Ancillary Structures Spring Meeting

March 7th, 8:30 AM – Noon
DeForest Post - Large Conference Room

1.	Introductions	All
2.	Sign/Signal Monotubes/HML- 2017 Inspection Contracts	
	a. Work Distribution	Travis
	b. Redistribution Contract for Initial Inspections	Dave/Travis
	c. Element/Assessment Based Inspections	Travis
3.	Sign/Signal Monotubes - Design / Fabrication / Field Issues	
	a. SPV's for FY '17 LET Repair Contracts	Vu/Joanna
	b. 2017 Monotube Spec Language Change for ID Plaque	Ahmet/Joanna
	c. Review of Repairs/Replacements by BOS	Vu
	d. Ancillary Structures Update Given at Regional Const.	Vu
	e. Anchor Rod Template Eccentricity – Beltline?	Vu/Aaron
	f. Base Plate / Foundation Standoff Issues	Vu/Aaron
	g. Transverse Welds - Valmont	Vu/Travis
	h. High Route Corridors – Standard Design	Aaron/Joanna
	i. "Astro Brac" Cracking	Ahmet/Travis/Joanna
	j. Pro Electric contract, phases, and progress	Joanna
	k. Structural Bolting Issues (DTI, Washer, Broken Bolts)	Anthony/Joanna
	l. Trusses Installed Incorrectly	Travis
	m. Other Items	All
4.	Sign/Signal/HML Training Needs	
	a. Bolt Training	Travis
5.	Walls – Retaining Walls and Sound Barriers	
	a. Training Development – FHWA Resource Center	Travis
	b. Modular Block Retaining Walls - Protective Surface Treatment	Anthony
	c. Construction, Inventory, and Inspection Updates?	All
6.	Small Bridges (C-Structures)	
	a. Dive Contract – List to Matt/Dave	Travis
	b. Confined Space Requirements	Jason
	c. Construction, Inventory and Inspection Updates?	All
7.	Manual Chapter Review Updates	
	a. Small Bridges	Anthony
	b. Retaining Walls	Shiv
	c. Sound Barriers	Jason
	d. Sign/Signal Monotube	Brady, Dan, Tom
	e. HML	Kyle

f. Miscellaneous — Dave B.

8. Research Needs – WHRP — Travis
9. Other Items?

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DeForest Post - Large Conference Room

March 7th, 8:30 AM

Agenda

1. Introductions

2. Sign/Signal Monotubes/HML- 2017 Inspection Contracts
   - Work Distribution — Travis
   - Redistribution Contract for Initial Inspections — Travis/Dave
   - Element/Assessment Based Inspections — Travis

3. Sign/Signal Monotubes - Design / Fabrication / Field Issues
   - SPV's for FY '17 LET Repair Contracts — Vu/Joanna
   - 2017 Monotube Spec Language Change for ID Plaque — Ahmet/Joanna
   - Review of Repairs/Replacements by BOS — Vu
   - Ancillary Structures Update Given at Regional Const. — Vu
   - Transverse Welds - Valmont — Vu/Travis
   - Base Plate / Foundation Standoff Issues — Vu/Aaron
   - Anchor Rod Template Eccentricity – Beltline? — Vu/Aaron
   - High Route Corridors – Standard Design — Aaron/Joanna
   - "Astro Brac" Cracking — Ahmet/Joanna
   - Pro Electric contract, phases, and progress — Joanna
   - Structural Bolting Issues (DTI, Washer, Broken Bolts) — Anthony/Joanna
   - Trusses Installed Incorrectly — Travis
   - Other Items — All

4. Sign/Signal/HML Training Needs
   - Bolt Training — Travis

5. Break

6. Walls – Retaining Walls and Sound Barriers
   - Training Development – FHWA Resource Center — Travis
   - Modular Block Retaining Walls - Protective Surface Treatment — Anthony

7. Small Bridges (C-Structures)
   - Dive Contract — Travis/Dave
   - Confined Space Requirements — Jason

8. Manual Chapter Review Updates
   - Small Bridges — Anthony
   - Retaining Walls — Shiv/Jason
   - Sound Barriers — Jason/Shiv
   - Sign/Signal Monotube — Brady, Dan, Tom
   - HML — Kyle
   - Miscellaneous — Dave B.

9. Research Needs – WHRP Solicitation — Travis
   - Anchor Rod Fatigue
   - Anchor Rod Standoff
   - Transverse Weld Fatigue Analysis

10. Other Items?

2017 Inspection Contracts

- Distribution
  - Collins Engineers
    - 593 Inspections ±
      - SE Region
      - NE Region (Initials Only)
  - Fish & Associates, Inc.
    - 269 Inspections ±
      - SW-Madison
      - NE Region (Routine Only)
  - Lamb-Star
    - 112 Inspections ±
      - NW Region
      - NC Region
      - SW-La Crosse
- 41% Initial Inspections

Initial Inspections – Redistribution Contract

- **FDM 8-15-2.1 Redistribution Contract Provisions**

Redistribution Consultant contract provisions should be used for certain consultant contracts where consultants under contract with WisDOT will perform services for a relatively small number of hours on a relatively large number of WisDOT projects. Under these provisions, the contract or work order is encumbered and paid using a single project ID with costs transferred to other improvement projects using redistribution.

- **FDM 8-15-2.4 Basis of Payment/Contract Period**

The basis of payment to consultants using redistribution contract provisions is limited to Cost Per Unit of Work…

Redistribution Contract – Unit Costs (Collins)

- Inspection Cost
  - Full Span
  - Non-Full Span
  - Interim/Emergency
- Mobilization
  - By County
  - Includes travel time, gas, meals, etc.
- Truck Rental
  - Invoiced Monthly
    - Rates vary depending on number of days truck used on ALL DOT Projects
    - Truck usage Excel table for all projects will be provided
- Traffic Control
  - Single Lane (Freeway)
  - Double Lane (Freeway)
  - Ramp
  - Local Single Lane
  - Local Double Lane

Element/Assessment Inspections

- Compliance with Transportation Asset Management Plan (MAP-21) in development by DOT Administration
- Major Difference(s):
  1) Old 3 Component rating system (Good, Fair, Poor)

     Vs

     New 4 Condition States (Good, Fair, Poor, Severe)
  2) New system utilizes quantities (# anchor Rods, # of bases, LF of truss, # and square footage of signs, etc.)

Elements/Assessments

- Process and Progress
  - Developed new Elements & Assessments (Worked with Inspection Consultants)
    - Numbering system, Names, UOM, Condition State Language, Etc.
  - Translation Flowcharts (Worked with Inspection Consultants)
    - Example: A Good rating for the Anchor Rod component gets translated to CS1 in Element 8702.
      A Fair rating for the Anchor Rod component gets translated to CS2 in Element 8702.
      Etc.
  - Wrote SQL code to realize the above translation in the database
  - Added to TEST site for Consultants to review
  - Updated HSIS (March 1st) to use this data, updated PDF's, etc.
  - Ready to use for 2017 Inspection season

Elements/Assessments

#	Name
8701	Base/Foundation
8702	Steel Anchor Rods
8703	Base Plate(s) (Aluminum or Steel)
8704	Column Support(s) (Aluminum or Steel)
8705	Truss Chord(s) / Mast Arm(s) (Aluminum or Steel)
8706	Connection(s) - Column to Truss Chord/Arm
8707	Connection(s) - Splices for Columns, Chords, Arms
8708	Overhead Sign Panels
8709	Signal Head(s)
8710	Connection(s) - Overhead Sign Panel / Signal Heads
9200	Rodent Screen
9201	Electrical, Luminaire Device, and/or Camera
9202	Miscellaneous Mounted Attachments
9204	Winch and Cables
9205	Handhole Covers and Caps
9206	Catwalk
9207	Crash Protection (Guardrail, Barrier, etc.)
9208	Structure ID Plaque
9209	Protective Coating(s) (Galvanization, Paint, etc.)

