

FIELD INSPECTION REPORT

WEST STACK A & NORTH TRUSS (LEVEL 6)

APRIL 13, 2018

ERI PROJECT 35473, ADDENDUM 1
977 FT SELF-SUPPORT TOWER
SAN FRANCISCO, CA
ASRN 1001289

Prepared For:

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EXECUTIVE SUMMARY

Mr. Dausman,

This report is submitted by Electronics Research Incorporated (ERI) with regards to the field inspection conducted by ERI on August 22-23, 2017. The contracted scope of work included on-site inspections of the West Stack “A” above the 6th Level and the North Truss at the 6th Level. The subject inspections were completed in accordance with the current ANSI/TIA-222-G standard.

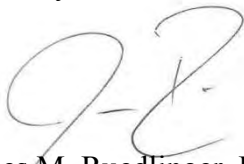
The purpose of the work was to complete thorough visual inspections to evaluate current condition of the structural components. The inspection was completed along with assistance from the Sutro Tower Maintenance Staff.

In general, the structural elements of the West Stack “A” above the 6th Level and the North Truss at the 6th Level are in good condition with no critical items found which warrant immediate attention. Routine maintenance observations such as minor surface rust, short bolts, small localized gouges and minor coating damage to the hot dip galvanized surfaces, inadequate drainage, guy hardware settings, and compromised weather sealing at the Phillystran terminations were noted and are explicitly addressed in Appendix II of this report.

Additionally, pre-existing member damage was identified in three specific locations which should be further evaluated by Simpson Gumpertz & Heger Inc. serving as the structure’s engineer of record (EOR) to determine if corrective action measures are warranted (see Observations 45, 52, & 53 in Appendix II).

Appendix II in this report includes the completed inspection forms, detailed inspection findings and recommended correction action summaries, and corresponding pictures to support all pertinent observations made. Please contact me if you should have any questions or require any additional details.

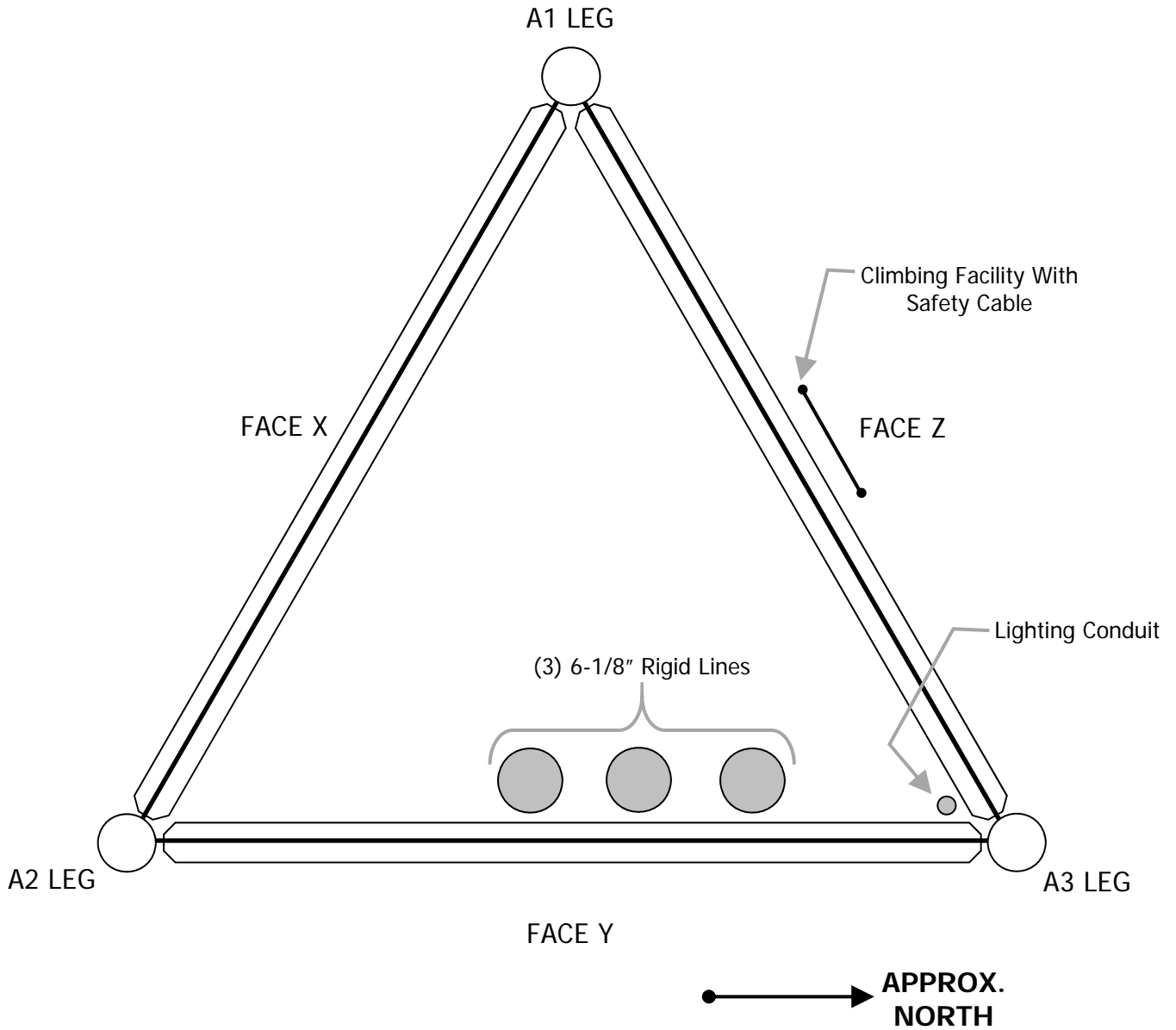
Sincerely,



James M. Ruedlinger, P.E.
Senior VP Engineering

Appendix I:
WEST STACK 'A'
ORIENTATION/NOMENCLATURE
INSPECTED AUG 22-23, 2017
977 FT SELF-SUPPORT TOWER
SAN FRANCISCO, CA
ERI PROJECT 35473
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Figure 1. West Stack “A” Orientation/Nomenclature per Inspection Forms



Appendix II:
INSPECTION FORMS, SUMMARIES, & PICTURES
INSPECTED AUG 22-23, 2017
977 FT SELF-SUPPORT TOWER
SAN FRANCISCO, CA
ERI PROJECT 35473
ASRN 1001289

ANTENNA MOUNT STACK "A" & NORTH TRUSS (LEVEL 6)

- Leg A North Face -

Inspection Summary - 2018 2017

Description of Inspection:

- ~~Routine inspection of Leg A~~
- ~~Routine inspection of horizontal levels of North Face~~
- ~~Routine inspection of strands on North Face~~
- ~~Routine inspection of strand anchors on Leg A~~
- ~~Routine inspection of base = all legs~~

ROUTINE INSPECTION OF ANTENNA MOUNT STACK "A" INCLUDING STACK CUYING SYSTEM AND NORTH TRUSS (LEVEL 6)

Special or In-Depth Inspections:

Summary of Results:

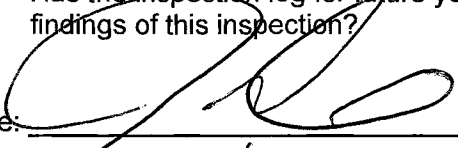
(NO CRITICAL ITEMS NOTED ~ SEE INSPECTION SUMMARY SHEETS)

Summary of Recommendations:

(SEE INSPECTION SUMMARY SHEETS FOR ALL RECOMMENDED CORRECTIVE ACTIONS)

Checklist:

