

# **Ancillary Structure Inspection Procedures and Findings**

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**Guidelines for the Installation,  
Inspection, Maintenance and Repair  
of Structural Supports for Highway  
Signs, Luminaries, and Traffic Signals**





# Inspection Program

- Written Procedures
  - What
  - When
  - By Whom
- Inspection Activities
  - Staff
  - Equipment
  - Access
  - Traffic
- Documentation
- Reporting and Recommendations



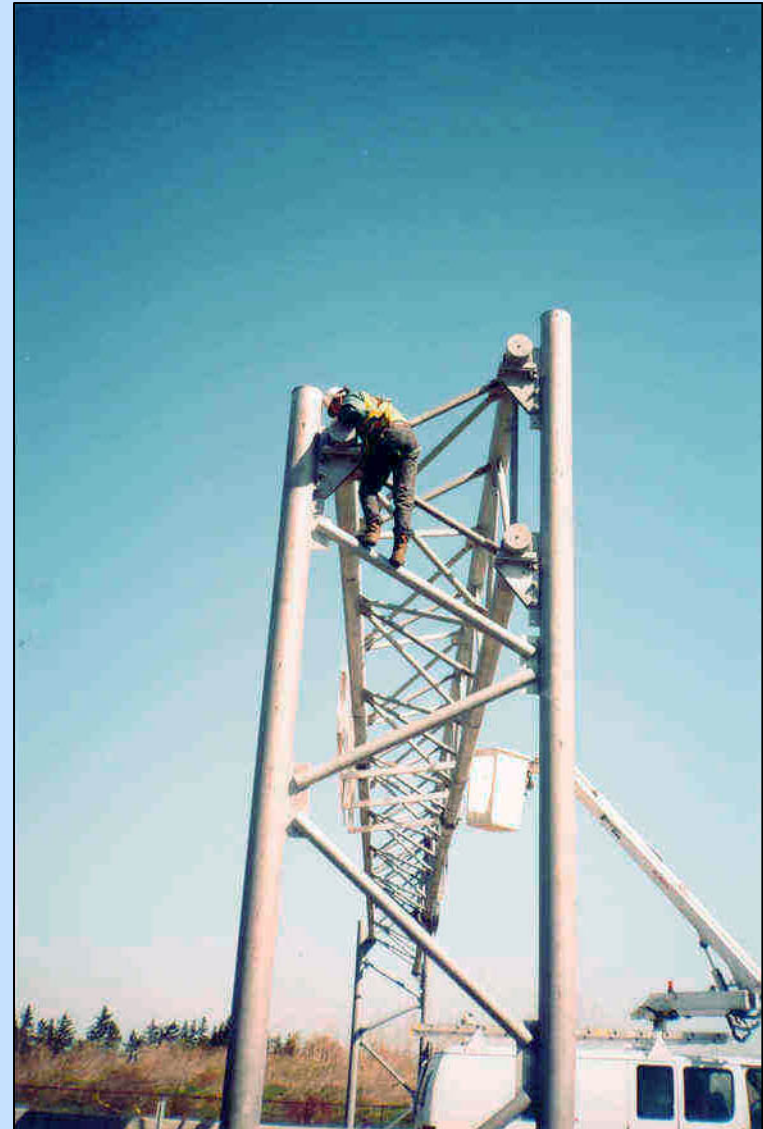
# Typical Frequencies

<u>Type</u>	<u>Frequency</u>
Structure-Mounted Signs	w/ bridge
Aluminum	2 years
Cantilever/Non-Redundant	4 years
Redundant Structures	6 years
High Mast Lighting Towers	-
Weathering Steel	2 years
Galvanized Steel	4 years



# Bucket Truck Has Limitations

- Shoulder Slope
- Fences, Guiderails Near Support



# Access Methods – Over Live Traffic





# Ground Observation



# Mobile Lane Closures





# Night Work



# Defect Examples









# Anchor Rods Nuts Obviously Loose









# Deteriorated Grout Pad



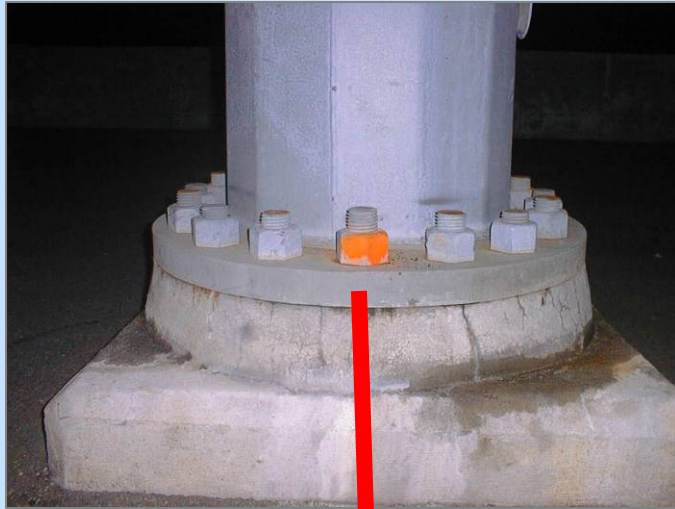


# Anchor Bolt Nut Not Seated Properly





# Anchor Rod Failure



- Broken Due to Corrosion

# Construction Deficiencies

Short  
Coupler

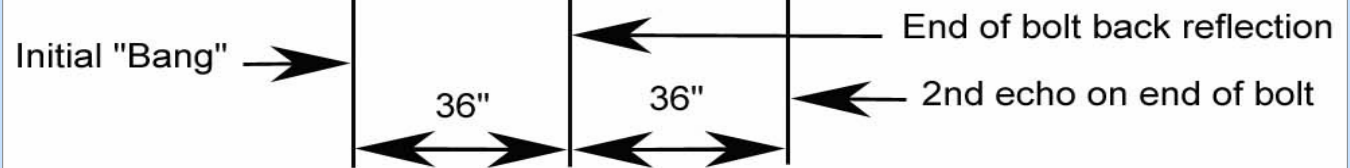
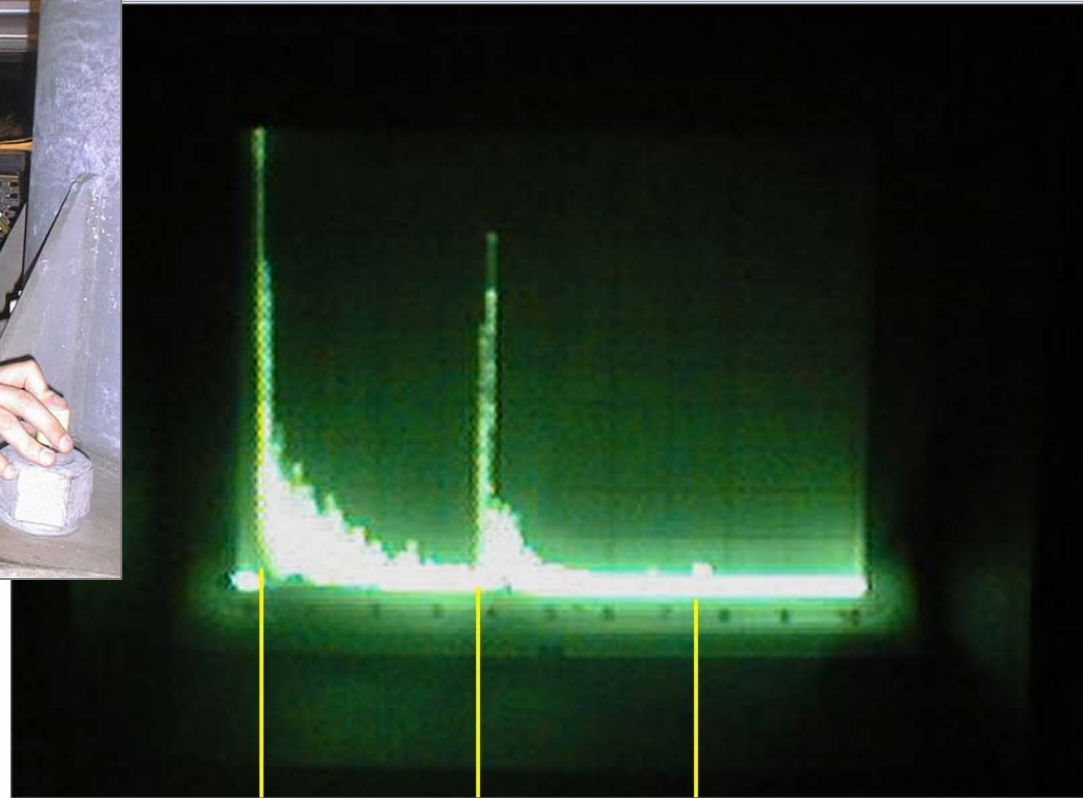