Sign/Signal Monotubes
Design / Fabrication / Construction Issues

3. Sign/Signal Monotubes - Design / Fabrication / Field Issues

• SPV's for FY '17 LET Repair Contracts	Vu/Joanna/Ahmet
• 2017 Monotube Spec Language Change for ID Plaque	
• Review of Repairs/Replacements by BOS	Vu
• Ancillary Structures Update Given at Regional Const.	Vu/Aaron/Travis
• Transverse Welds - Valmont	
• Base Plate / Foundation Standoff Issues	
• Anchor Rod Template Eccentricity – Beltline	
• High Route Corridors – Standard Design	Aaron/Joanna
• "Astro Brac" Cracking	Ahmet/Joanna
• Pro Electric contract, phases, and progress	Joanna
• Structural Bolting Issues (DTI, Washer, Broken Bolts)	Anthony/Joanna
• Trusses Installed Incorrectly	Travis
• Other Items	All

Ancillary (Wind Loaded) Structures

- Standard Spec updates
  - 636: Concrete Sign Supports
    - Construction joint is not allowed on footing, or shaft without engineer's written approval
    - Remove disposable casing before backfilling

  - 641: Sign Bridges and Overhead Sign Supports
    - Removal of aluminum sign bridges, and reformat the section to cover aluminum components (sign supports & catwalk) only
    - Re-arrange the steel sign bridge section for better clarity
    - Design overhead sign support per plan specification, currently design with ASD and LFD methods
    - Welding aluminum members in the field is not allowed

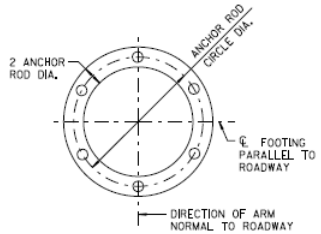
Ancillary (Wind Loaded) Structures

- Standard Spec updates (continue)
  - 657: Poles, Arms, Standards, and Bases
    - Contractor furnish all H.S. bolts, nuts, flat washers and DTI's
    - All standard poles are designed under AASHTO legacy standards until LRFD specifications are implemented
    - Misprinted section 657.2.2.1.4. It is a repeat of 657.2.2.1
  - 660: High Mast Lighting
    - Design high mast lighting structure per 6th edition of AASHTO design standards

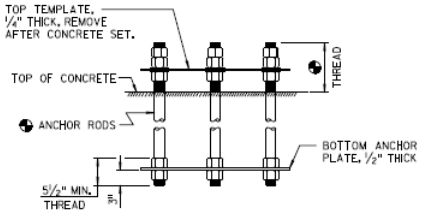
Ancillary (Wind Loaded) Structures

- Standard Drawings
  - Updated standard drawings for Chapter 39 of the WisDOT Bridge Manual
  - All new sign bridge standard insert sheets
  - Updated SDD's for type 10 & 13 concrete base
  - Updated SDD's for all overhead sign support concrete bases – new details for anchor rod

    assembly, top template and bottom anchor plates as shown



TOP TEMPLATE AND BOTTOM ANCHOR PLATE



ANCHOR ROD ASSEMBLY DETAILS

MINIMUM OF 6 ANCHOR RODS. EXACT NUMBER, SIZE, DIMENSION AND ORIENTATION AS SHOWN ON FABRICATION DRAWING.

Ancillary (Wind Loaded) Structures

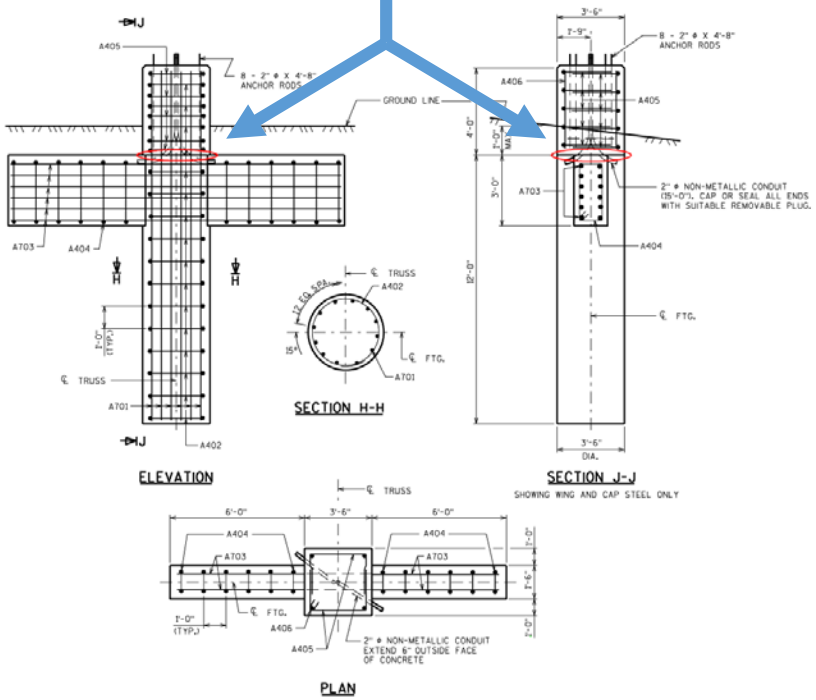
- Footing construction issues
  - No horizontal construction joint on cantilever structure footings

ACCEPTABLE
(single pour)

separate pours

NOT ALLOWED

NOT a construction joint



CANTILEVER TRUSS FOOTING

Ancillary (Wind Loaded) Structures

- Recent Findings – Cantilever Truss
  - End of truss connections to be bolted.

Ancillary (Wind Loaded) Structures

- Recent Findings –
  - Ensuring anchor templates are consistent with plans
  - Anchors properly installed

Ancillary (Wind Loaded) Structures

- Recent Findings - Full Span Truss
  - Transverse plate should be parallel to chord.
  - Bottom web should be facing up

Transverse Weld Detail - Valmont

- Occurs on 4-chord Full-Span Trusses

Bridge Id ▼	County	Region	Vil Town City	Feature on	Feature under	Component
S-05-147	BROWN	NE	V-ASHWAUBENON	SIGN STRUCTURE	IH 41 S	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-05-168	BROWN	NE	V-ASHWAUBENON	SIGN STRUCTURE	USH 41	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-05-171	BROWN	NE	C-GREEN BAY	SIGN STRUCTURE	USH 41	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-05-175	BROWN	NE	V-ASHWAUBENON	SIGN STRUCTURE	IH 41 S	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-40-019	MILWAUKEE	SE	C-WEST ALLIS	SIGN STRUCTURE	IH 41 N	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-40-053	MILWAUKEE	SE	C-WAUWATOSA	SIGN STRUCTURE	IH 41 N	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-40-084	MILWAUKEE	SE	C-MILWAUKEE	SIGN STRUCTURE	IH 94 E	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-40-086	MILWAUKEE	SE	C-WEST ALLIS	SIGN STRUCTURE	IH 94 E	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-40-856	MILWAUKEE	SE	C-MILWAUKEE	SIGN STRUCTURE	IH 794 E	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-51-014	RACINE	SE	T-BURLINGTON	SIGN STRUCTURE	Milwaukee Ave N	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-67-047	WAUKESHA	SE	C-BROOKFIELD	SIGN STRUCTURE	IH 94 E	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-70-243	WINNEBAGO	NE	T-MENASHA	SIGN STRUCTURE	IH 41 S	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-70-244	WINNEBAGO	NE	T-MENASHA	SIGN STRUCTURE	IH 41 N	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-70-246	WINNEBAGO	NE	T-MENASHA	SIGN STRUCTURE	IH 41 N	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD
S-70-247	WINNEBAGO	NE	T-MENASHA	SIGN STRUCTURE	IH 41 S	SIGN STRUCTURE - TRANSVERSE WELD DETAIL - 4 CHORD

