Northeast Bridge Preservation Conference
September 28-30, 2010
Hartford, CT

Rocker Bearing Issues

By
Franco Balassone, P.E.
Executive Vice President
HAKS Engineers, P.C.

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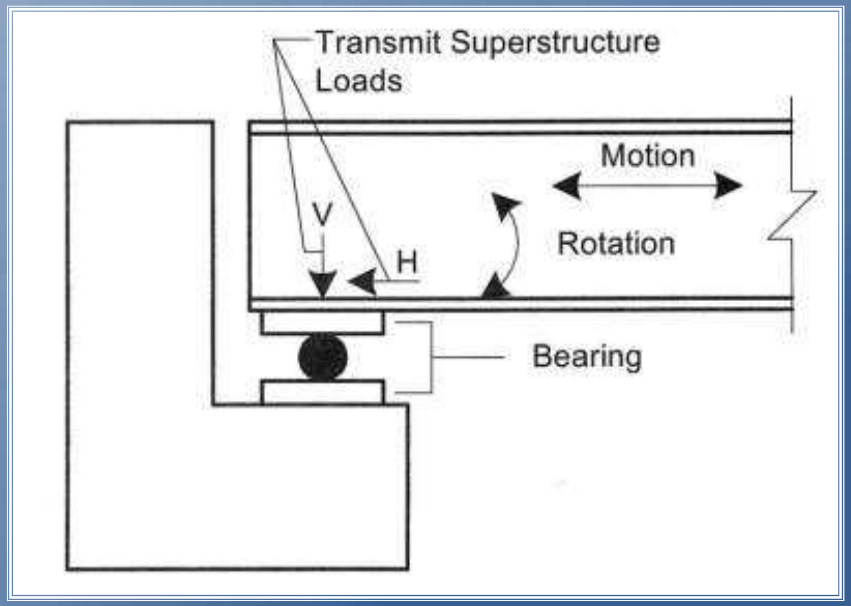
Typical Bridge Bearing Types

- Sliding Plate Bearings
- Roller Bearings
- Elastomeric Bearings
- Spherical Bearings
- Pot Bearings
- Rocker Bearings



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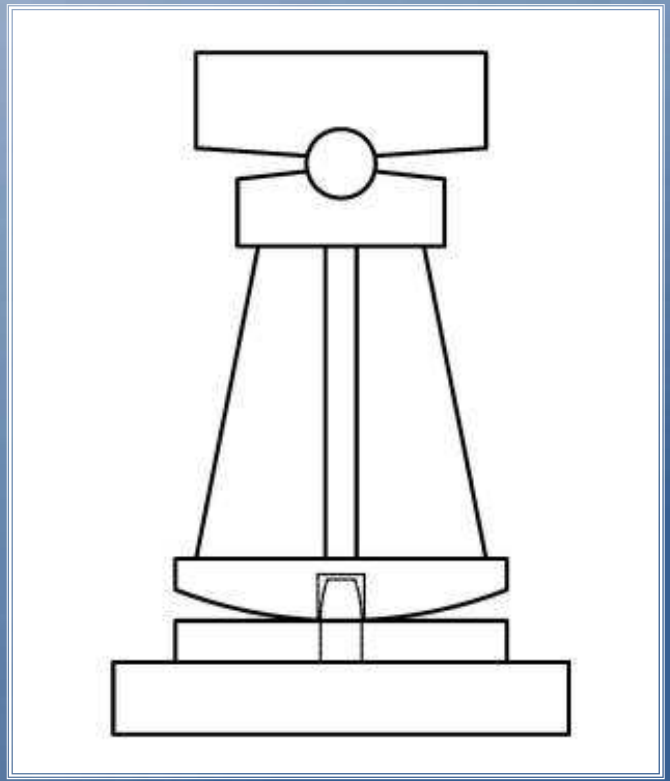
Rocker Bearing



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Why Discuss Rocker Bearings?

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Albany, NY (I-787, Exit 3 NB)

Bridge Closed, July 28, 2005

Rocker Bearing Failure

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Albany, NY (I-787, Exit 3 NB)

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Albany, NY (I-787, Exit 3 NB)

Contributing Factors:

- Misaligned / Over-expanded Bearing
- Overly Flexible Pier

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Source: NYDOT

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Pittsburgh, PA (Birmingham Bridge)