- Has a severe event occurred since the previous inspection? Yes No N/A
- Have action items and recommendations from previous inspections been addressed in the scope of work? Yes No N/A
- Has the inspection log for future years been revised to account for scope of work and findings of this inspection? Yes No N/A

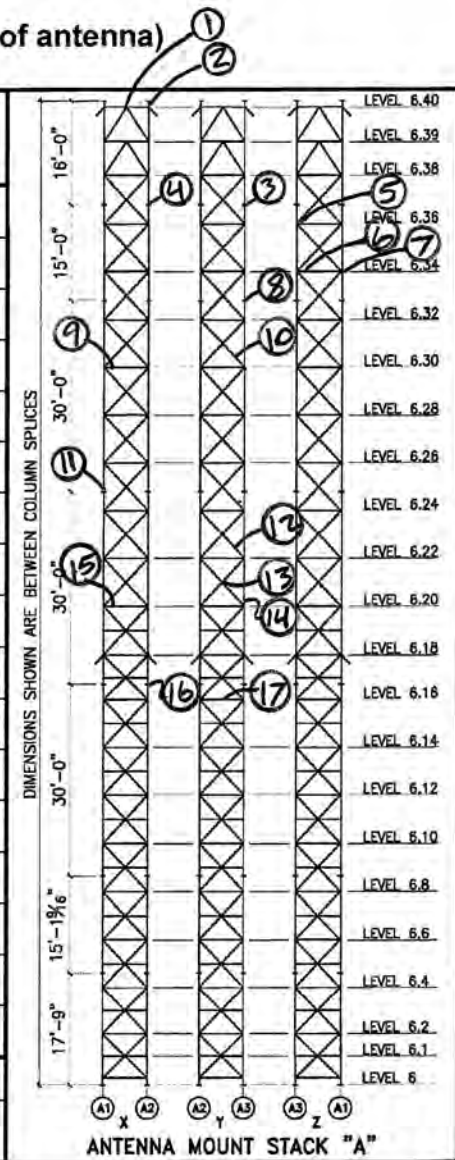
Signature: 
 Date: 8/23/2017

#NOTE: FIRST INSPECTION COMPLETED BY FRI.

Inspection Data Sheet: Antenna Mount Stack "A" (Level 6 to base of antenna)

Observ. No.	Location/Identification			Photo No.	Observation Comments
	Column	Elevation	Item ¹		
1	A11	6.40	C	1	
2	A2	6.40	H	2	
3	A3	6.36	C	3	
4	A2	6.36	C	4	
5	Z-FACE	6.36	C	5	
6	(Inside)	6.34	O	6	
7	Z-FACE	6.34	C	7	
8	A3	6.32	C	8	
9	X-FACE	6.30	C	9	
10	Y-FACE	6.30	C	10	
11	A1	6.24	C	11	
12	Y-FACE	6.22	C	12	
13	Y-FACE	6.20	C	13	
14	(Inside)	6.20	O	14	
15	X-FACE	6.20	C	15-16	
16	A2	6.16	C	17	
17	Y-FACE	6.16	O	18	
Sutro Tower			Signature: <i>[Signature]</i>		Page: 1 of 2
San Francisco, CA			File:		Date: 9/7/17

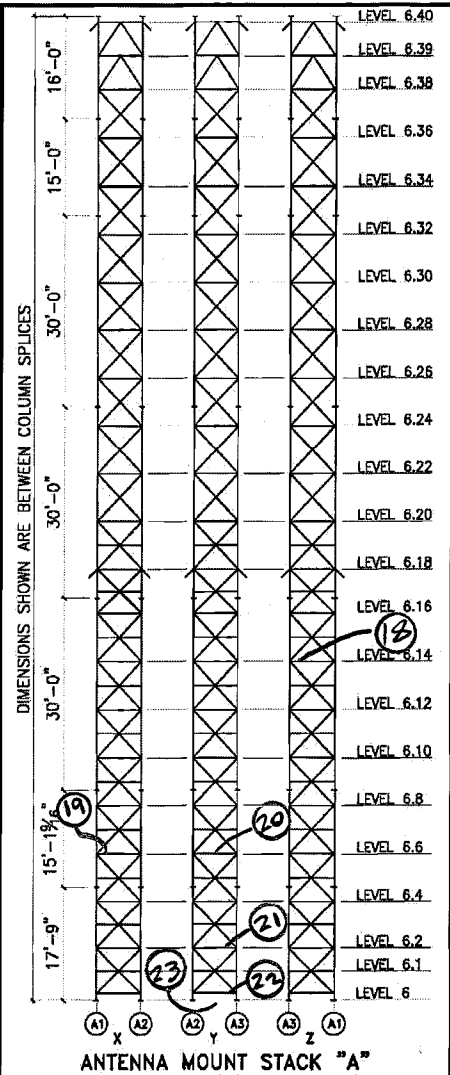
SEE INSPECTION SUMMARY



¹ Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

Inspection Data Sheet: Antenna Mount Stack "A" (Level 6 to base of antenna)

Observ. No.	Location/Identification			Photo No.	Observation Comments
	Column	Elevation	Item ¹		
18	Z-FACE	6.14	C	19	(SEE INSPECTION SUMMARY)
19	X-FACE	6.6	C	20	
20	Y-FACE	6.6	O	21-22	
21	(Inside)	6.2	O	23	
22	(Inside)	6	O	24	
23	Y-FACE	6	O	25	
Sutro Tower				Signature: <i>[Handwritten Signature]</i>	Page: 2 of 2
San Francisco, CA				File:	Date: 9/7/17



¹ Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

ERI Project 35473 * Sutro Tower * West Stack 'A' Inspection Summary * Inspected Aug 22-23, 2017

WEST STACK 'A' LATTICE MAST						
OBSERV. NO.	Location/Identification			Photo No.	OBSERVATION COMMENTS	RECOMMENDED CORRECTIVE ACTION (CA)
	Column	Elevation	Item			
1	A11	6.40	C	1	Minor Rust On Bolts, MRB (X6), Antenna Bolts	Surface prepare and treat
2	A2	6.40	H	2	Minor Rust On Inner Channel	Surface prepare and treat
3	A3	6.36	C	3	Short Bolt, SB (X1), ANCO Pin Not Fully Engaged, Leg Bolt	Replace with longer bolts, or remove flat washer to allow full engagement of ANCO locking pin
4	A2	6.36	C	4	SB (X2), ANCO Pin Not Fully Engaged, Leg Bolt	Replace with longer bolts, or remove flat washer to allow full engagement of ANCO locking pin
5	Z-FACE	6.36	C	5	Small Gouge In Gusset Plate (X1)	Lightly grind surface smooth and treat
6	(Inside)	6.34	O	6	J-Box Missing Plugs (X2)	Install missing plugs to keep weather-tight
7	Z-FACE	6.34	C	7	Hot Dip Galv, HDG, Coating Damaged (X2), Gusset Plate	Surface prepare and treat
8	A3	6.32	C	8	SB (X1), ANCO Pin Not Fully Engaged, Leg Bolt	Replace with longer bolts, or remove flat washer to allow full engagement of ANCO locking pin
9	X-FACE	6.30	C	9	MRB (X2), Horiz Bolts	Surface prepare and treat
10	Y-FACE	6.30	C	10	MRB (X1), Diag Bolt	Surface prepare and treat
11	A1	6.24	C	11	SB (X2), ANCO Pin Not Fully Engaged, Leg Bolt	Replace with longer bolts, or remove flat washer to allow full engagement of ANCO locking pin
12	Y-FACE	6.22	C	12	MRB (X1), Diag Bolt	Surface prepare and treat
13	Y-FACE	6.20	C	13	MRB (X1), Diag Bolt	Surface prepare and treat
14	(Inside)	6.20	O	14	Minor Rust On J-Box Plugs (X2)	Replace plugs in near future
15	X-FACE	6.20	C	15-16	HDG Coating Damaged (X2), Gusset Plate	Surface prepare and treat
16	A2	6.16	C	17	SB (X2), ANCO Pin Not Fully Engaged, Leg Bolt	Replace with longer bolts, or remove flat washer to allow full engagement of ANCO locking pin
17	Y-FACE	6.16	O	18	Missing Rigid Line Spring Hanger (X1)	Corrected By Sutro Staff ~ Hanger installed 8/22/17
18	Z-FACE	6.14	C	19	HDG Coating Damaged (X2), Gusset Plate	Surface prepare and treat
19	X-FACE	6.6	C	20	HDG Coating Damaged (X1), Gusset Plate	Surface prepare and treat
20	Y-FACE	6.6	O	21-22	Rigid Line Spring Hanger Setting Off (X1)	Adjust hanger setting (34-3/8" at 40-80deg F)
21	(Inside)	6.2	O	23	SO J-Box Connector Broken (X1)	Replace connector
22	(Inside)	6	O	24	Minor Rust On 90° J-Box Connector	Replace connector in near future
23	Y-FACE	6	O	25	Standing Water In Gusseted Rigging Weldment	Drill drainage holes