S-70-243

S-70-243

S-5-175

S-5-171

S-40-53

S-51-14 Built 2008

Eccentricity

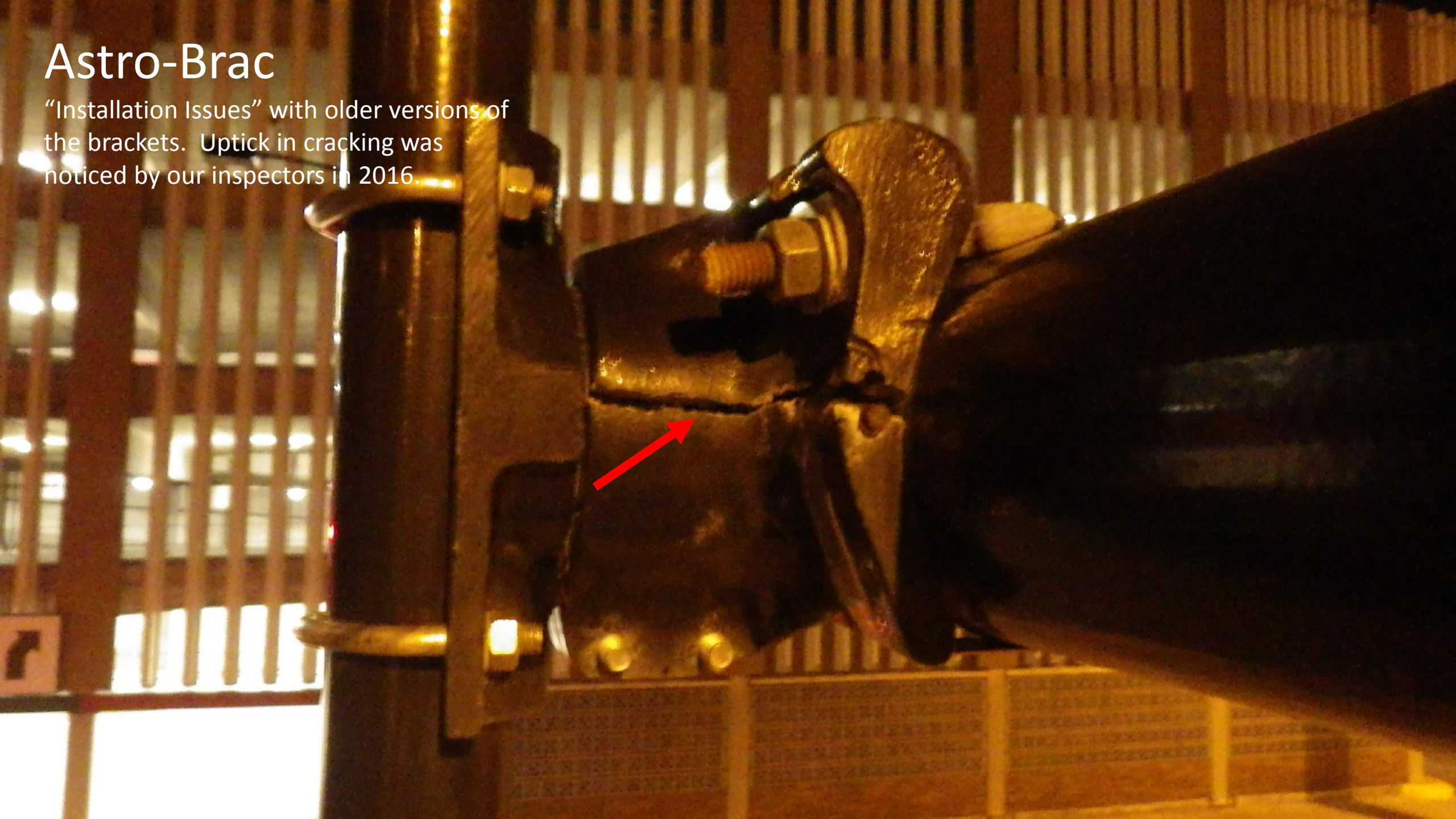
Eccentricity

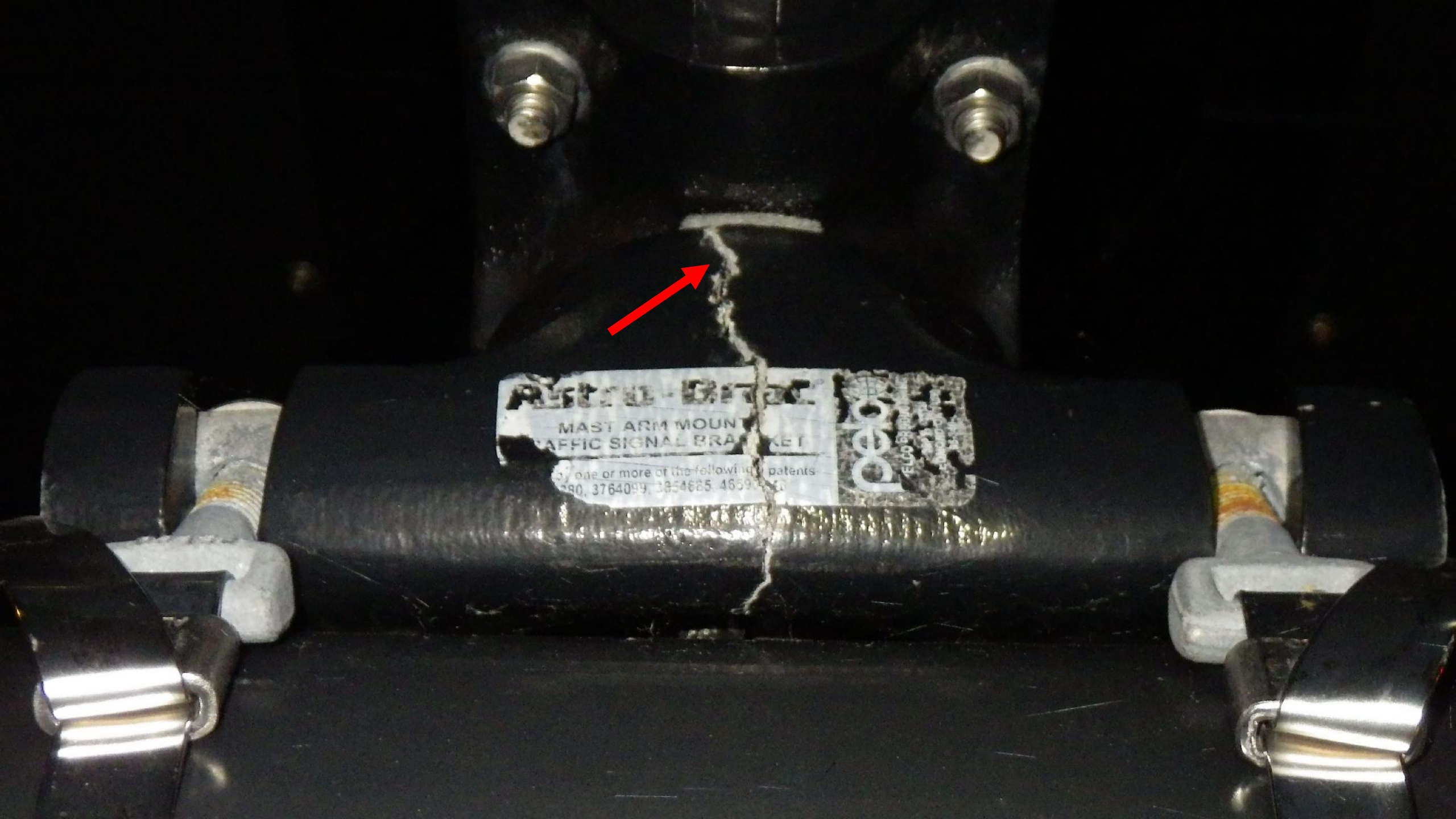
Excessive Standoff

