE-SIGN SUPPORT SYSTEM





NOTE: ITEM E TORQUE IS 40 FT-LBS

ITEM	DESCRIPTION	QTY
A	3/4"-10 X 3-1/2" GRADE 8 DOUBLE HEADED FLANGE BOLT	3
B	7/8" USS FLAT WASHER, ANSI B18.22.1	6
C	5/8" X 1-3/8" WASHER, AR400	3
D	5/8" X 1-3/4" WASHER, AR400	3
E	5/8-11 X 5-3/4" HEX BOLT, A325	3
F	5/8" FLAT WASHER F436	3
G	5/8" HEX NUT, A563DH	3
H	7/8" USS BLUE TEFLON COATED WASHER	3
I	3/4"-10 GRADE 8 FLANGE NUT	3

TOLERANCE UNLESS OTHERWISE NOTED:

MATERIAL: X

FINISH: X

ORIGINAL

DRAWN: XXXX

DATE: XXXX

APPROVED: XXXX

DATE: XXXX

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES [MM]

DIMENSIONS IN PARENTHESES ( ) ARE REFERENCE ONLY

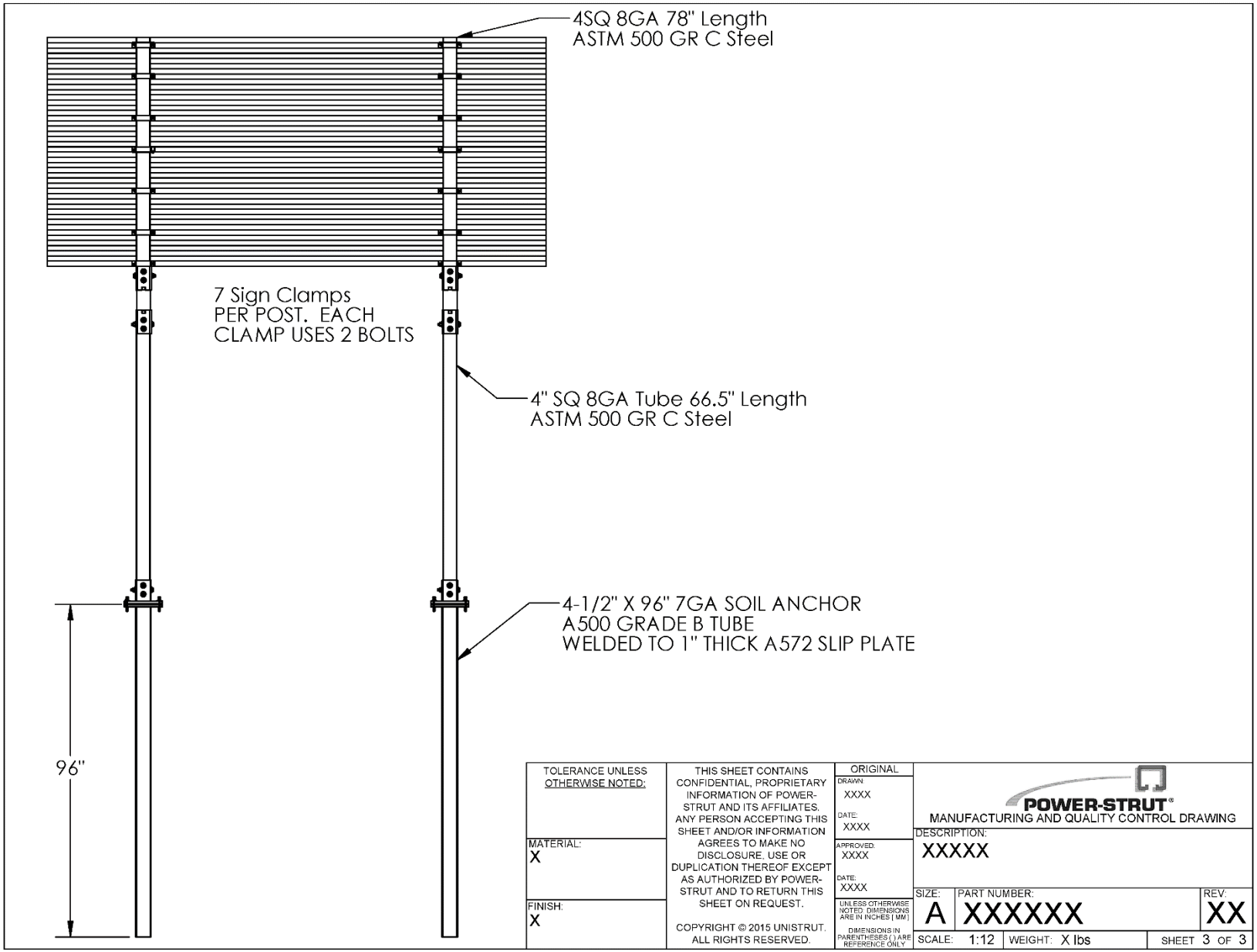
POWER-STRUT®

MANUFACTURING AND QUALITY CONTROL DRAWING

DESCRIPTION: XXXXX

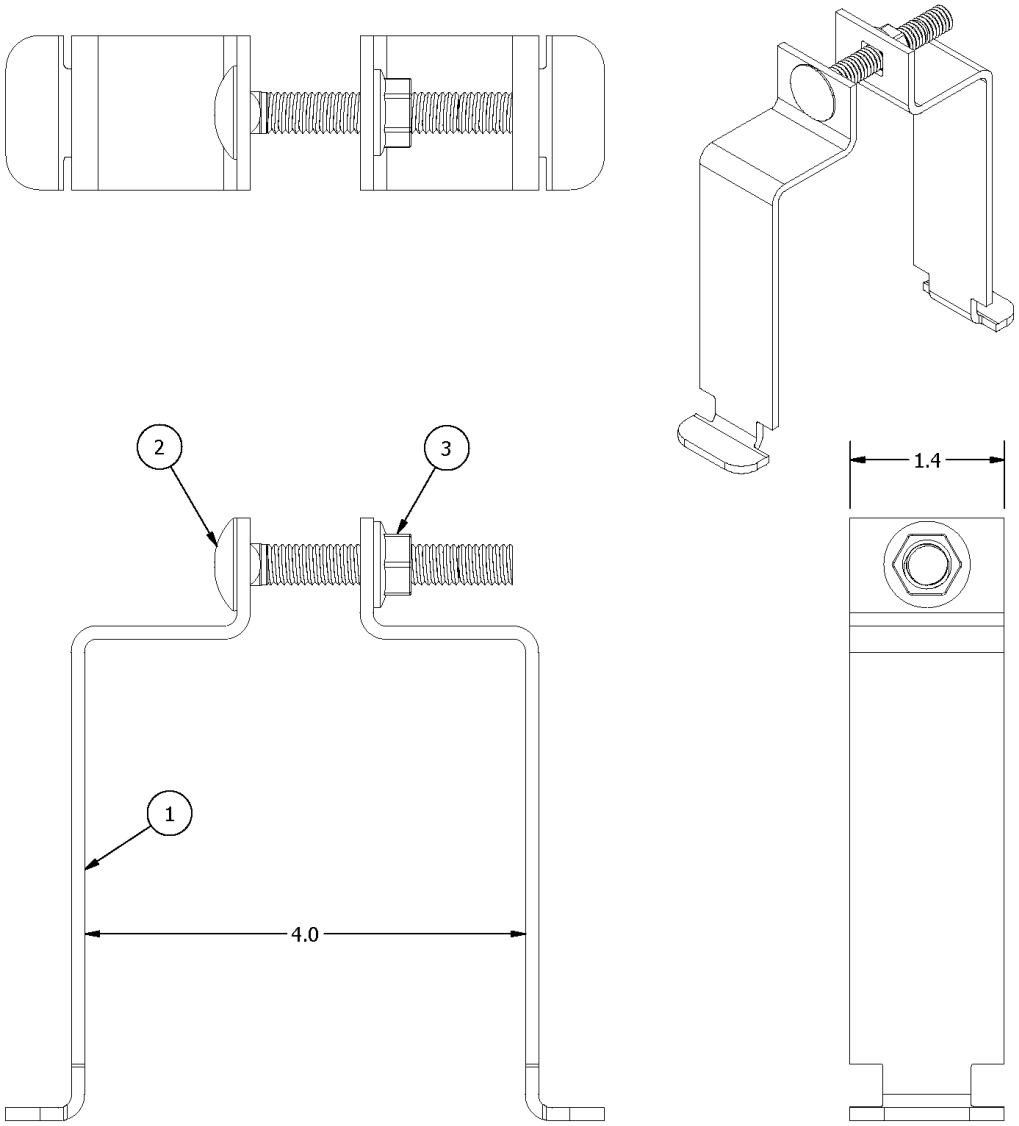