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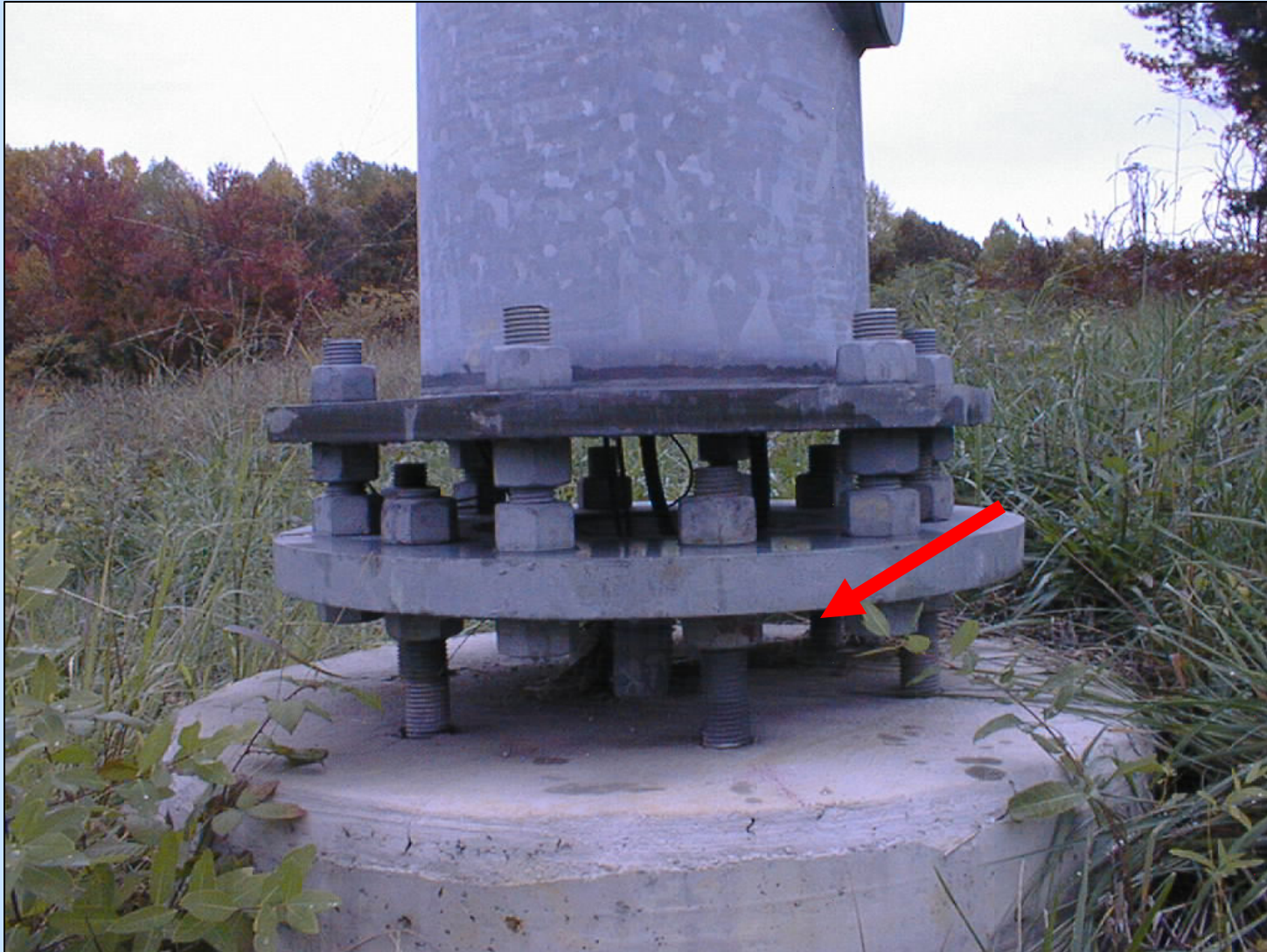