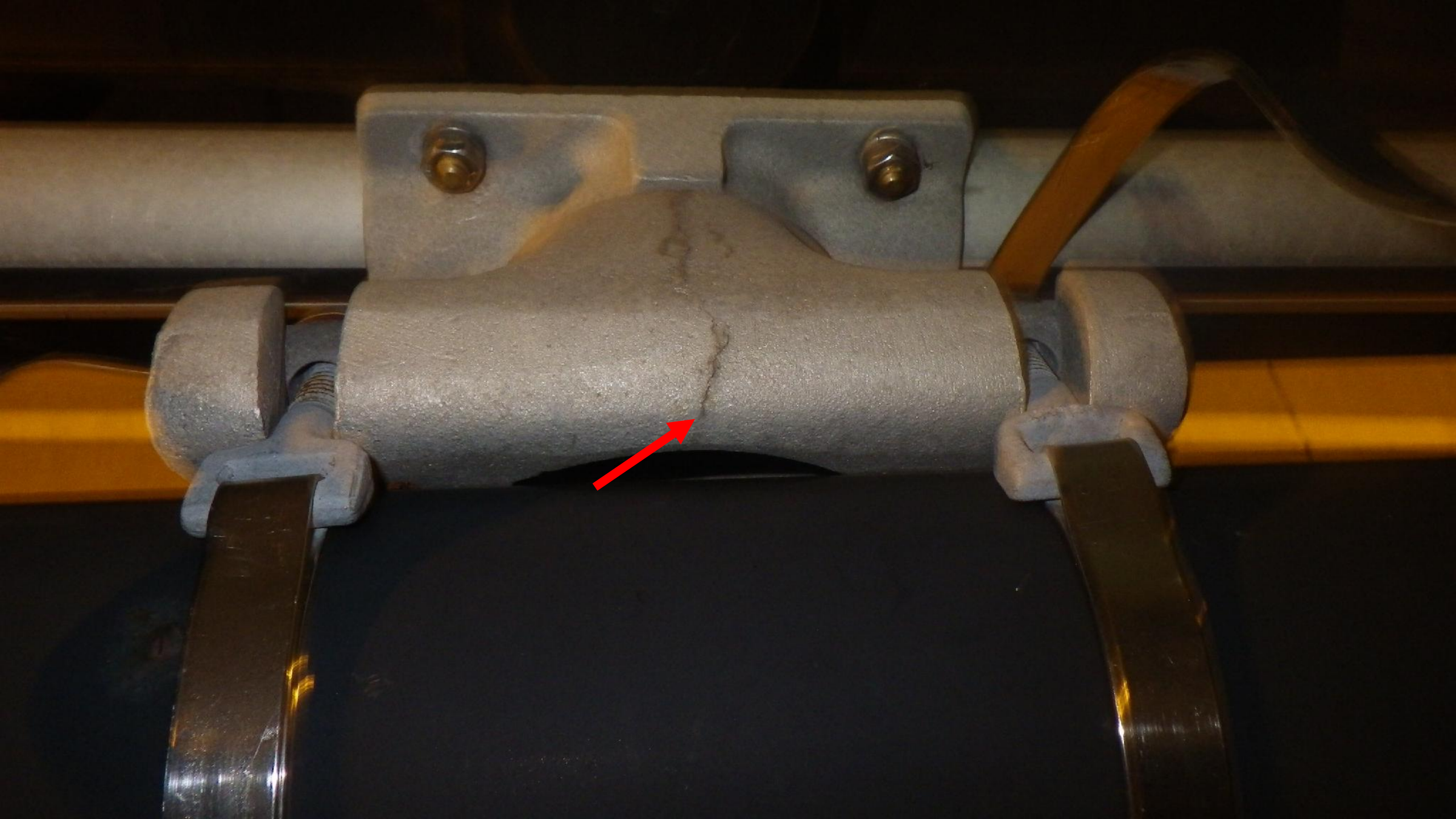
High Route Corridors

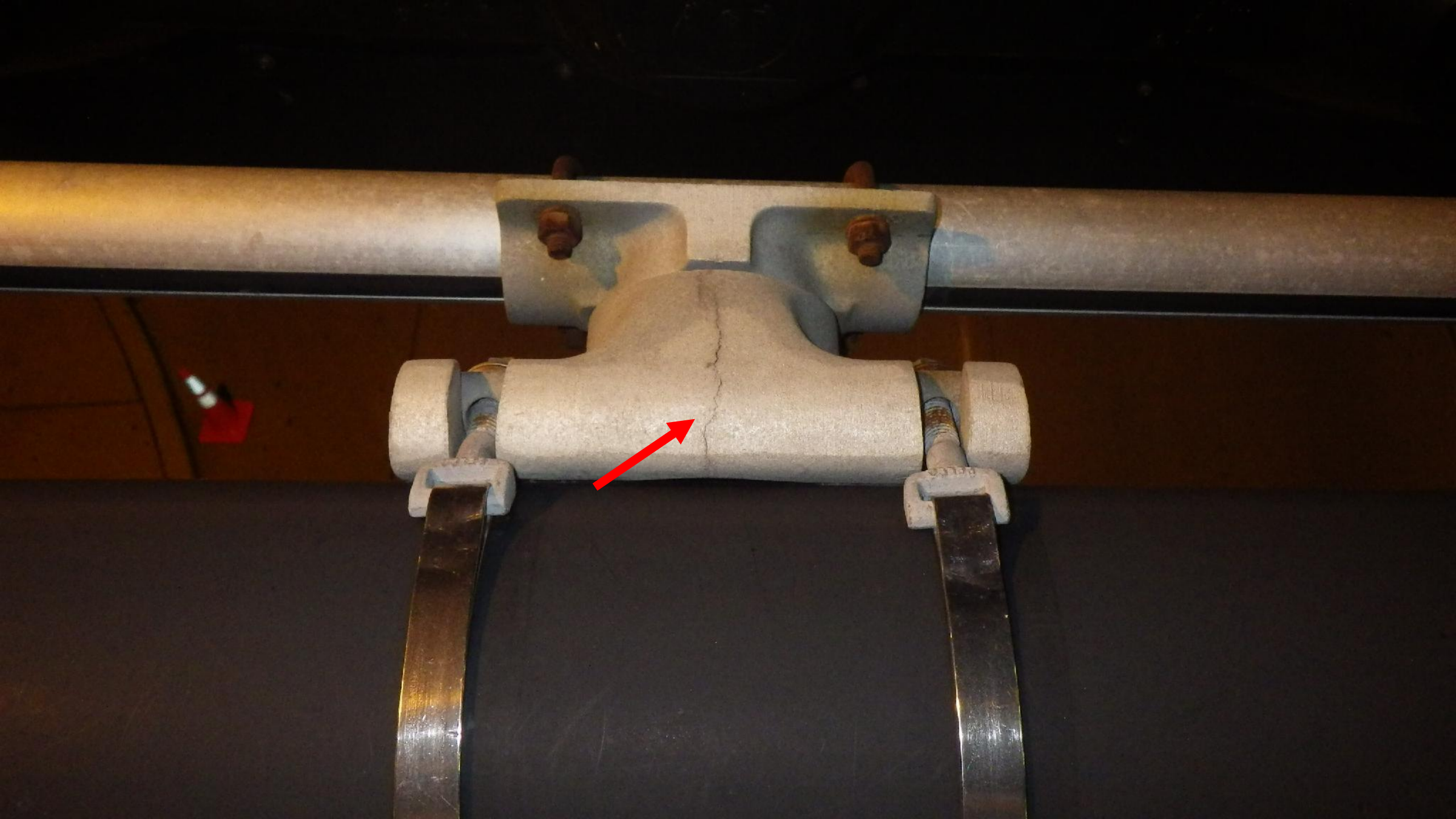
Astro-Brac

"Installation Issues" with older versions of the brackets. Uptick in cracking was noticed by our inspectors in 2016.