SIZE: A | PART NUMBER: XXXXXX | REV: XX

SCALE: 1:12 | WEIGHT: X lbs | SHEET 2 OF 3



TOLERANCE UNLESS OTHERWISE NOTED:	THIS SHEET CONTAINS CONFIDENTIAL, PROPRIETARY INFORMATION OF POWER-STRUT AND ITS AFFILIATES. ANY PERSON ACCEPTING THIS SHEET AND/OR INFORMATION AGREES TO MAKE NO DISCLOSURE, USE OR DUPLICATION THEREOF EXCEPT AS AUTHORIZED BY POWER-STRUT AND TO RETURN THIS SHEET ON REQUEST.	ORIGINAL	POWER-STRUT® MANUFACTURING AND QUALITY CONTROL DRAWING
MATERIAL: X		DRAWN: XXXX	DESCRIPTION: XXXXX
FINISH: X		DATE: XXXX	
		APPROVED: XXXX	
		DATE: XXXX	
		UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES [MM]	SIZE: A / PART NUMBER: XXXXXX / REV: XX
		DIMENSIONS IN PARENTHESES ( ) ARE REFERENCE ONLY	SCALE: 1:12 / WEIGHT: X lbs / SHEET 3 OF 3

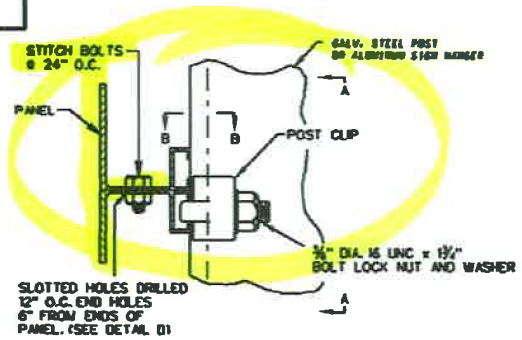
XCESSORIES SQUARED Development & MFG., Inc. Auburn, IL 62615 tel: 217-438-3535 fax: 217-438-3917		BILL OF MATERIALS		
*Do not scale drawing-work to dimensions *All tolerances +/- 1/64" unless otherwise noted *Unit of Measure - Inches	PROPRIETARY PRINT NOT TO BE DUPLICATED PROPERTY OF XCESSORIES SQUARED	1	SBPCS400SQ-C	2 each	Post Clamp for 4" Square Post
		2	CBS38-250	1 each	3/8"-16 x 2-1/2" Stainless Carriage Bolt
		3	CHFN38-Z	1 each	Case Hardened 3/8"-16 Flange Nut- zinc&clear
		4			



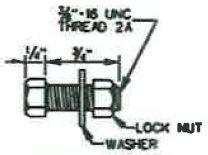
DWG# SBPCS400SQ	Revision	Date	Description of Revision *(Supercedes Previous Drawing)*	Approved by / date
	Original	4-7-16		
DESCRIPTION: Post Clamp for 4" Square w/Hdw	Rev. A	10-4-16	Changed bolt length	
FINISH: n/a DRAWN BY: GAK WEIGHT: 0.72 lbs.				