Bridge Closed February 8, 2008

Rocker Bearing Failure

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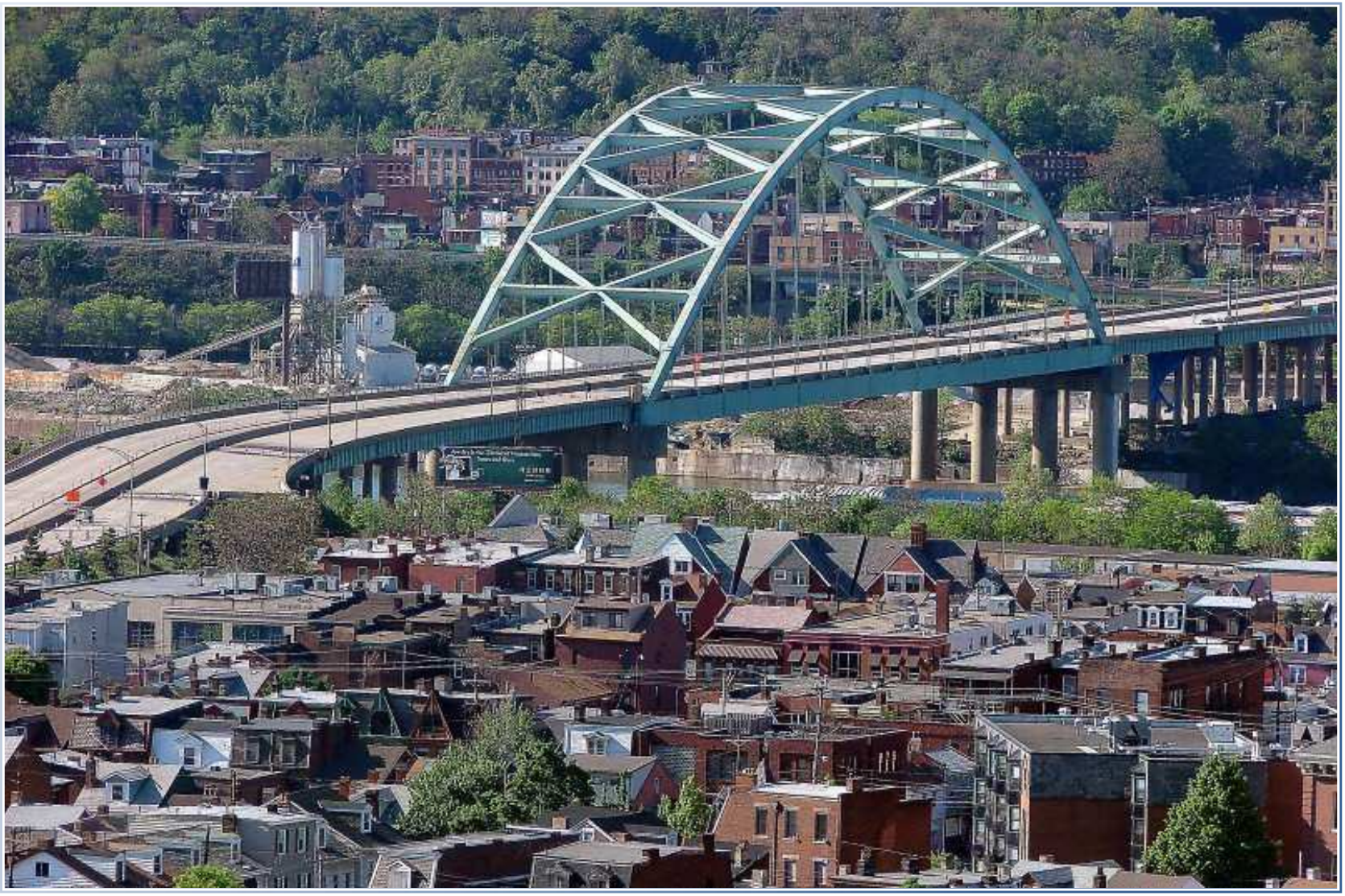
Pittsburgh, PA (Birmingham Bridge)



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Pittsburgh, PA (Birmingham Bridge)

Contributing Factors:

- Misalignment of Bearing
- Cumulative Bearing Ratcheting
- Horizontal Force – Deflection of Pier

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Source: PennDOT

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Pittsburgh, PA (Birmingham Bridge)