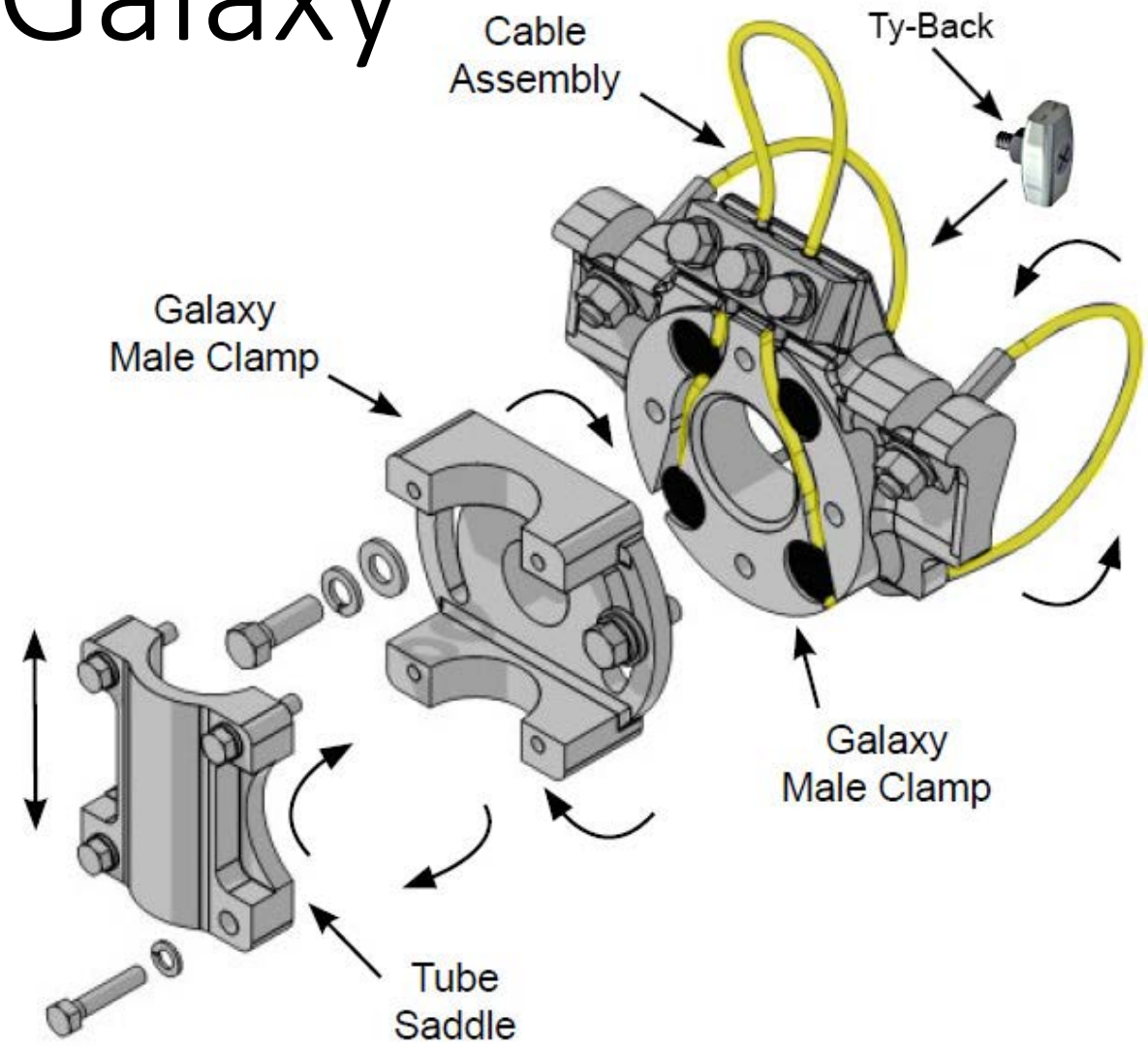


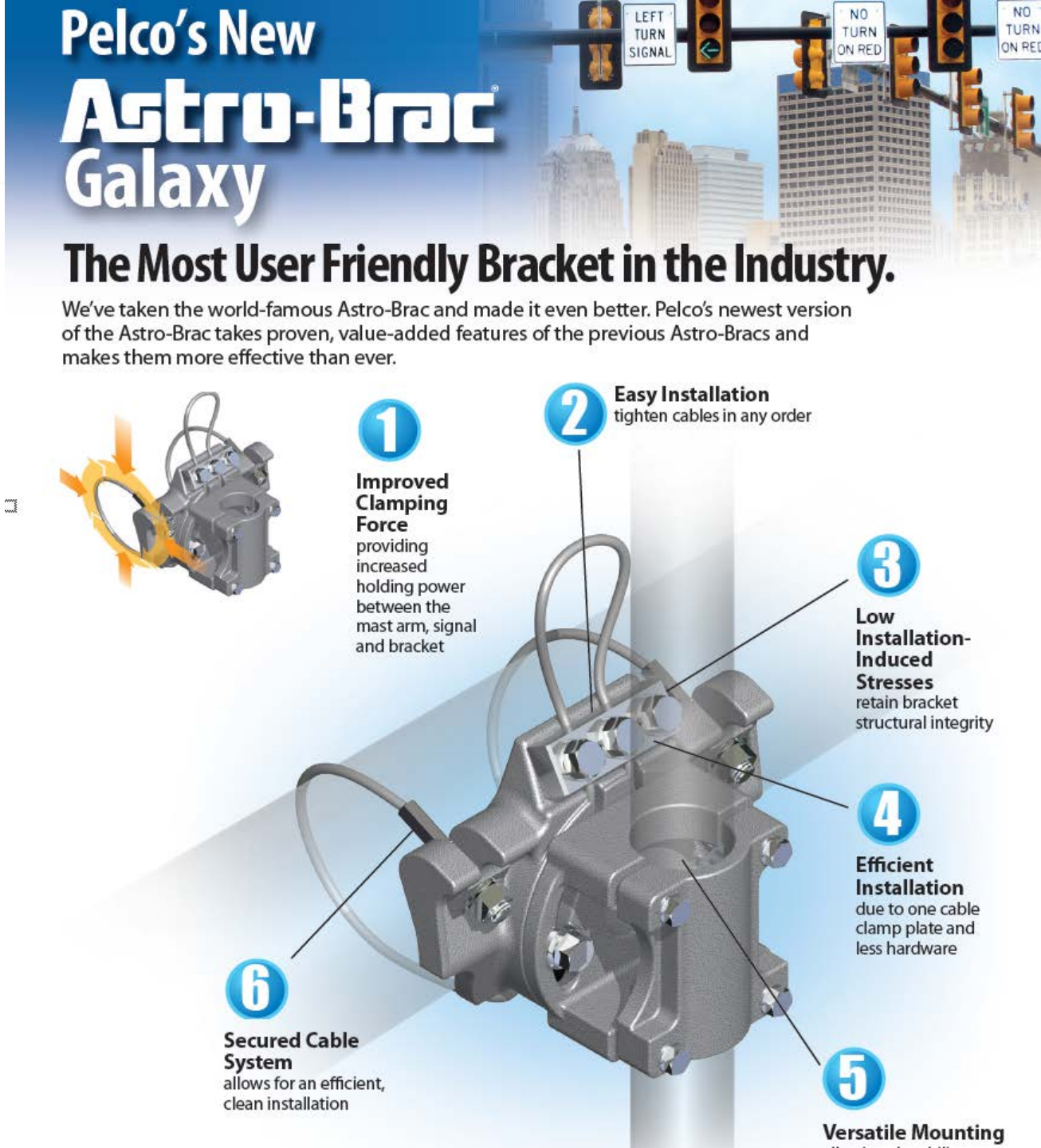

MAST ARM MOUN
AFFIC SIGNAL BRA KET
one or more of the following patents
280, 3764099, 3854685, 4659