Nomenclature: HDG = Hot Dip Galvanizing, MRB = Mild Rust on Bolts, SB = Short Bolt

Picture 1: OBSERVATION 1



Picture 2: OBSERVATION 2



Picture 3: OBSERVATION 3



Picture 4: OBSERVATION 4



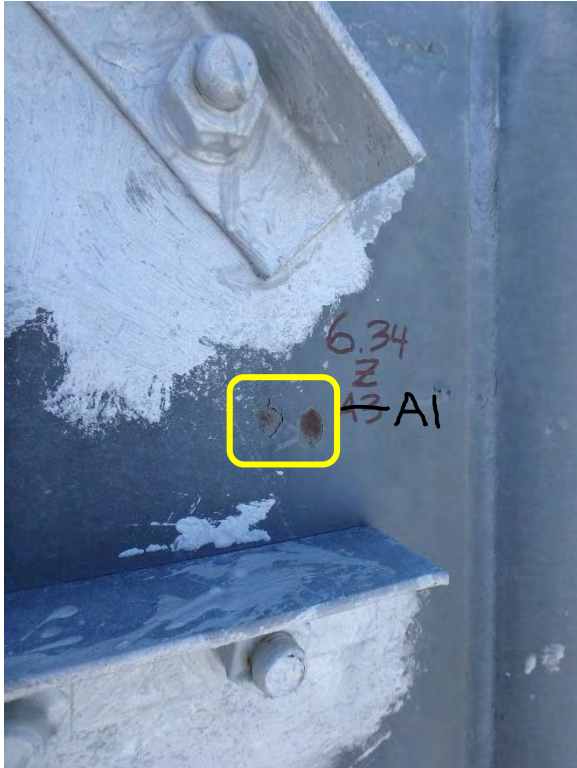
Picture 5: OBSERVATION 5



Picture 6: OBSERVATION 6



Picture 7: OBSERVATION 7



Picture 8: OBSERVATION 8



Picture 9: OBSERVATION 9



Picture 10: OBSERVATION 10



Picture 11: OBSERVATION 11



Picture 12: OBSERVATION 12



Picture 13: OBSERVATION 13



Picture 14: OBSERVATION 14



Picture 15: OBSERVATION 15



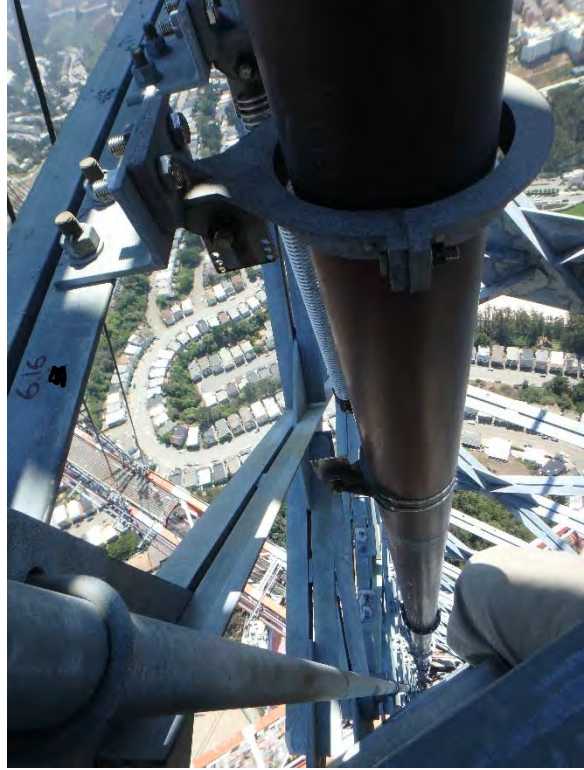
Picture 16: OBSERVATION 15



Picture 17: OBSERVATION 16



Picture 18: OBSERVATION 17 ~ CORRECTED



Picture 19: OBSERVATION 18



Picture 20: OBSERVATION 19



Picture 21: OBSERVATION 20



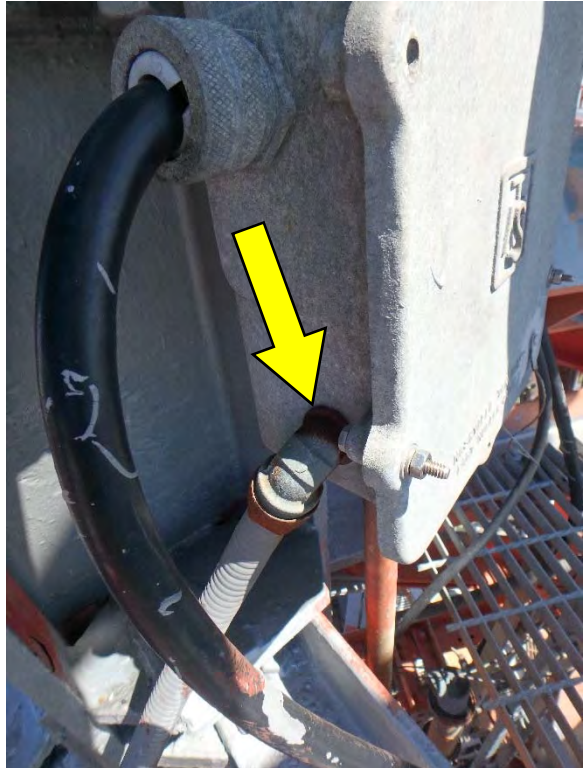
Picture 22: OBSERVATION 20



Picture 23: OBSERVATION 21



Picture 24: OBSERVATION 22

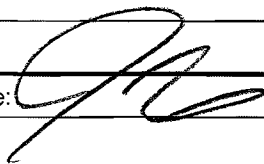


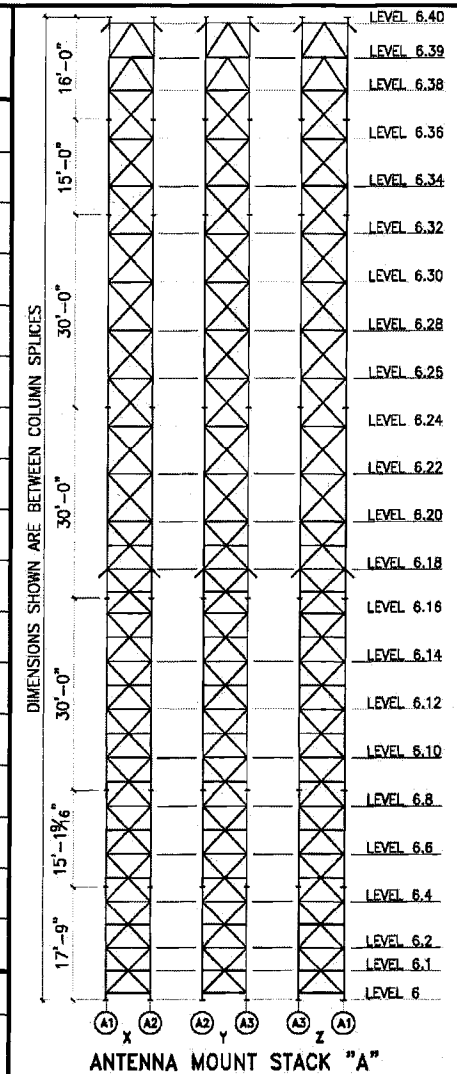
Picture 25: OBSERVATION 23



Inspection Data Sheet: Antenna Mount Stack "A" (Level 6 to base of antenna)