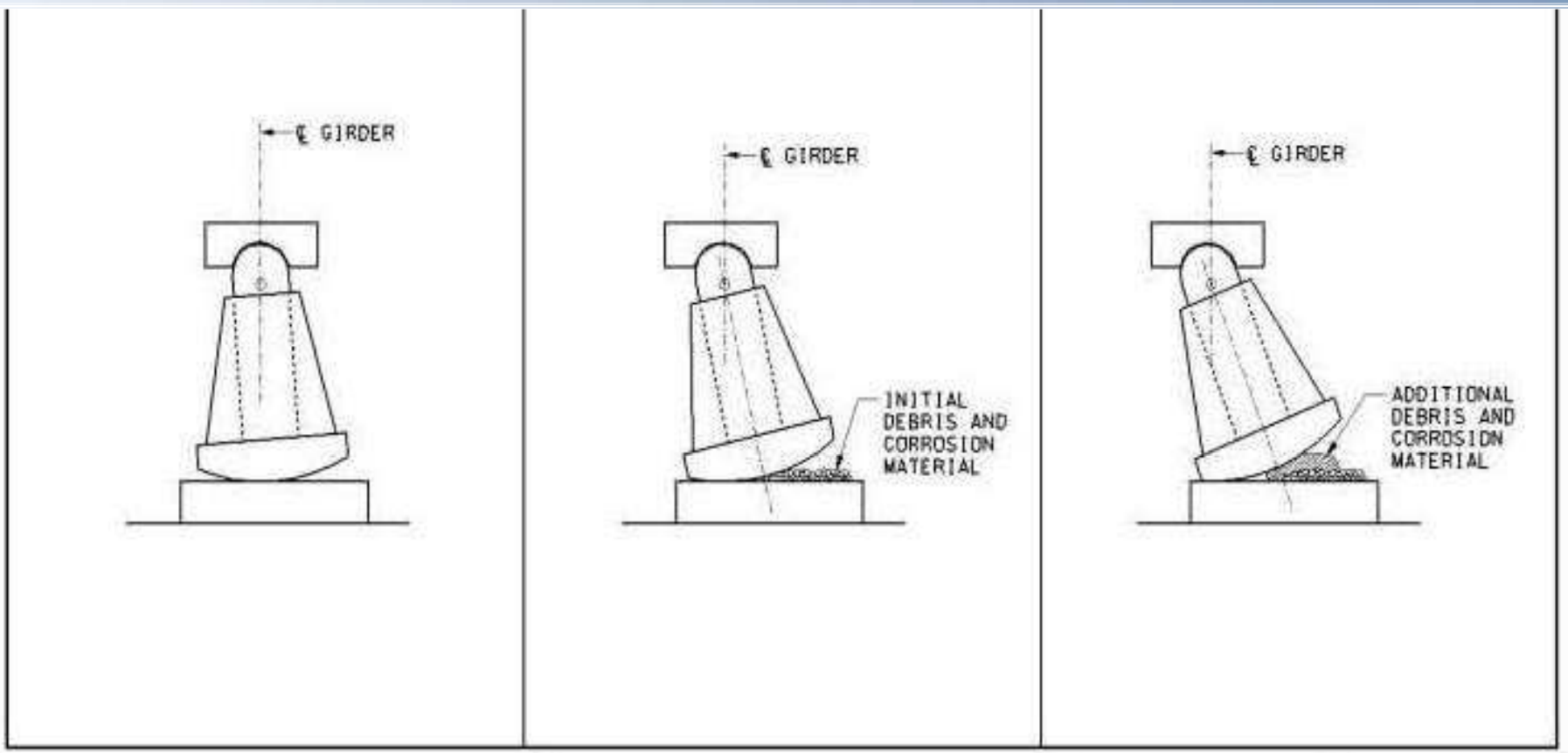

Figure 1 – Rocker Bearing Ratcheting Effect

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Source: PennDOT

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Pittsburgh, PA (Birmingham Bridge)