Astro-Brac Galaxy





Pro-Electric Contract – Signal Monotubes

- Includes:
  - Structural Bolts
  - Anchor Rods
  - Rodent Screens

B	C	D	E	F	G	H	I	J	K	L	M	N	O
Date		Phase 2 structures											
Complete	Scheduled								Type 9/10	Type 12/13	Luminaire Arm	Type 10	Type 13
		Installation #	Intersection	Municipality		County	Region	Structure No.	$ 415.86	$ 626.55	$ 385.86	$ 415.86	$ 626.55
6/16/2016		S0575/S1347	USH 43 & CTH V	City	Green Bay	Brown	NE	S050121, S050122, S050123, S050124, S050125, S050126	3	3	4	3	3
6/16/2016		S0319/S1354	USH 41 & CTH VK	Village	Ashwaubenon	Brown	NE	S050130, S050131, S050132, S050133, S050134, S050135	2	4	4	2	4
		S13-0533	USH 12/14/18/151 & Fish Hatchery Rd	City	Madison	Dane	SWM	S13053301, S13053302, S13053303, S13053304, S13053305, S13053306, S13053307, S13053308, S13053309, S13053310	10			10	
		S0975	USH 51 & STH 19	Town	Burke	Dane	SWM	S13097501, S13097502, S13097503, S13097504		4			4
		S1318	USH 12 / 18 EB & USH 14	City	Madison	Dane	SWM	S13131801, S13131802	2			2	
		S13-1348	USH 51 & I39/90/94 NB Off Ramp	Town	Burke	Dane	SWM	S13134801, S13134802		2			2
		S13-1362/S13-1395	USH 151 & CTH C	City	Sun Prairie	Dane	SWM	S13136201, S13136202, S13136203, S13139501, S13139502, S13139503		6			6
		S13-1344	USH 151 & Main St	City	Sun Prairie	Dane	SWM	S13134401, S13134402, S13131403, S13134404, S13134405, S13134406				2	4
4/27/2016		S1282/S1283	USH 94 & STH 158	Town	Somers	Kenosha	SE	S301109, S301110, S301111, S301112, S301113, S301114	1	5		1	5
2/24/2016		S0917	STH 50 & CTH P	Town	Twin Lakes	Kenosha	SE	S301125, S301126, S301127, S301128	2	2		2	2
2/19/2016		S1320/S1321	IH 94 & 71st St	City	Kenosha	Kenosha	SE	S301132, S301133, S301134, S301135, S301136, S301137	2	4		2	4
2/19/2016		S0562	STH 50 & Cooper Rd/52nd Ave	Village	Pleasant Prairie	Kenosha	SE	S301158	1			1	
2/19/2016		S0334	STH 50 & 60th Ave	City	Kenosha	Kenosha	SE	S301159	1			1	
2/24/2016		S1296	STH 50 & CTH B	Village	Silver Lake	Kenosha	SE	S301101, S301102, S301103, S301104				1	3
4/26/2016		S1307	STH 31 & 45th	Town	Somers	Kenosha	SE	S301105, S301106, S301107, S301108				1	3
6/16/2016		S0692	STH 441 & CTH KK		Appleton	Outagamie	NE	S440065, S440066, S440067, S440068, S440069, S440070	3	3		3	3
6/27/2016		S0329	USH 41 & STH 125	Town	Grand Chute	Outagamie	NE	S440045, S440046, S440047, S440048					4
6/27/2016		S0805	STH 47 & Evergreen Dr	Town	Grand Chute	Outagamie	NE	S440050, S440051, S440052, S440053					4
		S0526/S1059	IH 43 & STH 33	Village	Saukville	Ozaukee	SE	S451101, S451102, S451103, S451104, S451105, S451106	2	4		2	4
		S1058	STH 33 & Foster Dr	Village	Saukville	Ozaukee	SE	S451107, S451108, S451109, S451110		4			4
2/16/2016		S0584	STH 36 / 83 & CTH W	City	Burlington	Racine	SE	S511126, S511127, S511128, S511129	2	2		2	2
2/9/2016		S0640	STH 36 / 83 & CTH D	Town	Rochester	Racine	SE	S511130, S511132		2			2

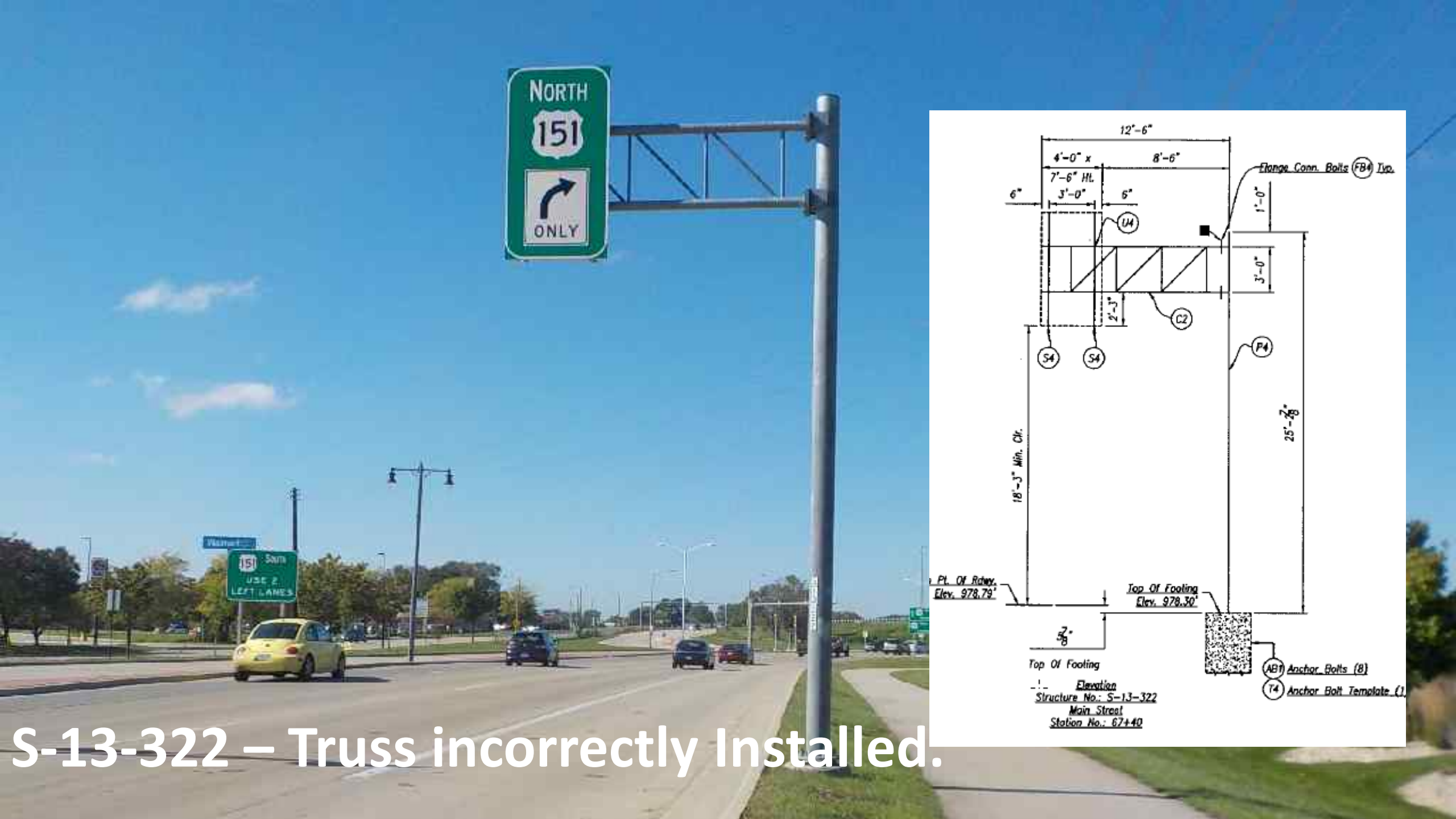
Structural Bolting Issues (DTI, Washers, Broken Bolts)