GUYING SYSTEM

Observ. No.	Location/Identification			Photo No.	Observation Comments	
	Column	Elevation	Item ¹			
24	Guying	All	O	26-27	(SEE INSPECTION SUMMARY)	
25		All		-		
26		L1-L3, A2, Y1, Y2		28-29		
27		L3, A1, X		30		
28		L3, A2, Y1		31		
29		L3, A2, Y2				
30		L2, A3, Y2				
31		L1, A2, X				
32		L2, A2, X				
33		L3, A2, X				
34		L3, A3, Z				
35	↓	L3, A1, Z	↓	↓		
Sutro Tower				Signature: 		Page: 1 of 1
San Francisco, CA				File:		Date: 9/7/17



¹ Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

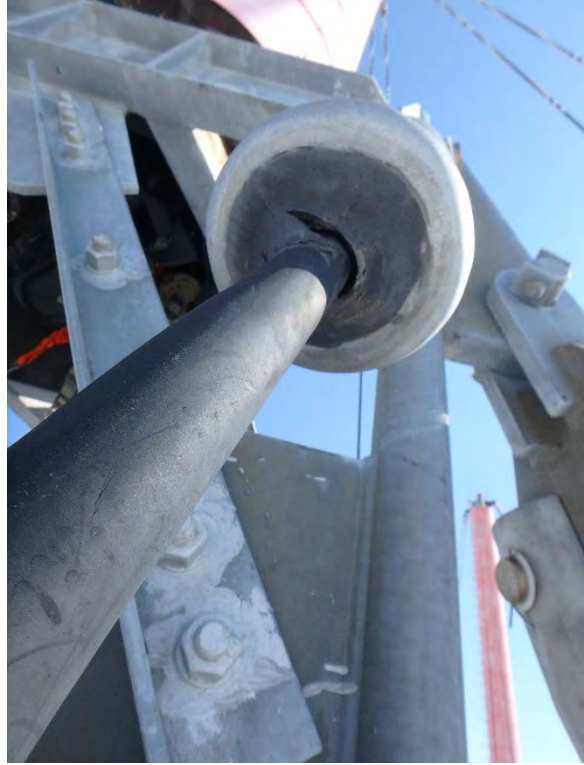
ERI Project 35473 * Sutro Tower * West Stack 'A' Guying System Inspection Summary * Inspected Aug 22-23, 2017

WEST STACK 'A' GUYING SYSTEM						
OBSERV. NO.	Location/Identification			Photo No.	OBSERVATION COMMENTS	RECOMMENDED CORRECTIVE ACTION (CA)
	Chord	Horiz. Location	Item			
24	Guying	All	O	26-27	Silicone Sealant At Socketed Corona Ends Has Split And Separated From The Cable And Socket At Most Locations Both At The Mast And Anchor Attachment Locations ~ No Damage Noted To Polyurethane Jackets Or Poured Resin	Remove loose silicone and debris and inject fresh pure black silicone ~ High quality pure black silicone from a local paint distributor may be used
25	Guying	All	O	-	Mild High Frequency Aeolian Vibration Noted On Multiple Cables During Inspection	Consider installing additional PLP spiral vibration dampers (SVD) to mitigate vibration ~ Recommend trial installation on single cable to compare with adjacent cable(s) prior to placing large order for SVD's to ensure adequate mitigation ~ Note, per discussion with Phillystran, high frequency aeolian vibration is not a structural concern for the Phillystran guying systems, but rather a general concern primarily for supported structures utilizing incandescent lighting where operational issues may arise from premature wear on filaments and electrical contact points imposed by the induced vibrations
26	Guying	L1-L3, A2, YL & YR	O	28-29	Minor Rust On All-Thread Cotter Pins (x12)	Replace cotter pins in near future
27	Guying	L3, A1, X	O	30	Top Lock Nuts Not Tightened Down	Run down and tighten top lock nuts
28	Guying	L3, A2, YL	O	31	All-Thread Out By ~1/2"	Adjust all-thread to balance load
29	Guying	L3, A2, YR	O	31	All-Thread Out By ~1/4"	Adjust all-thread to balance load
30	Guying	L2, A3, YR	O	31	All-Thread Out By ~1/4"	Adjust all-thread to balance load
31	Guying	L1, A2, X	O	31	All-Thread Out By ~1/4"	Adjust all-thread to balance load
32	Guying	L2, A2, X	O	31	All-Thread Out By ~1/2"	Adjust all-thread to balance load
33	Guying	L3, A2, X	O	31	All-Thread Out By ~1/4"	Adjust all-thread to balance load
34	Guying	L3, A3, Z	O	31	All-Thread Out By ~1/2"	Adjust all-thread to balance load
35	Guying	L3, A1, Z	O	31	All-Thread Out By ~1/4"	Adjust all-thread to balance load

Picture 26: OBSERVATION 24 (TYP. ANCHOR END)



Picture 27: OBSERVATION 24 (TYP. TOWER END)



Picture 28: OBSERVATION 26



Picture 29: OBSERVATION 26




Picture 30: OBSERVATION 27



Picture 31: OBSERVATION 28-35 (TYP.)

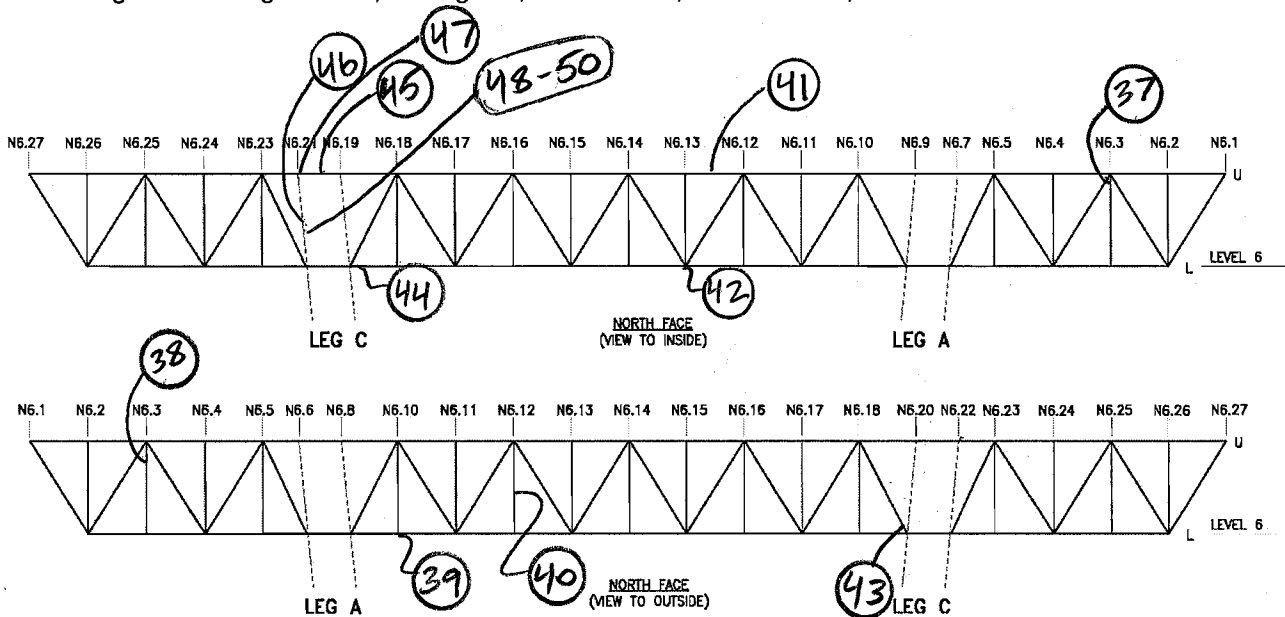


Inspection Data Sheet: North Truss (Level 6)