10/4/2016 10:35 AM

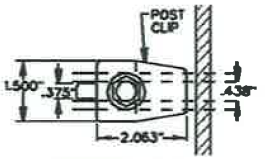
SPD-2



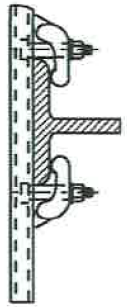
SIGN PANEL ASSEMBLY



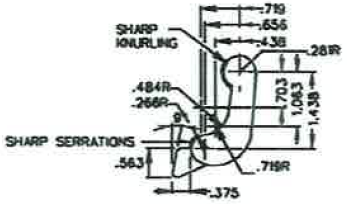
STITCH BOLT (TYP.)



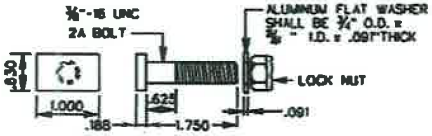
SECTION A-A



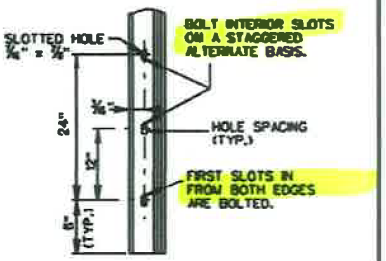
SECTION B-B



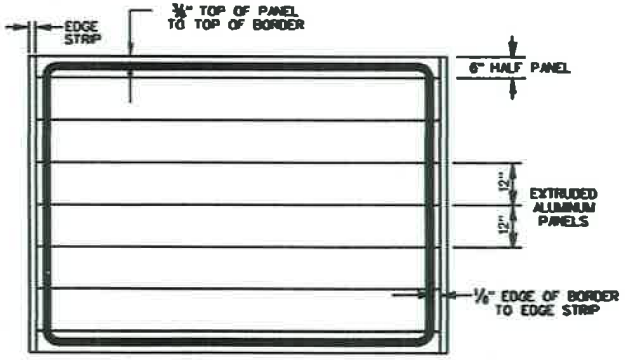
POST CLIP (TYP.)



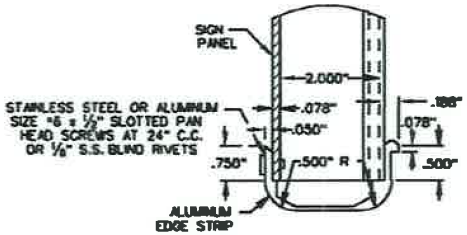
POST CLIP BOLT (TYP.)



DETAIL D



BORDER DETAIL



DETAIL OF EDGE STRIP

NOTE:

EDGE STRIP SHALL BE PLACED ON BOTH SIDES OF ALL EXTRUDED PANEL SIGNS.

DOUBLE POST CLIPS SHALL BE INSTALLED ON ALL SIGN HANGERS.

ALL SIGN PANELS INSTALLED ON OVERHEAD SIGN STRUCTURES SHALL BE BOLTED DIRECTLT TO THE SIGN HANGER MEMBERS AT THE BOTTOM AND TOP ROW AND POST CLIPS SHALL BE USED AT ALL OTHER MOUNTING POINTS.