S-40-132 – Washers Bearing on the Splice Weld

S-67-970 – Weld Interference with DTI (and A449 Bolts)

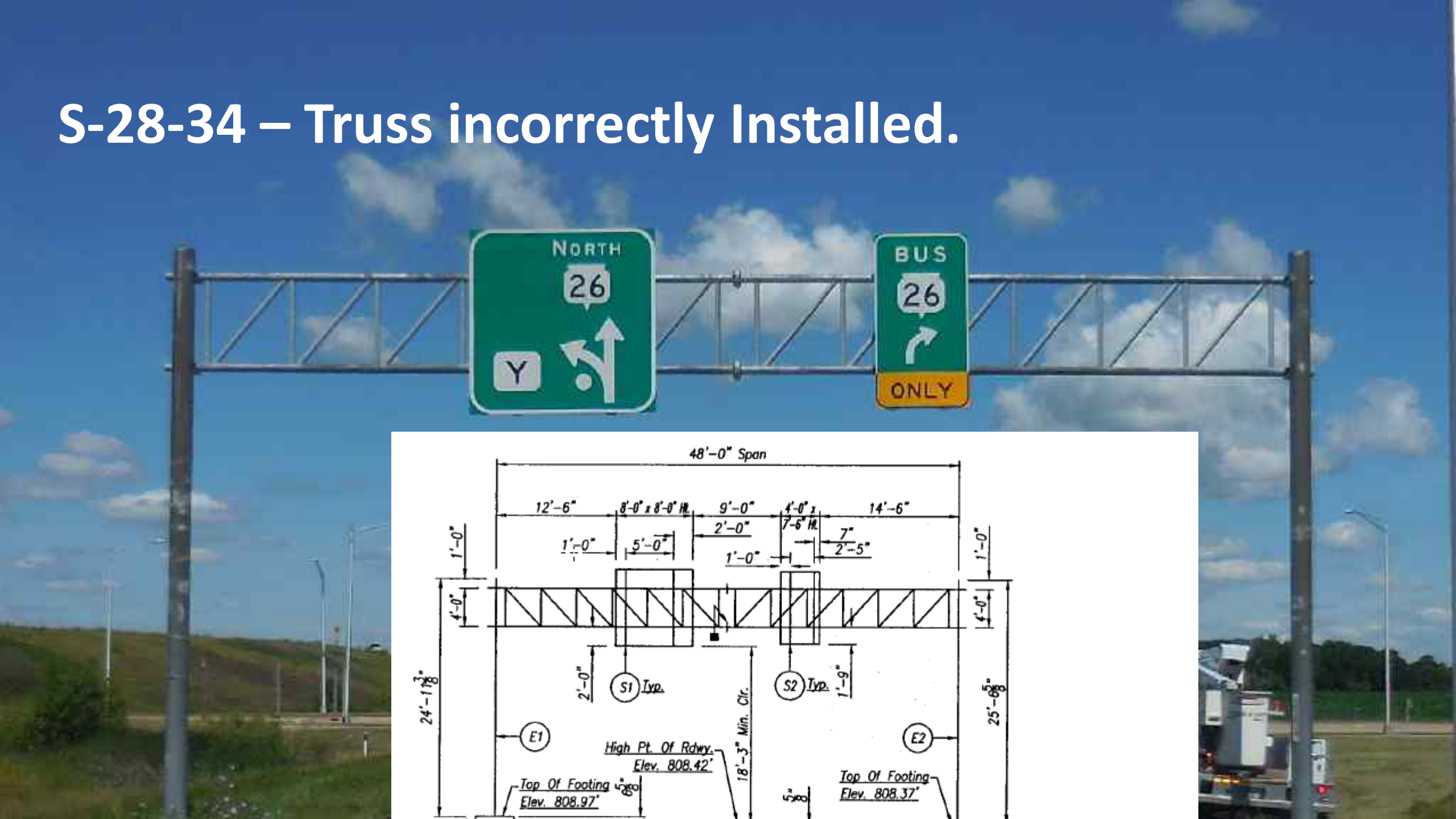
Inverted Trusses
Multiple Cases/Multiple Contractors

STRC_ID	YEAR BUILT	STREET UNDER	PROJECT ID	LET DATE	SUB-CONTRACTOR	ISSUE	FIXED YEAR	CONTRACT?	FIXED BY?
S-13-309	2011	MINERAL POINT ROAD	5992-01-71			TRUSS INSTALLED UPSIDE DOWN			
S-13-322	2011	MAIN ST WB	1111-02-77			TRUSS INSTALLED UPSIDE DOWN			
S-28-34	2009	USH 26 NB	5992-00-76	April 2010		TRUSS INSTALLED UPSIDE DOWN	2017	2017 LETTING FOR REPAIR CONTRACT	
S-45-201	2007	STH 57 EB	1390-09-77			TRUSS INSTALLED UPSIDE DOWN	2016	REPAIR CONTRACT	HIGHWAY LANDSCAPERS
S-47-9	2008	STH 35 SB	1381-02-70	May 2007		TRUSS INSTALLED UPSIDE DOWN	2017	2017 LETTING FOR REPAIR CONTRACT	
S-49-11	2015	STH 66 WB	1590-01-70	November 2009		TRUSS INSTALLED UPSIDE DOWN	2016	REPAIR CONTRACT	HIGHWAY LANDSCAPERS
S-53-37	2011	HART ROAD	5989-01-77	June 2009		TRUSS INSTALLED UPSIDE DOWN			
S-53-39	2011	HART ROAD	5989-01-77	June 2009		TRUSS INSTALLED UPSIDE DOWN	2015	REPAIR CONTRACT	ARBOR GREEN
S-67-947	2015	USH 18 EB	1330-18-70	Dec 2013		~~TRUSS INSTALLED UPSIDE DOWN~~	~~2015~~	~~DURING CONSTRUCTION~~	~~CONTRACTOR~~
S-67-948	2015	STH 83 SB	1330-18-70	Dec 2013		~~TRUSS INSTALLED UPSIDE DOWN~~	~~2015~~	~~DURING CONSTRUCTION~~	~~CONTRACTOR~~
S-67-949	2015	USH 18 WB	1330-18-70	Dec 2013		~~TRUSS INSTALLED UPSIDE DOWN~~	~~2015~~	~~DURING CONSTRUCTION~~	~~CONTRACTOR~~