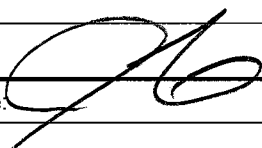
Observ. No.	Location/Identification			Photo No.	Observation Comments
	Chord ¹	Horiz. Location	Item ²		
36	IU	NW Outer: gus	O	32-33	
37	IU	6.3	C	34-35	
38	OU	6.3	C	36	
39	OL	6.10	C	37-38	
40	O	6.12	C	39-40	
41	IU	6.12-6.13	D	41	
42	IL	6.13	C	42-43	
43	IL	6.18-6.21	C	44-45	
44	IL	6.19	V/H	46-47	
45	IU	6.19-6.21	O	48	
46	I	6.21	V/A	49-50	
47	OU	6.21	C	51-52	
48	I	6.21	V/H	53-54	
49	I	6.21	C	55-56	
50	I	6.21	V/D	57-58	
Sutro Tower				Signature: 	Page: <u>1</u> of <u>2</u>
San Francisco, CA				File:	Date: <u>9/7/17</u>

SEE INSPECTION SUMMARY

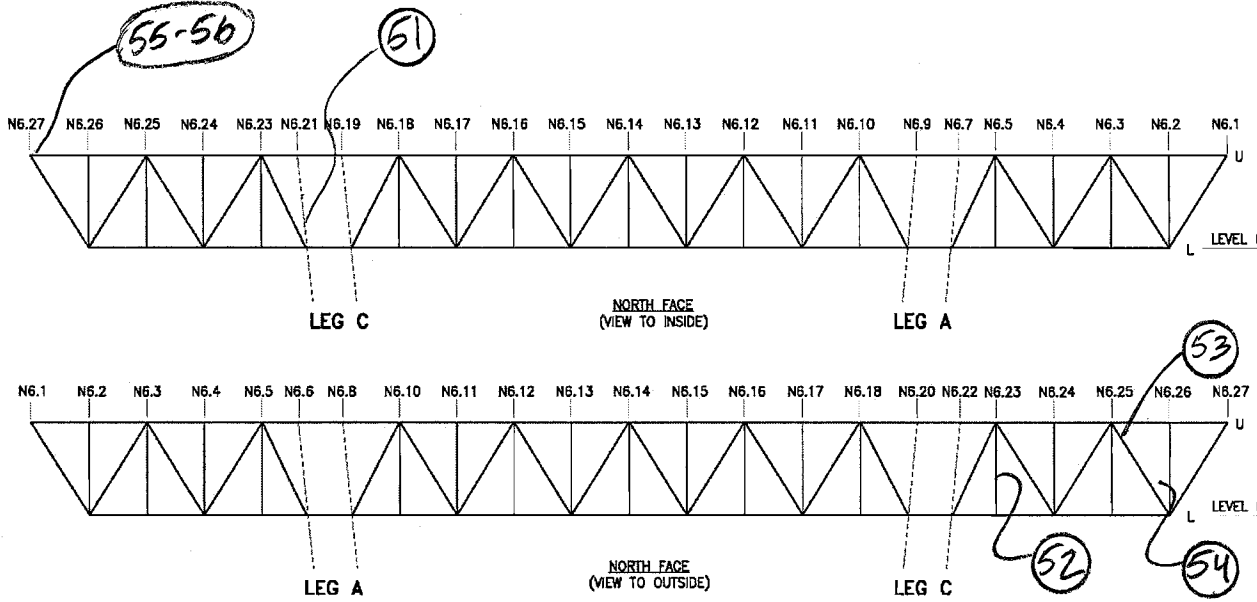
¹ Chord member designation: OU = outer upper, OL = outer lower, IU = inner upper, and IL = inner lower
² Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others



Inspection Data Sheet: North Truss (Level 6)

Observ. No.	Location/Identification			Photo No.	Observation Comments
	Chord ¹	Horiz. Location	Item ²		
51	I	6.21	V	59	(SEE INSPECTION SUMMARY)
52	O	6.23	V	60	
53	OU	6.25-6.26	D	61	
54	IL	6.26	O	62	
55	IU	6.27	C	63	
56	IU	6.27	C	64-66	
<i>Sutro Tower</i>				Signature: 	Page: <u>2</u> of <u>2</u>
San Francisco, CA				File:	Date: <u>9/7/17</u>

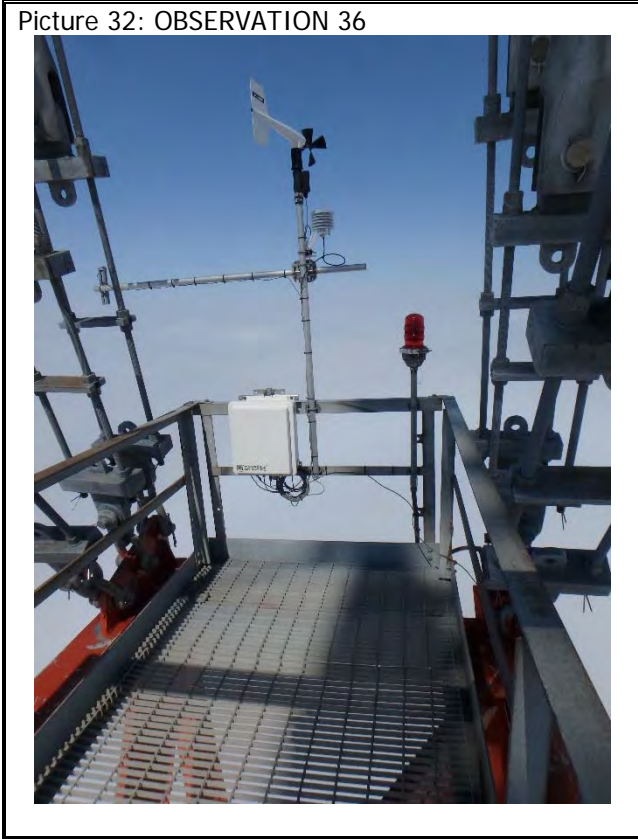
¹ Chord member designation: OU = outer upper, OL = outer lower, IU = inner upper, and IL = inner lower
² Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others



ERI Project 35473 * Sutro Tower * North Truss (Level 6) Inspection Summary * Inspected Aug 22-23, 2017