# Ultrasonic Testing



# Inadequate Design



Inadequate Base Plate-to-Pedestal Connection



# Post / Tower Corrosion



Base Plate Corrosion  
Note the Hole

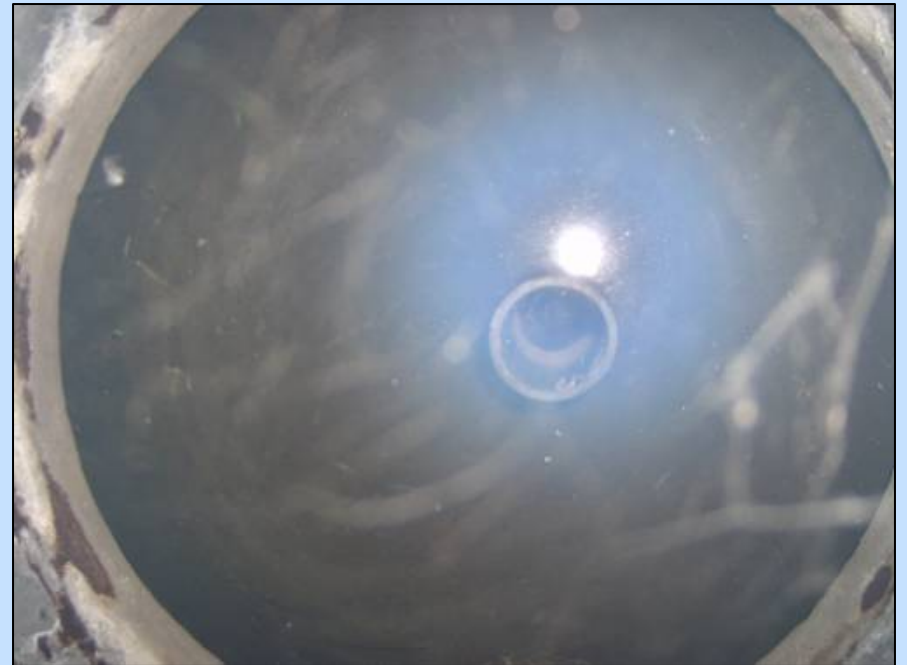


Corrosion Inside Post

# Tower / Post



Views Inside a Post





# Debris Inside Column





# Buried Base





# Interior Column Corrosion













# Loose Bolts on Sign Superstructure



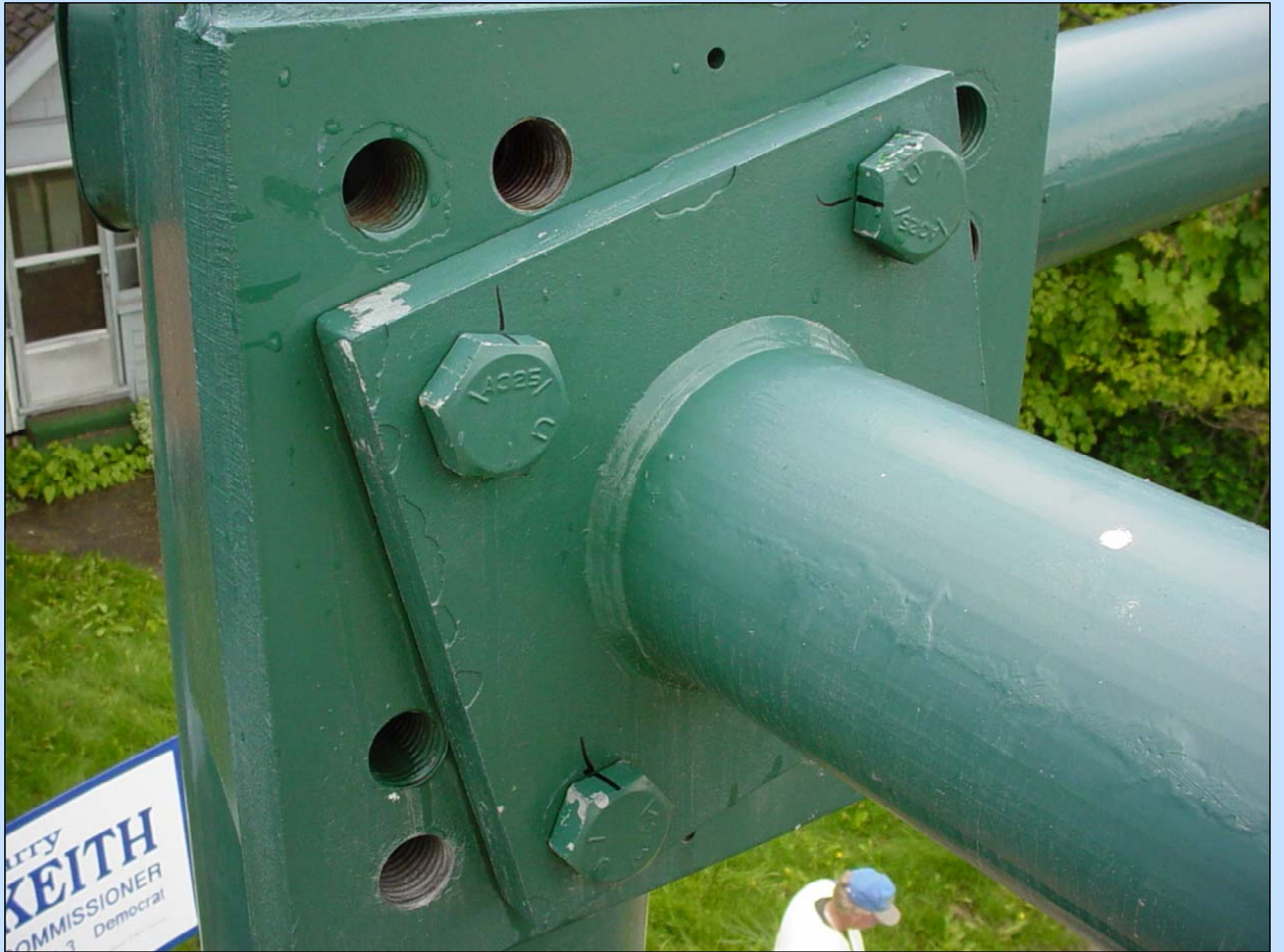


# Lower Chord to Post Connection









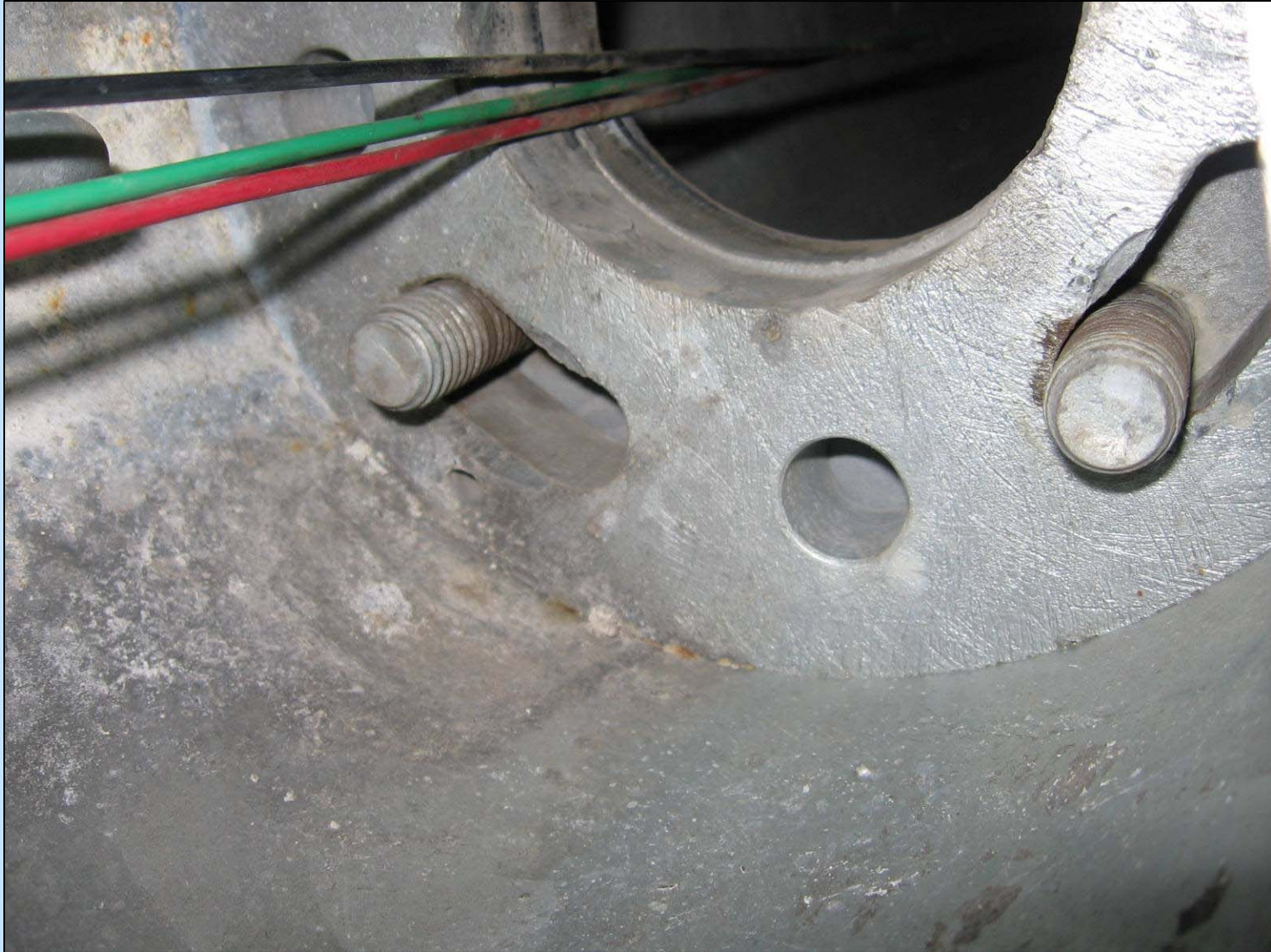
ITY  
**KEITH**  
OMMISSIONER  
Democrat