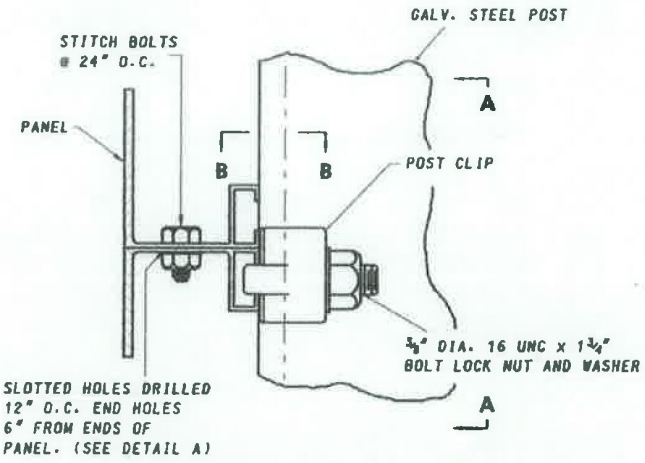
VDOT
ROAD AND BRIDGE STANDARDS

EXTRUDED SIGN PANEL DESIGN

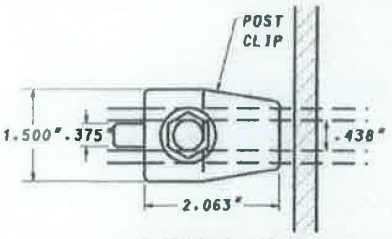
VIRGINIA DEPARTMENT OF TRANSPORTATION

SHEET 2 OF 2	REVISION DATE
1325.21	4/09

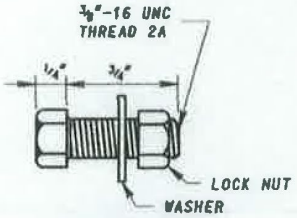
SPECIFICATION REFERENCE
701



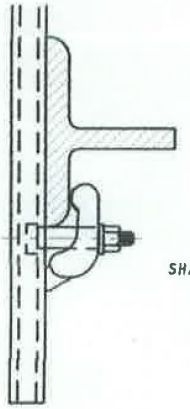
SIGN PANEL ASSEMBLY



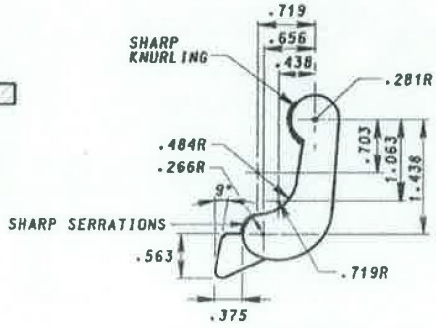
SECTION A-A



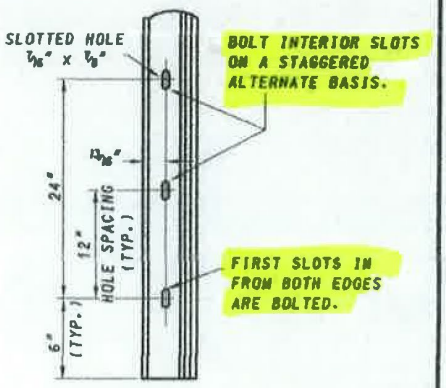
STITCH BOLT (TYP.)



SECTION B-B

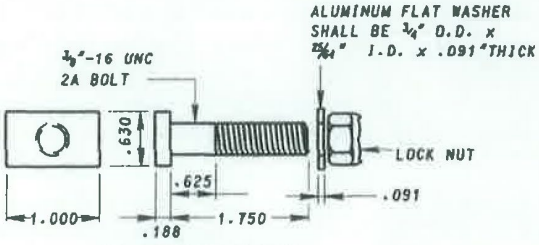


POST CLIP (TYP.)



DETAIL A

BOLTS	B211, ALLOY 2024-T4, 6262-T9 OR 6061-T6
FLAT WASHERS	B209, ALLOY 2024-T4
RIVETS	ALLOY 5052
NUTS	B211, ALLOY 2017-T4
POST CLIPS	B108, ALLOY 356-T6



POST CLIP BOLT (TYP.)

SPECIFICATION	CATEGORY CODE ITEMS
813	

APPROVED

DIRECTOR – OFFICE OF TRAFFIC AND SAFETY

APPROVAL • SHA REVISIONS		APPROVAL • FEDERAL HIGHWAY ADMINISTRATION	
APPROVAL	2-21-95	APPROVAL	2-21-95
REVISED	5-17-07	REVISED	5-2-07
REVISED		REVISED	
REVISED		REVISED	

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

EXTRUDED ALUMINUM DETAILS
SIGN PANEL ASSEMBLY

STANDARD NO. MD 813.06