NORTH TRUSS (LEVEL 6)						
OBSERV. NO.	Location/Identification			Photo No.	OBSERVATION COMMENTS	RECOMMENDED CORRECTIVE ACTION (CA)
	Chord	Horiz. Location	Item			
36	IU	NW Outrigger	O	32-33	Damaged Cable, Apparrent Bird Damage	Consider running cable in flexible conduit to protect ~ Replace cable as needed
37	IU	6.3	C	34-35	MRB (X5), Leg & Diag Bolts	Surface prepare and treat
38	OU	6.3	C	36	MRB (X1), Leg Bolt	Surface prepare and treat
39	OL	6.10	C	37-38	MRB (X1), Leg Bolt	Surface prepare and treat
40	O	6.12	C	39-40	Loose Stitch Bolt Near Midspan, Leg	Properly drive stitch bolt and tighten
41	IU	6.12-6.13	D	41	Damaged Angle Reinforced Using Bolt-On Brace, Wind Brace	Issue previously assessed by EOR and deemed acceptable
42	IL	6.13	C	42-43	Loose Stitch Bolt Near Outer Leg, Wind Brace	Properly drive stitch bolt and tighten
43	IL	6.18-6.21	C	44-45	MRB (X4), Diag Bolts	Surface prepare and treat
44	IL	6.19	V/H	46-47	Minor Rust At Leg To Wind Brace Horiz Joint	Surface prepare and treat
45	IU	6.19-6.21	O	48	Wind Brace Angle Legs Torch Cut To Facilitate Rigging Weldment	Contact EOR to determine if any CA is warranted
46	I	6.21	V/D	49-50	Leg To Diag Joint Holding Water	Clear drain hole or re-drill to allow positive drainage
47	OU	6.21	C	51-52	MRB (X1), Horiz Bolt	Surface prepare and treat
48	I	6.21	V/H	53-54	Minor Rust At Leg To Horizontal Joint	Surface prepare and treat
49	I	6.21	C	55-56	MRB (X6), Horiz Bolts	Surface prepare and treat
50	I	6.21	V/D	57-58	Leg To Diag Joint Holding Water	Clear drain hole or re-drill to allow positive drainage
51	I	6.21	V	59	HDG Coating Damaged, Leg	Surface prepare and treat
52	O	6.23	V	60	Bent Angle Leg Near Midspan Stitch Bolt, Leg	Contact EOR to determine if any CA is warranted
53	OU	6.25-6.26	D	61	Bent Angle Leg, Upper End, Diag	Contact EOR to determine if any CA is warranted
54	IL	6.26	O	62	Moderate/Severe Corrosion On Top Guard Rail	Repair or replace guard rail in near future
55	IU	6.27	C	63	MRB (X2), Horiz Bolts	Surface prepare and treat
56	IU	6.27	C	64-66	MRB (X3), Wind Bracing Bolts	Surface prepare and treat