# Connection Bolt Not Seated Properly





# Missing Column Splice Nuts



# Failed Mast Arm

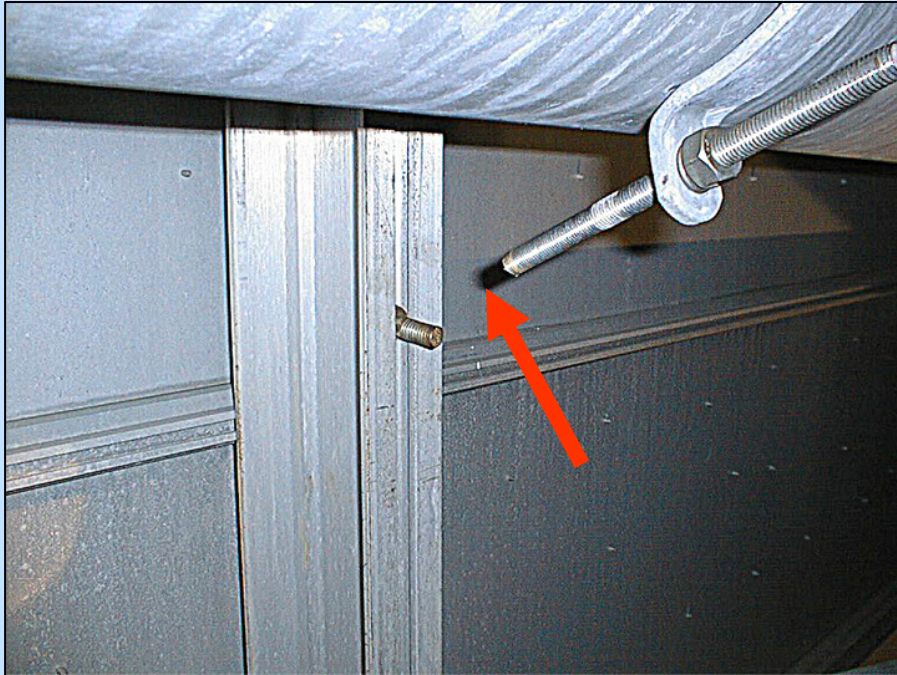




# Broken Connection Bolts



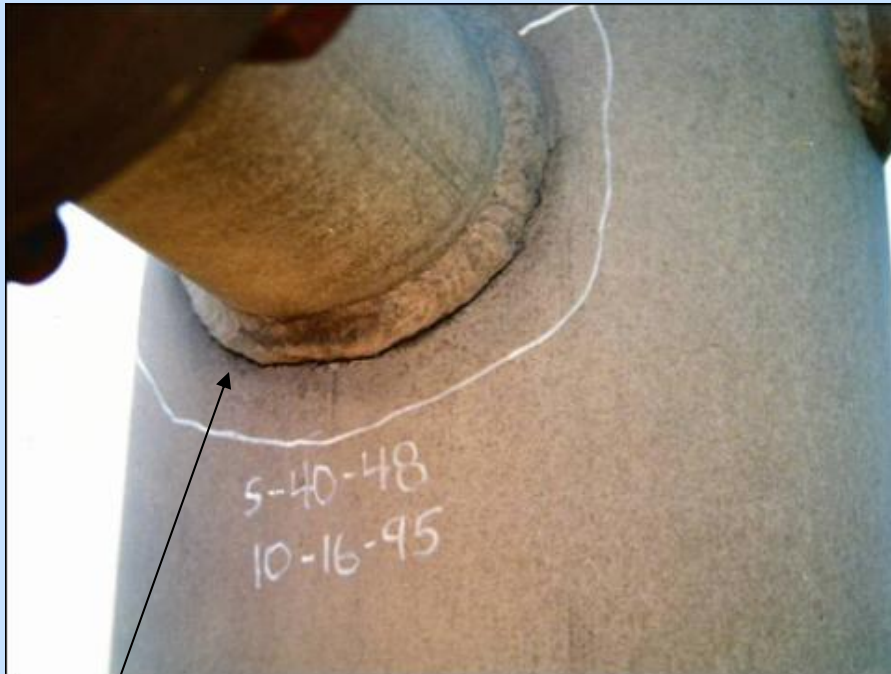
# Sign Panel Connection Deficiencies



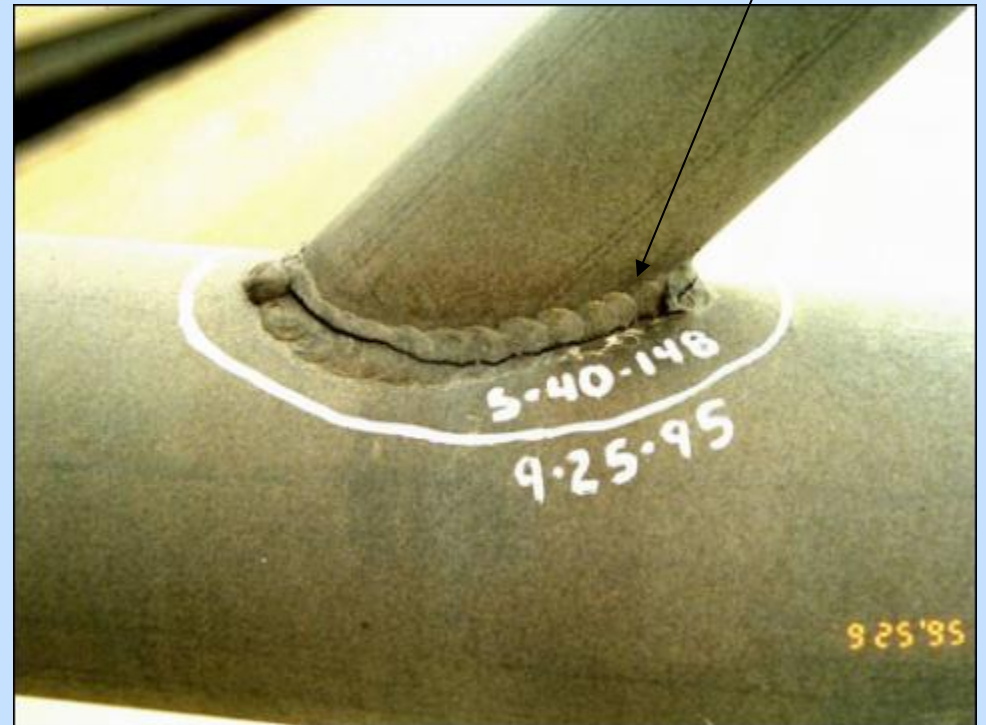