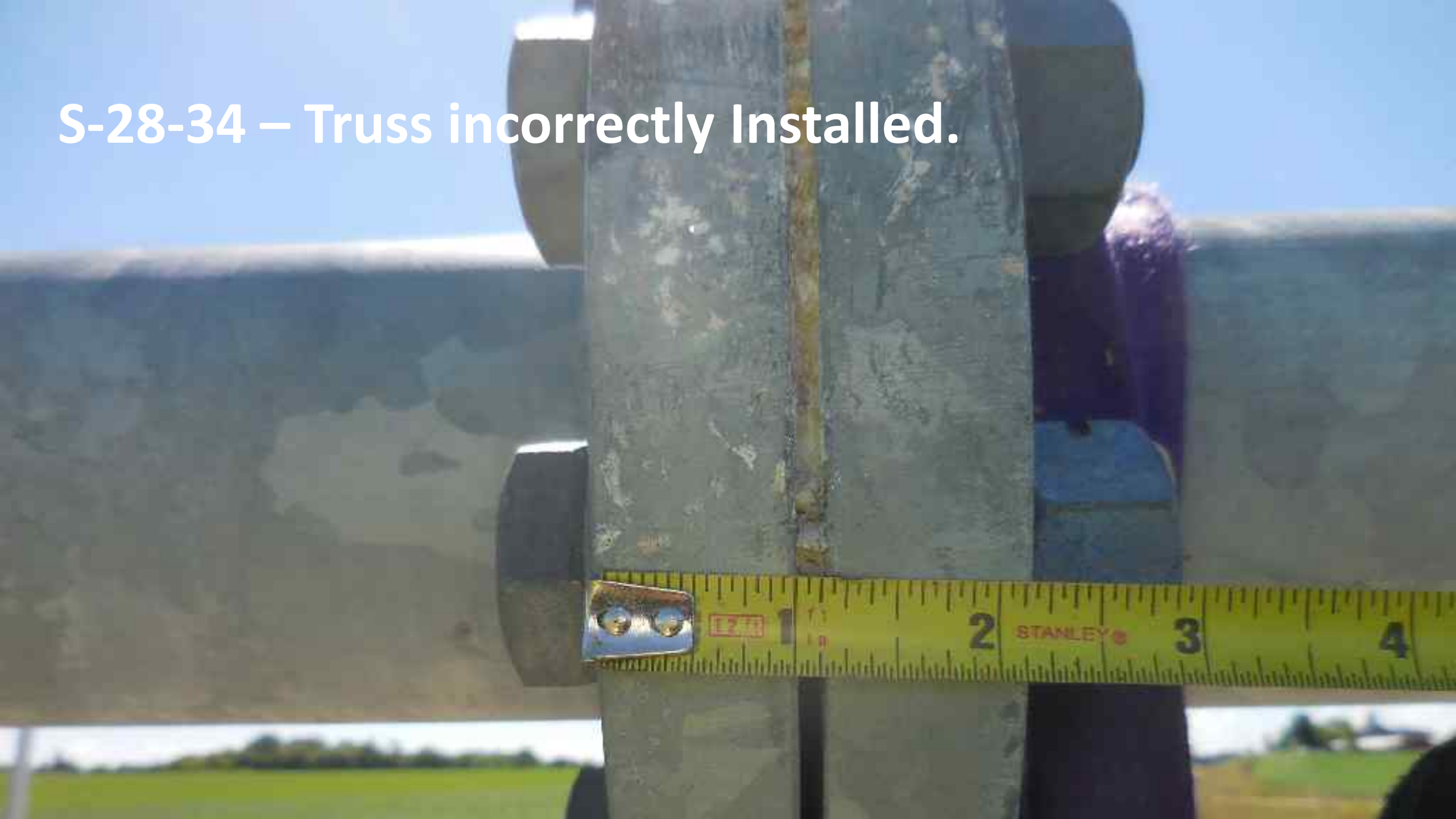


S-13-322 – Truss incorrectly Installed.

S-28-34 – Truss incorrectly Installed.



S-28-34 – Truss incorrectly Installed.



S-5-172 – Square “Washer”

S-40-15

Plate makes access to anchor rods difficult

Low Profile Hydraulic Wrench

Bolted Connection Training - Ancillary Structures

- Late April / Early May
- 3 sessions (One may be recorded)?
  - Tentative sites:
    - SW-Madison
    - SE
    - NE
- Budget depending. May need to host training with Regional training budgets. Once I get estimate, we'll have info from BOS management.
- Need volunteer(s) from each host Region
  - Logistics (reserving room, invites, coordination, etc.)
  - Course Development with Consultant (Likely Fish & Associates)
  - Volunteer to Co-Lead Effort?

Break

- 15 Minutes

BRIDGE MANUAL
14.1.1.1 Wall Numbering System

Permanent retaining walls that are designed for a design life of 75 years or more should be identified by a wall number, R-XX-XXX, as assigned by the Region unless otherwise specified below. For a continuous wall consisting of various wall types, each type of wall should be a separate number. For walls that are discontinuous due to driveways or roadways, designate each separate wall as a unit (001, 002, etc.) in the direction of project stations. For tiered walls, each tier should have a unique wall number. The first two digits represent the county the wall is located in and the next set(s) of digits represent the undivided wall.

Retaining walls whose height exceeds the following criteria require R numbers:

- Proprietary retaining walls (e.g., modular block MSE walls)
    - MSE walls having a maximum height of less than 5.5 ft. measured from the bottom of wall or top of leveling pad to top of wall are deemed to be "minor retaining walls" and do not require an R number. Refer to *FDM 11-55-5.2* for more information.
    - Modular block gravity walls having a maximum height of less than 4.0 ft. measured from the bottom of wall or top of leveling pad to top of wall are deemed to be "minor retaining walls" and do not require an R number. Refer to *FDM 11-55-5.2* for more information.

- Non-proprietary walls (e.g., sheet pile walls):
    - Walls having an exposed height of less than 5.5 ft. measured from the plan ground line to top of wall may require an R number based on specific project features.
    - Designer to contact the Bureau of Structures region liaison for more information.

Cast-in-place walls being utilized strictly as bridge abutment or box culvert wings do not require R numbers as they are considered part of the structure.

FDM 11.55.5.2 Minor Retaining Wall

A “Minor Retaining Wall” is a proprietary MSE wall with a modular block face that is less than 5.5 feet tall or a proprietary modular block gravity wall that is less than 4.0 feet tall as measured from the bottom of wall or top of the leveling pad to the top of the wall.

Minor retaining wall details are to be included in the 2.X sheet section of the plan set and quantities in the 3.X sheet sections of the plan set under Miscellaneous Quantities". The minimum required details to be included in a minor retaining wall plan include: a plan view layout, an elevation view, estimated soil parameters, and a typical cross section view of the wall. See BOS LRFD Standard Detail Drawing 14.03 for a sample plan and WisDOT
Bridge Manual 14.15.2 Special Provisions for bid items. This information constitutes a minor retaining wall plan.

Note: “Minor Retaining Walls” are not intended to support vehicle traffic or slopes equal to or steeper than 2.5H:1V. Additionally, tiered walls are not considered “Minor Retaining Walls” and should be assigned a structure number. In most cases, a geotechnical analysis is not required for “Minor Retaining Walls”; however, it is the designer’s responsibility to determine if an analysis is required. Contact the BOS region liaison, regional soils engineer, or Bureau of Technical Services Geotechnical Unit for more information. Submit shop drawings to BOS for review and acceptance.