Picture 32: OBSERVATION 36



Picture 33: OBSERVATION 36



Picture 34: OBSERVATION 37



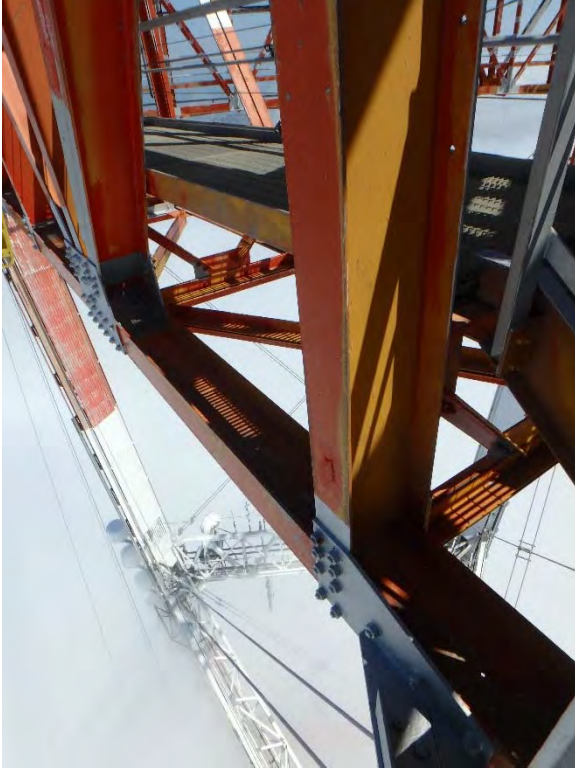
Picture 35: OBSERVATION 37



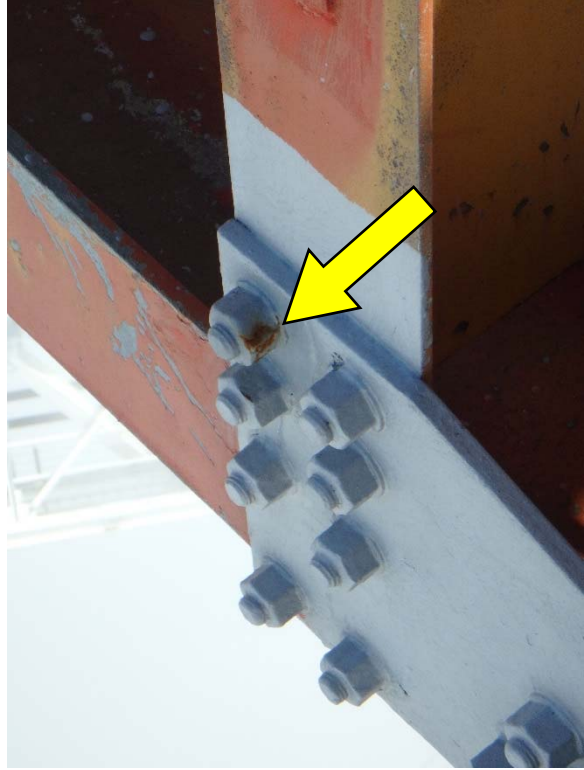
Picture 36: OBSERVATION 38



Picture 37: OBSERVATION 39



Picture 38: OBSERVATION 39



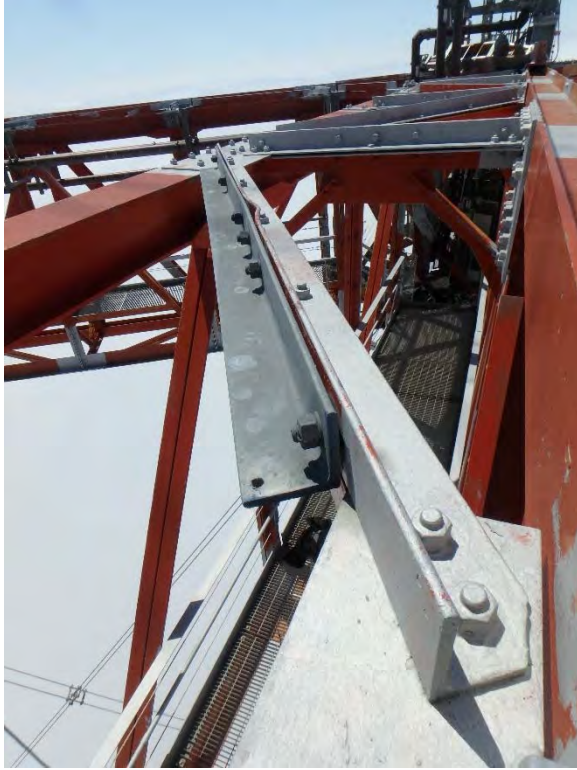
Picture 39: OBSERVATION 40



Picture 40: OBSERVATION 40



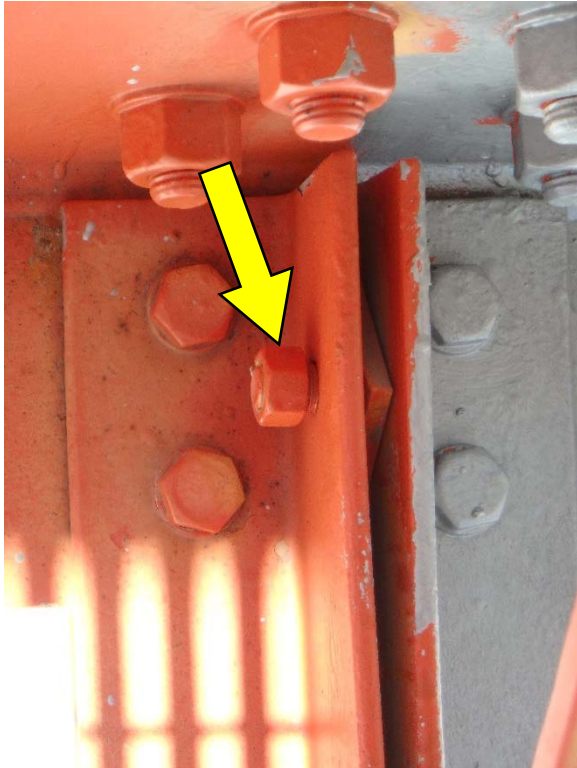
Picture 41: OBSERVATION 41



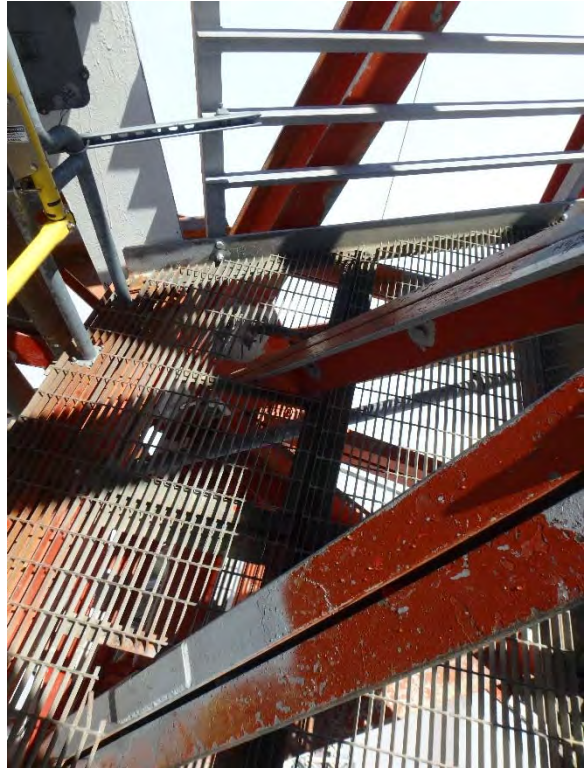
Picture 42: OBSERVATION 42



Picture 43: OBSERVATION 42



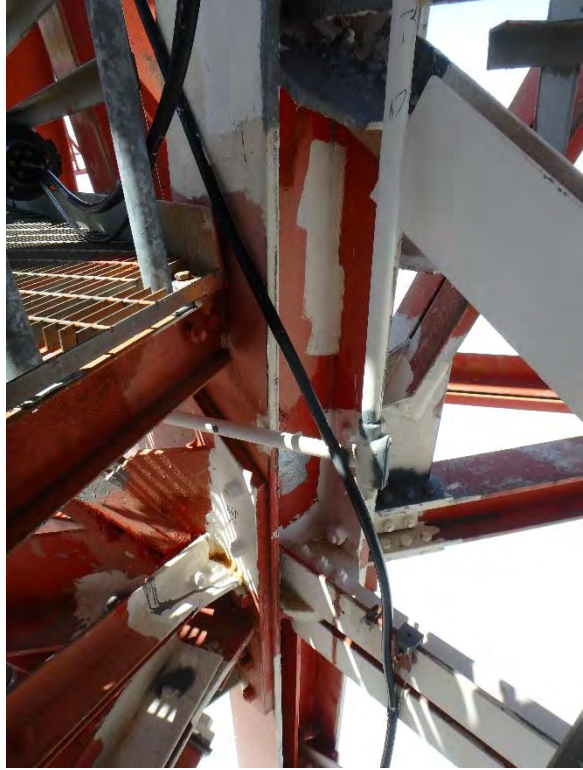
Picture 44: OBSERVATION 43



Picture 45: OBSERVATION 43



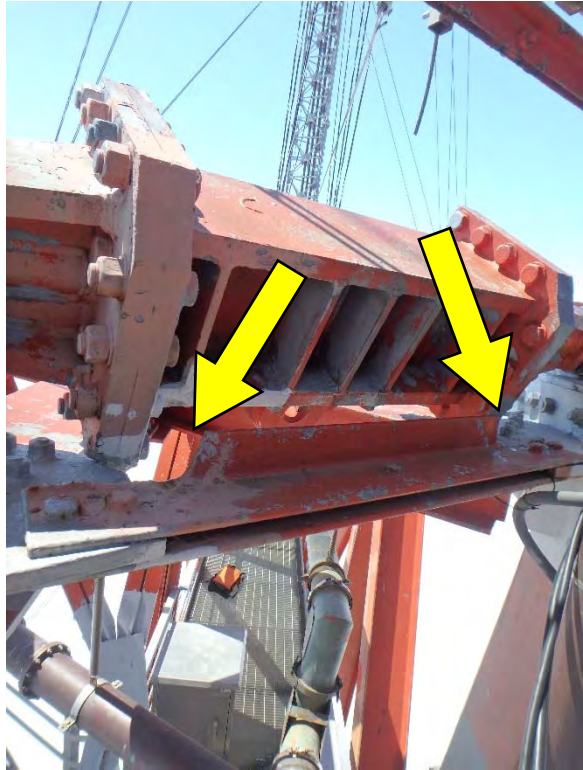
Picture 46: OBSERVATION 44



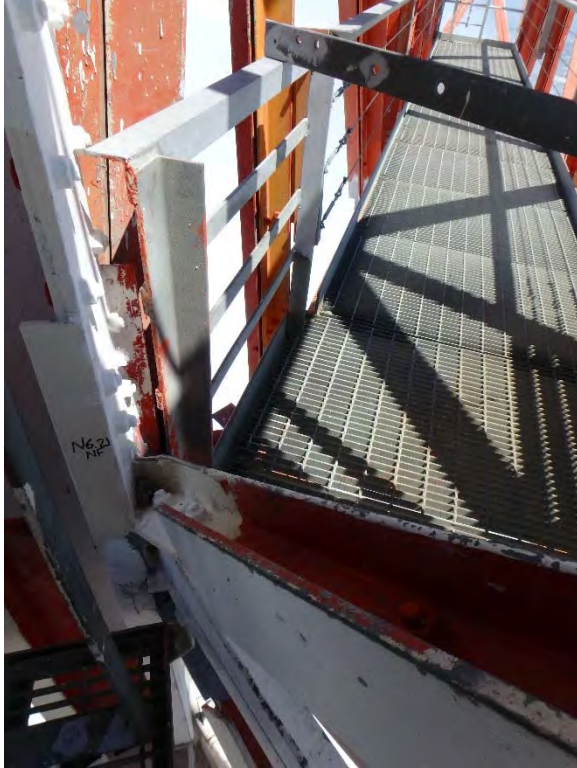