# Fatigue Cracks

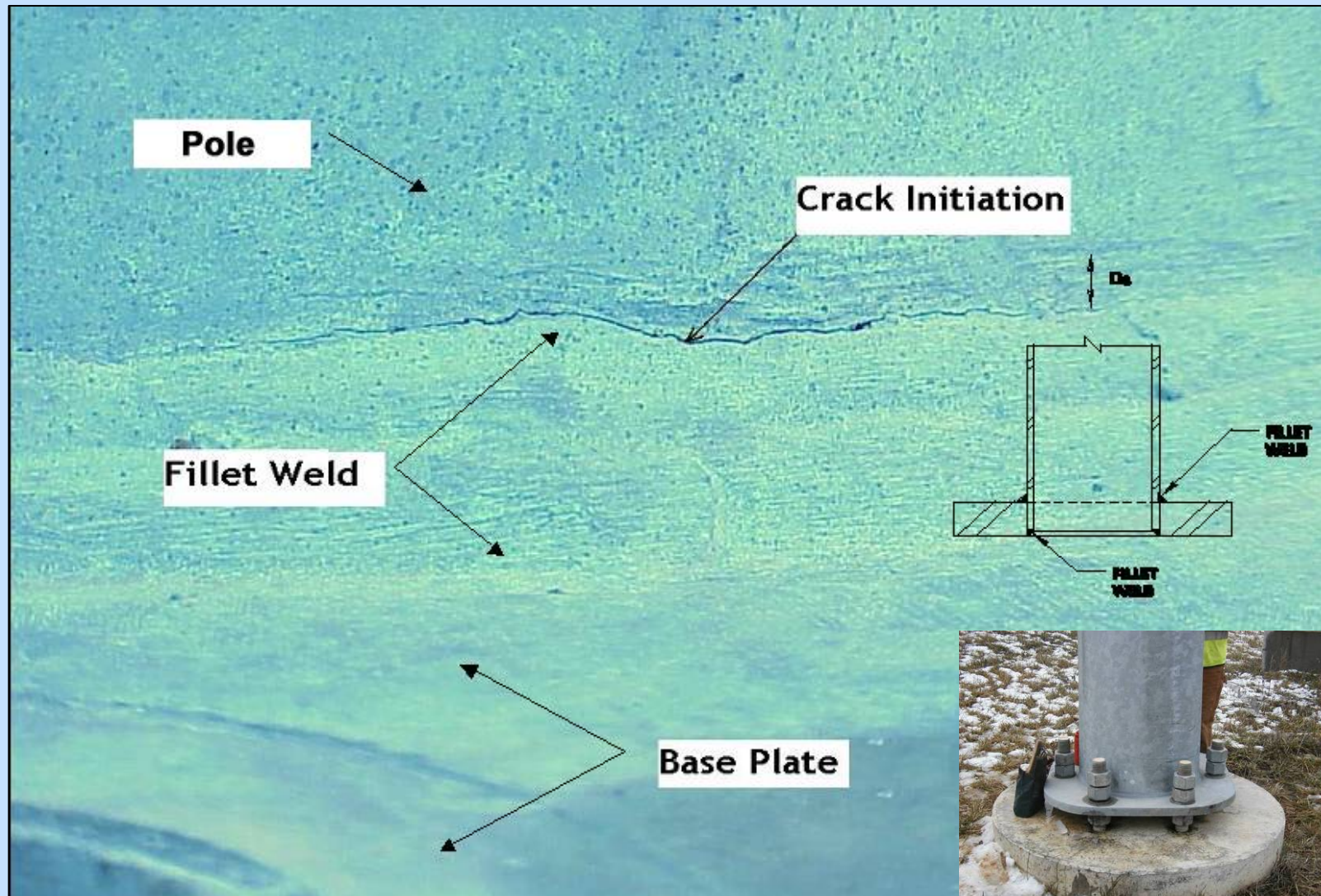
Fatigue Crack From Weld  
Crater Crack



Fatigue Crack in  
Heat Affected Zone

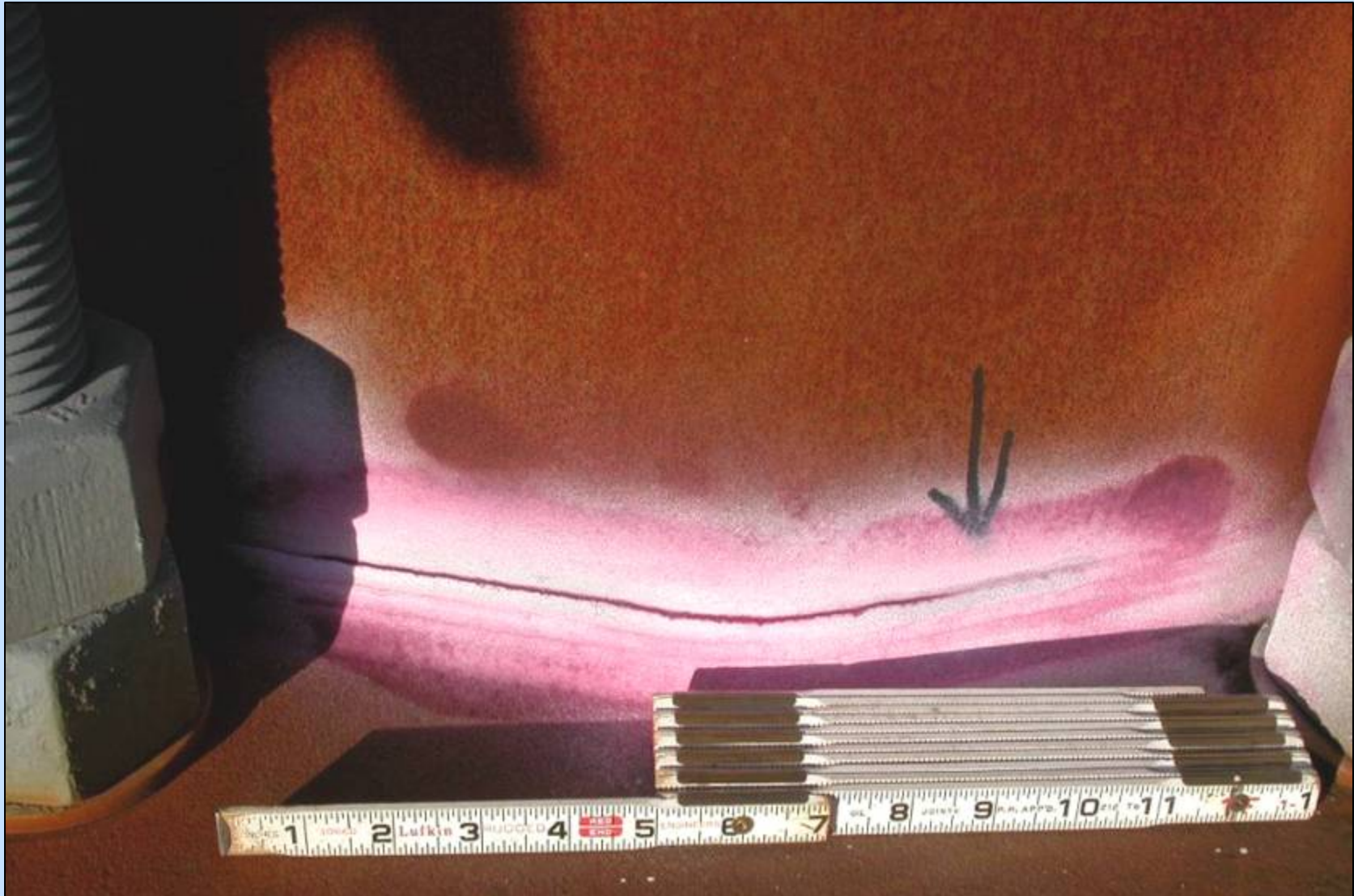


# Fatigue Initiation





# Fatigue Propagation



# Fatigue Fracture





# Dye Penetrant Testing



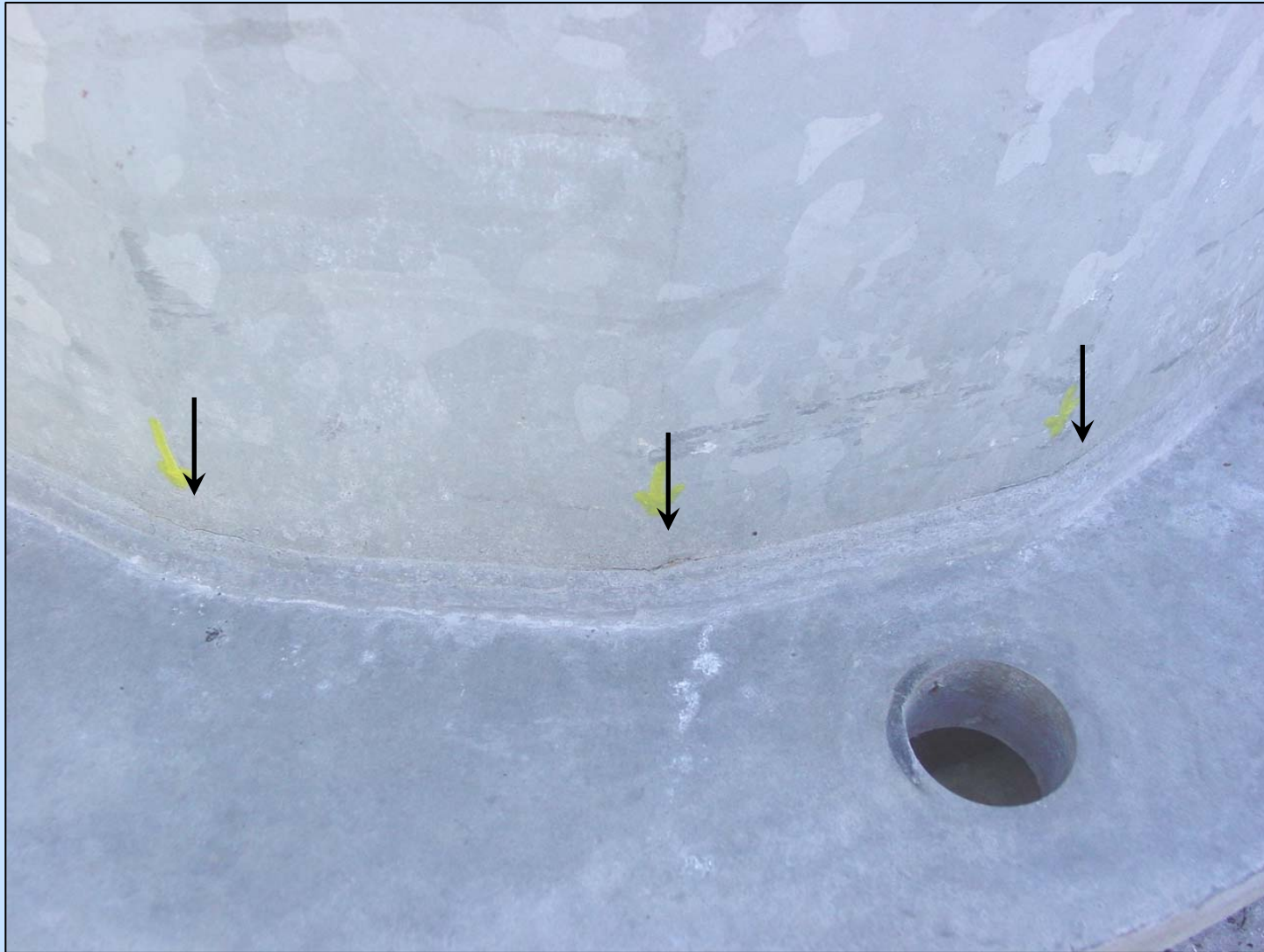
Crack

SW  
TOP

SW  
BOT

Top Loose  
SW

# Cracks at Bend Points





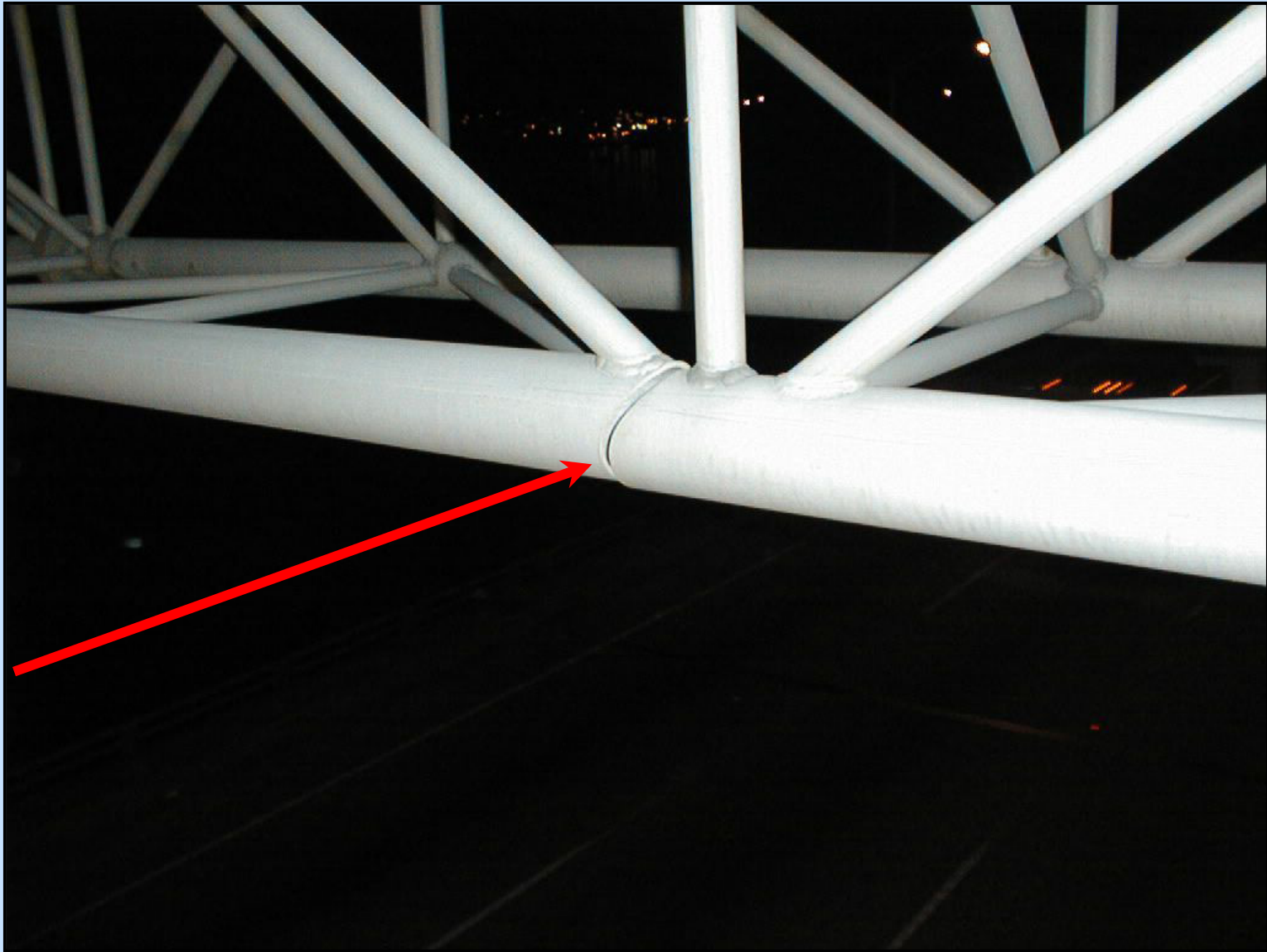
# Tower / Base Plate Welds







# Fractured Chord



# Weld Defects



Aluminum Weld Cracks  
in Aluminum Truss





# Crack – Friction Clamp to Post







# Cracks in Newer Structure



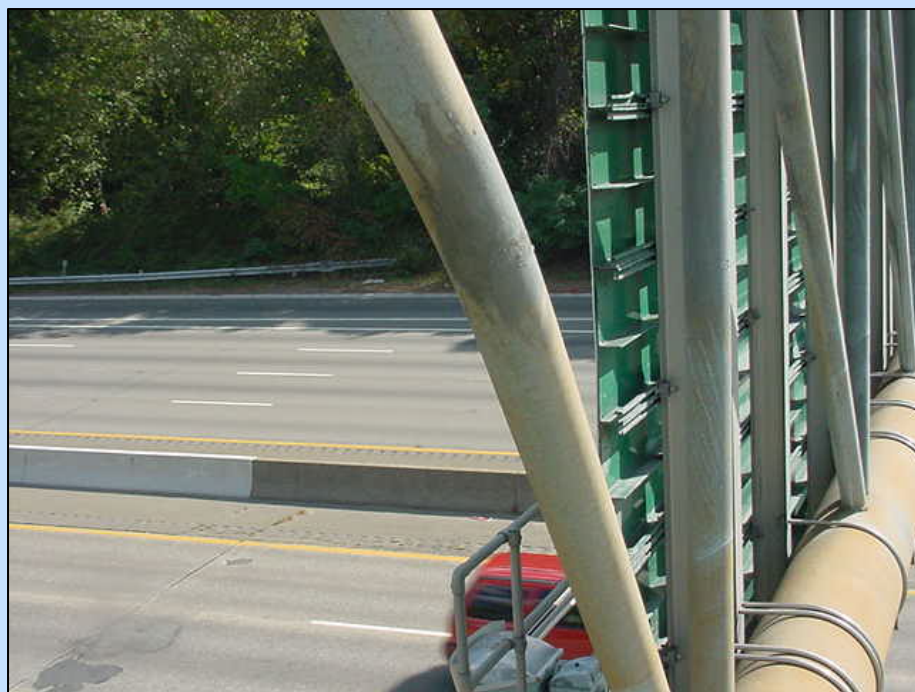