Picture 47: OBSERVATION 44



Picture 48: OBSERVATION 45



Picture 49: OBSERVATION 46



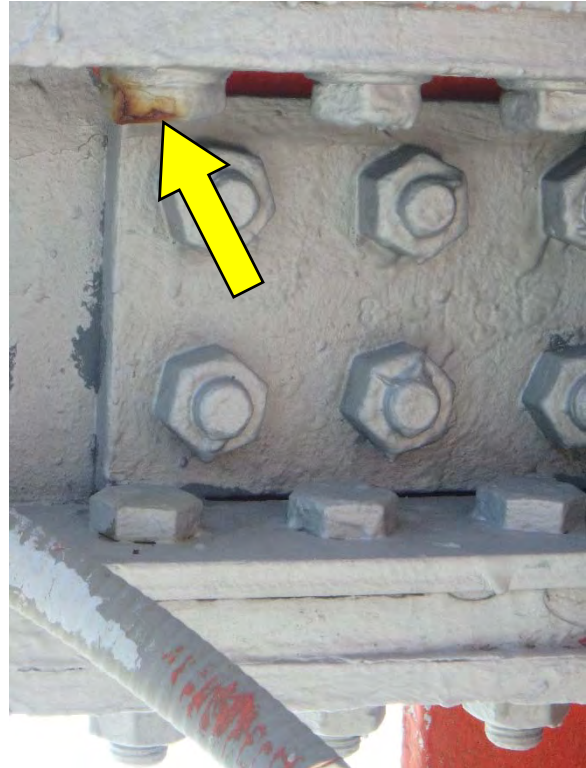
Picture 50: OBSERVATION 46



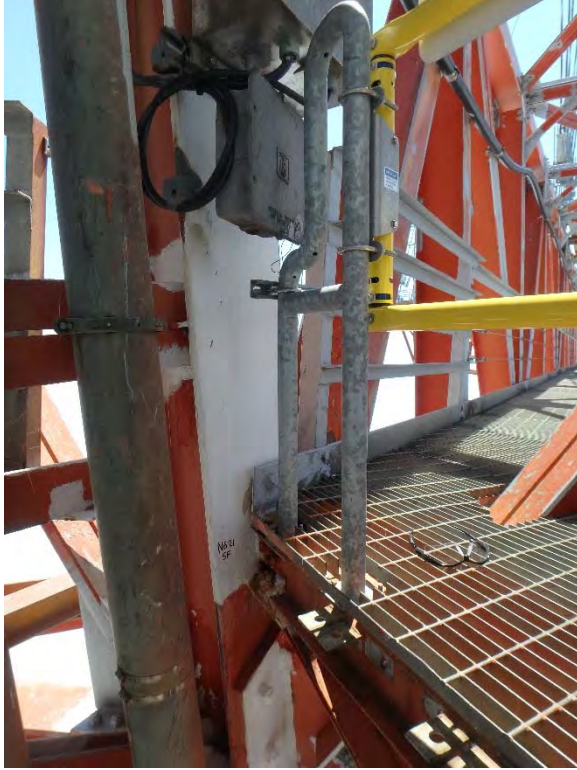
Picture 51: OBSERVATION 47



Picture 52: OBSERVATION 47



Picture 53: OBSERVATION 48



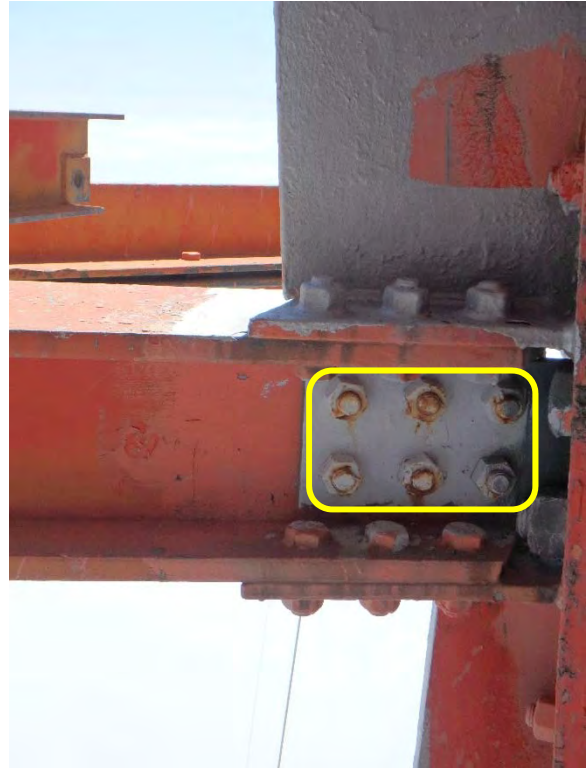
Picture 54: OBSERVATION 48



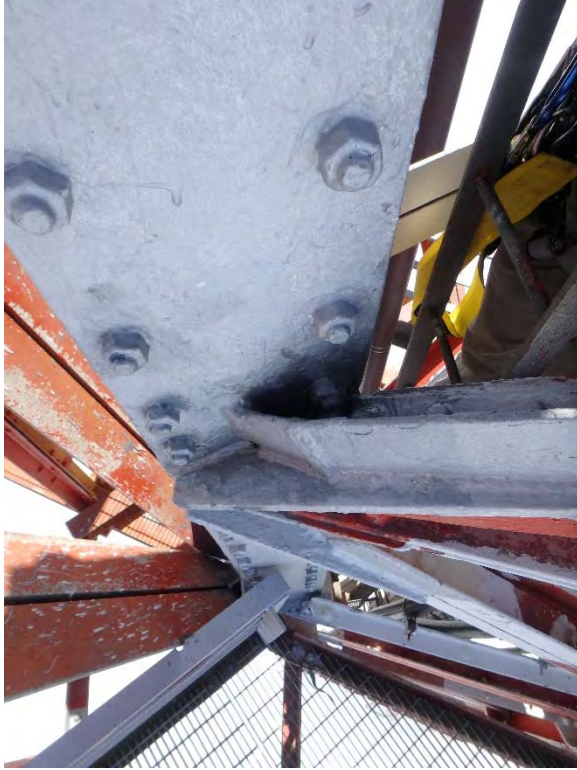
Picture 55: OBSERVATION 49



Picture 56: OBSERVATION 49



Picture 57: OBSERVATION 50



Picture 58: OBSERVATION 50



Picture 59: OBSERVATION 51



Picture 60: OBSERVATION 52



Picture 61: OBSERVATION 53



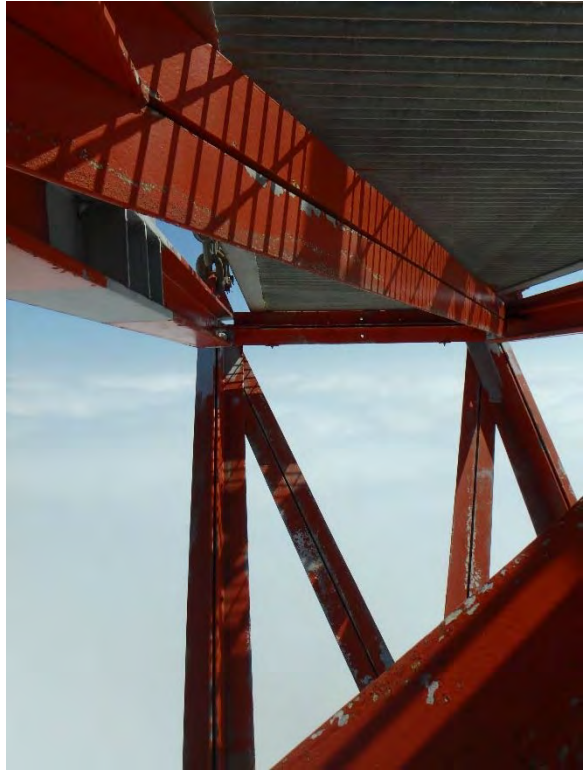
Picture 62: OBSERVATION 54



Picture 63: OBSERVATION 55



Picture 64: OBSERVATION 56



Picture 65: OBSERVATION 56



Picture 66: OBSERVATION 56