# Cracks in Newer Structure





# Weld Cracks on Z-Type Structure







# Chord Crack

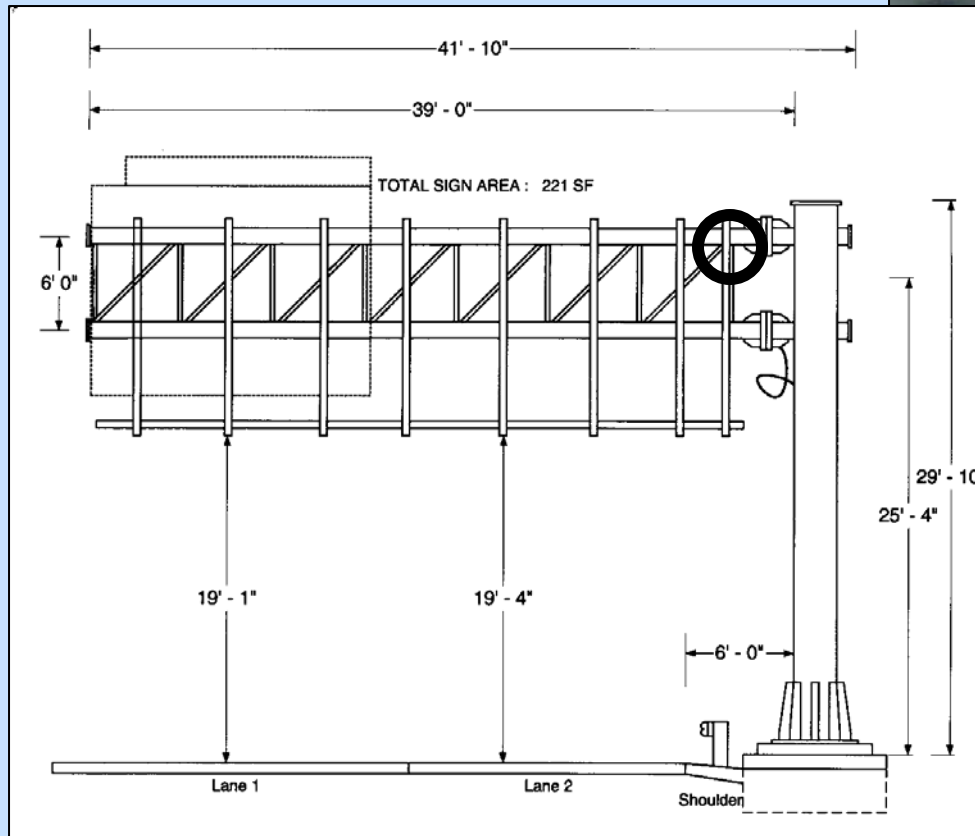
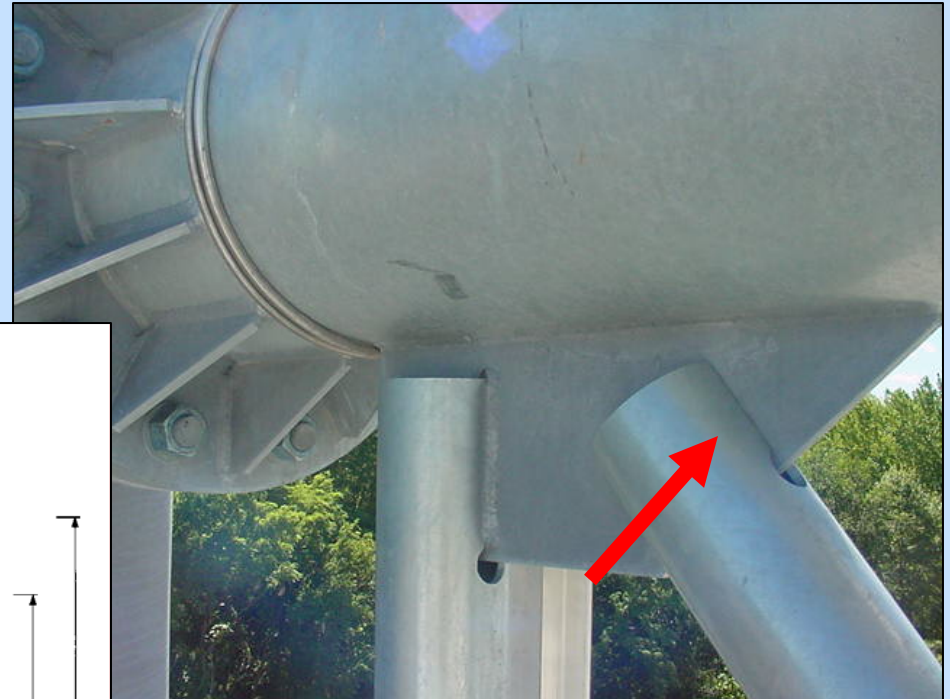


# Immediate Removal of Sign



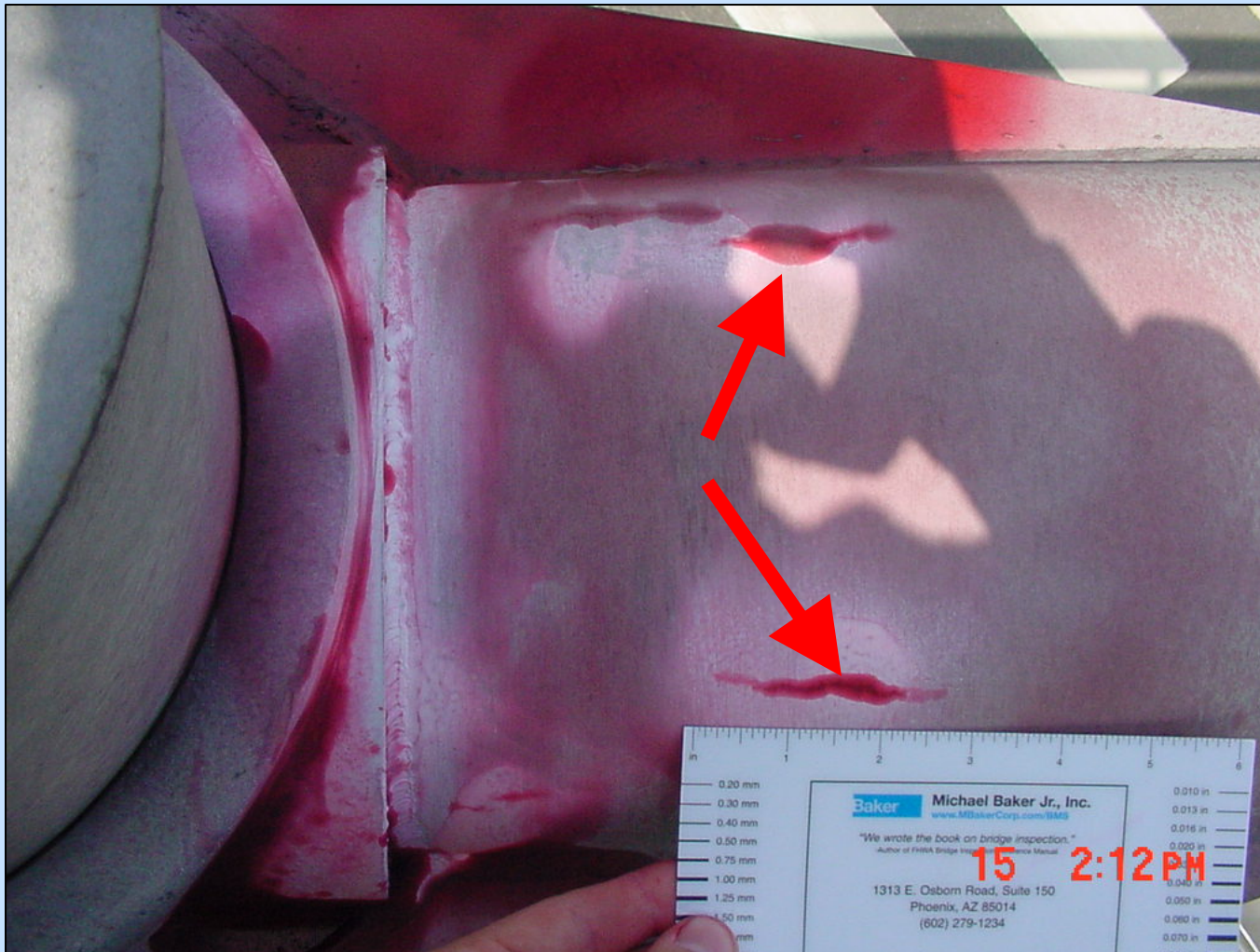


- Connection  
– Rating?



# Cracked Monotubes

- Cracks in Arm Parallel to Tensile Stress

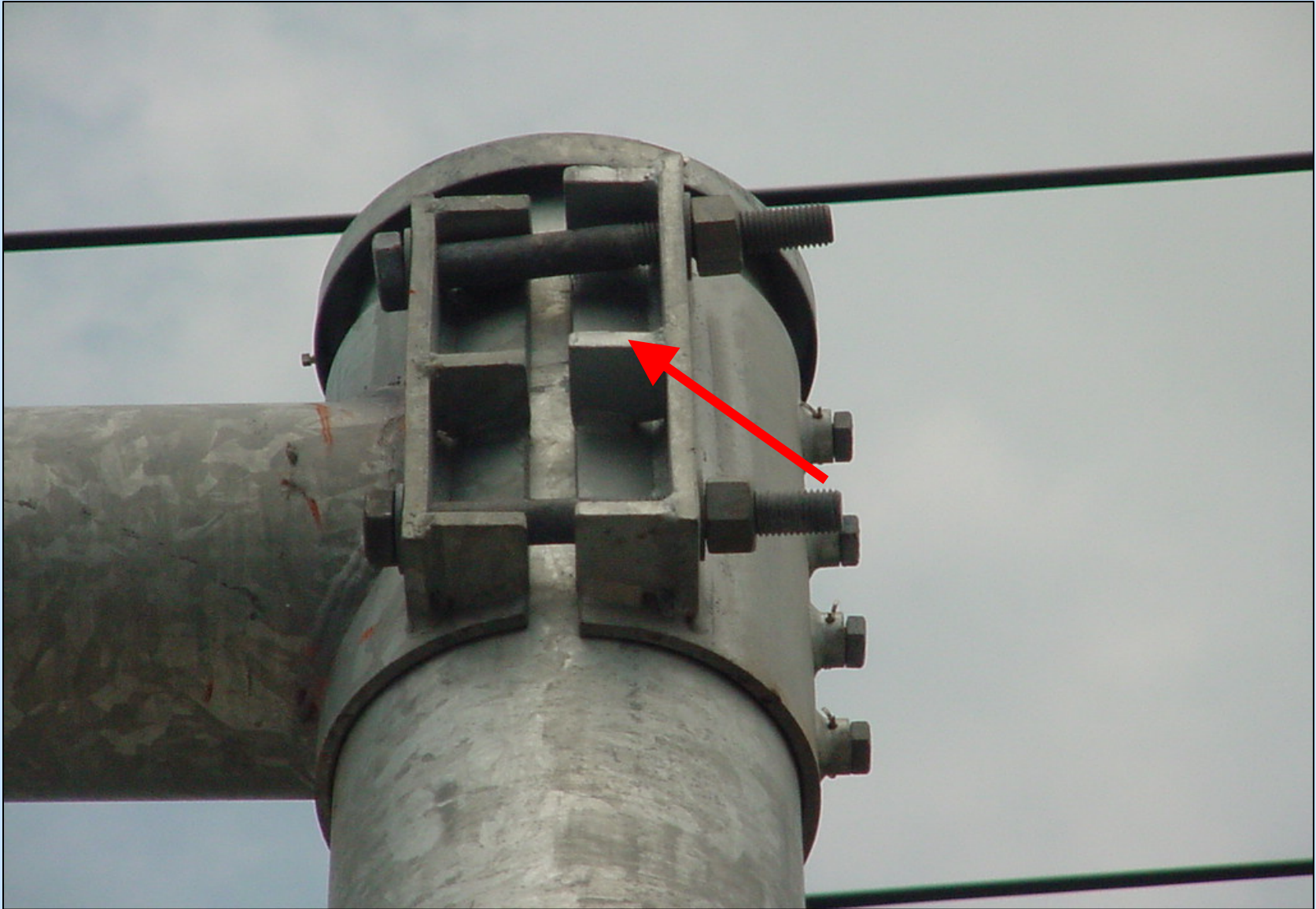




- Non Structural
  - Vertical Clearance
  - Camber
  - Alignment
  - Protection



# Mismatched Connections





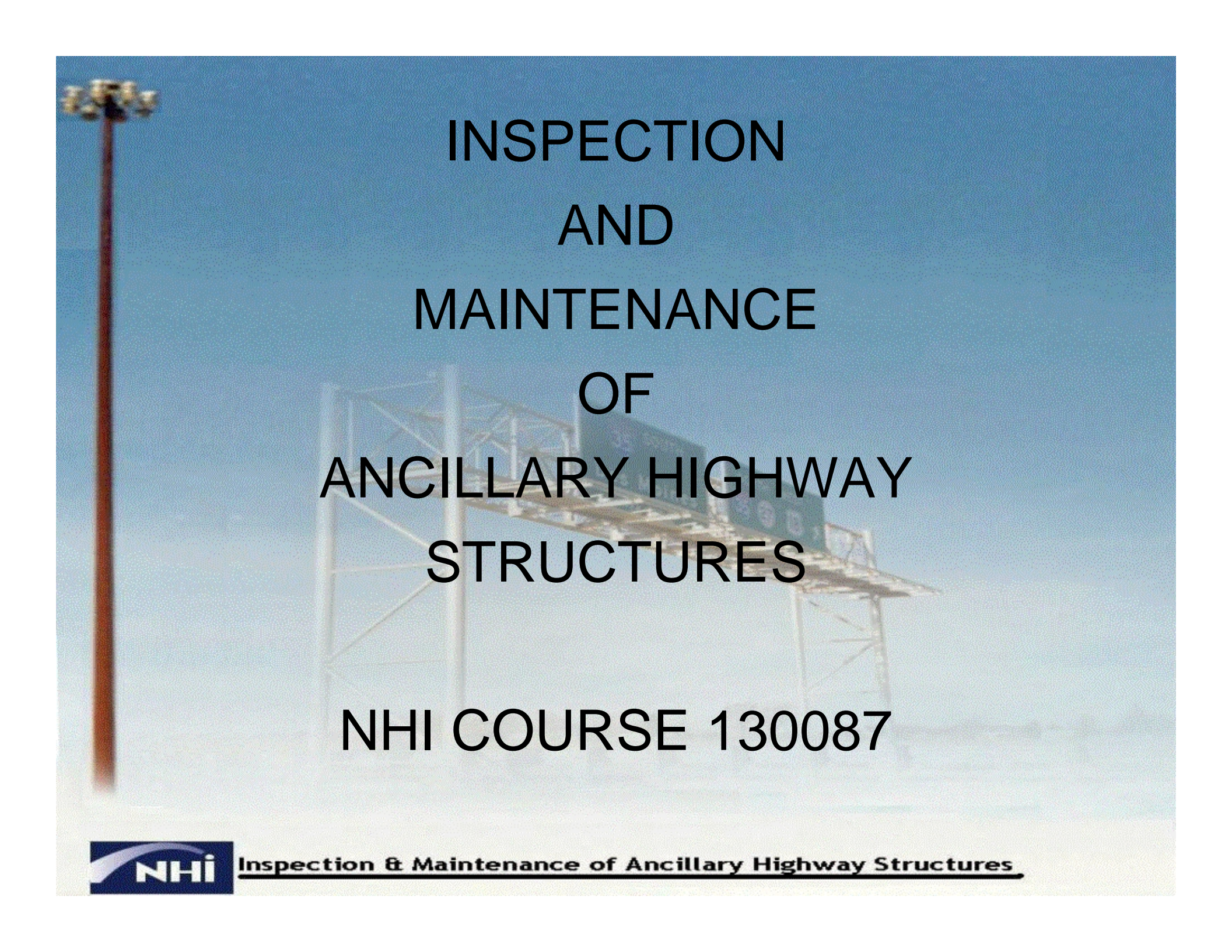
# Missing Column End Cap



# Missing Hand Hole Covers







INSPECTION  
AND  
MAINTENANCE  
OF  
ANCILLARY HIGHWAY  
STRUCTURES

NHI COURSE 130087



Inspection & Maintenance of Ancillary Highway Structures



# *Any Questions?*