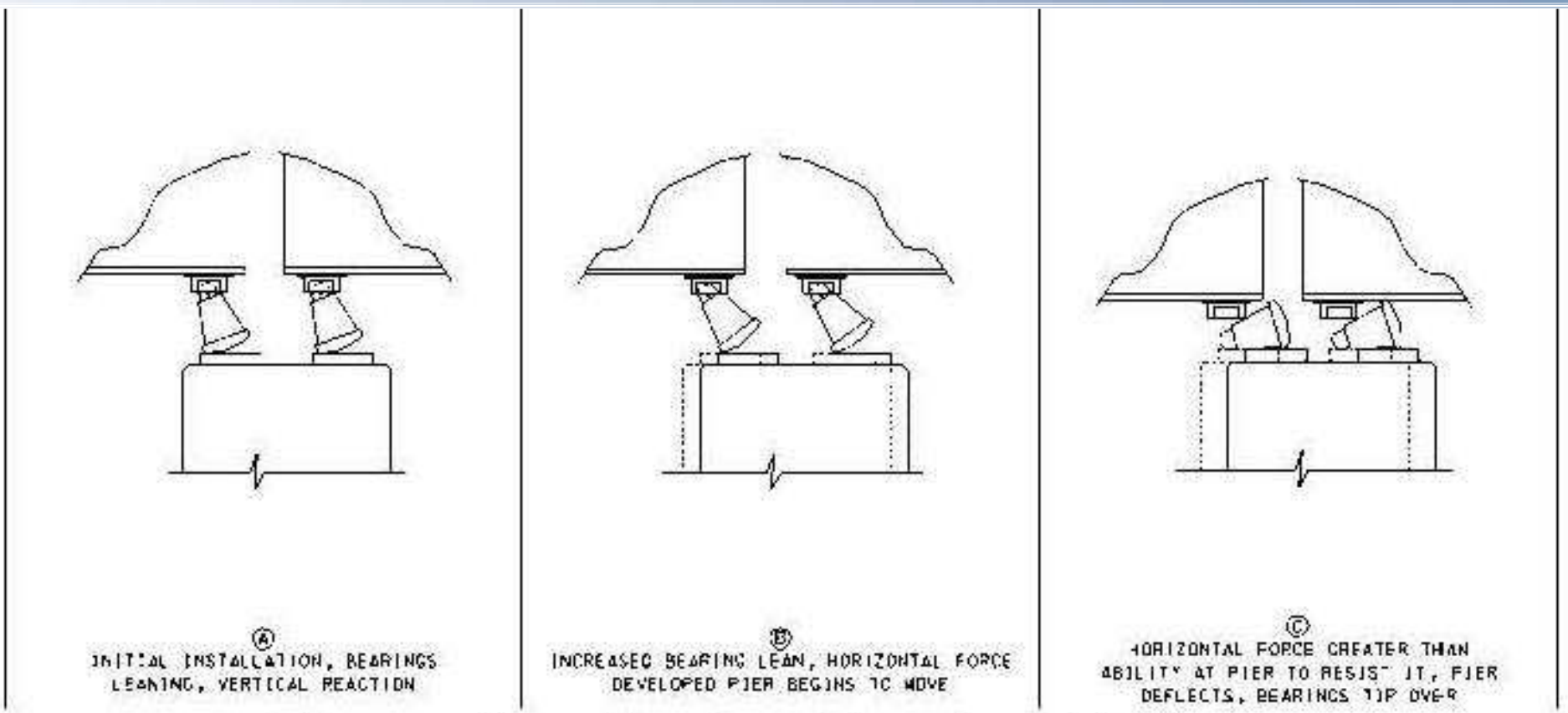

Figure 2 – Rocker Bearing Failure

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Source: PennDOT

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Rocker Bearing Failure

Contributing Factors

- Corrosion (pack rust) below rocker or pivot point
- Section Loss, Debris
- Abnormal Behavior
  - Contracted position in warm weather, Expanded in cold
- Misalignment, Ratcheting
- Substructure Movement

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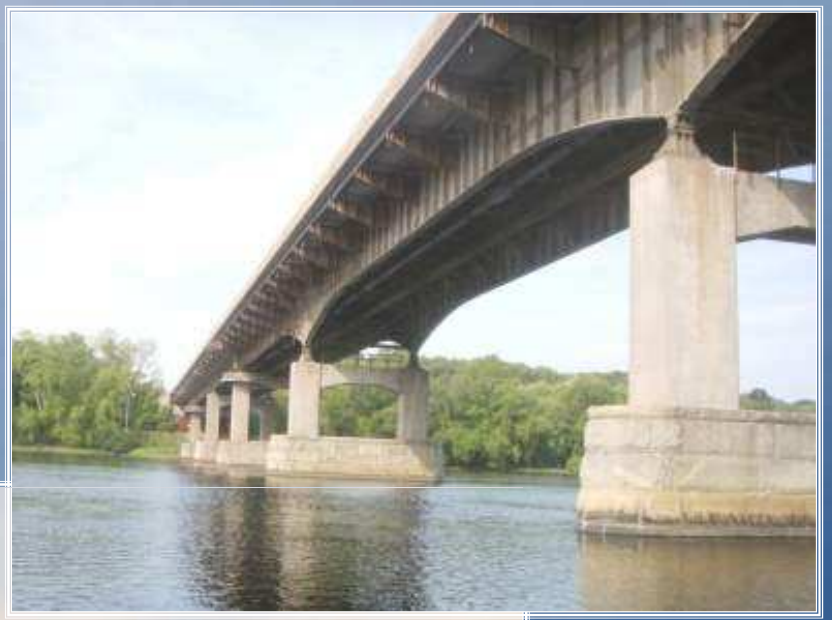
Suffield Bridge, CT (Route 190)

Consists of 9 spans over Connecticut River & Amtrak
ADT = 26,200
Length = 1,345ft
Deck Area = 80,344sf



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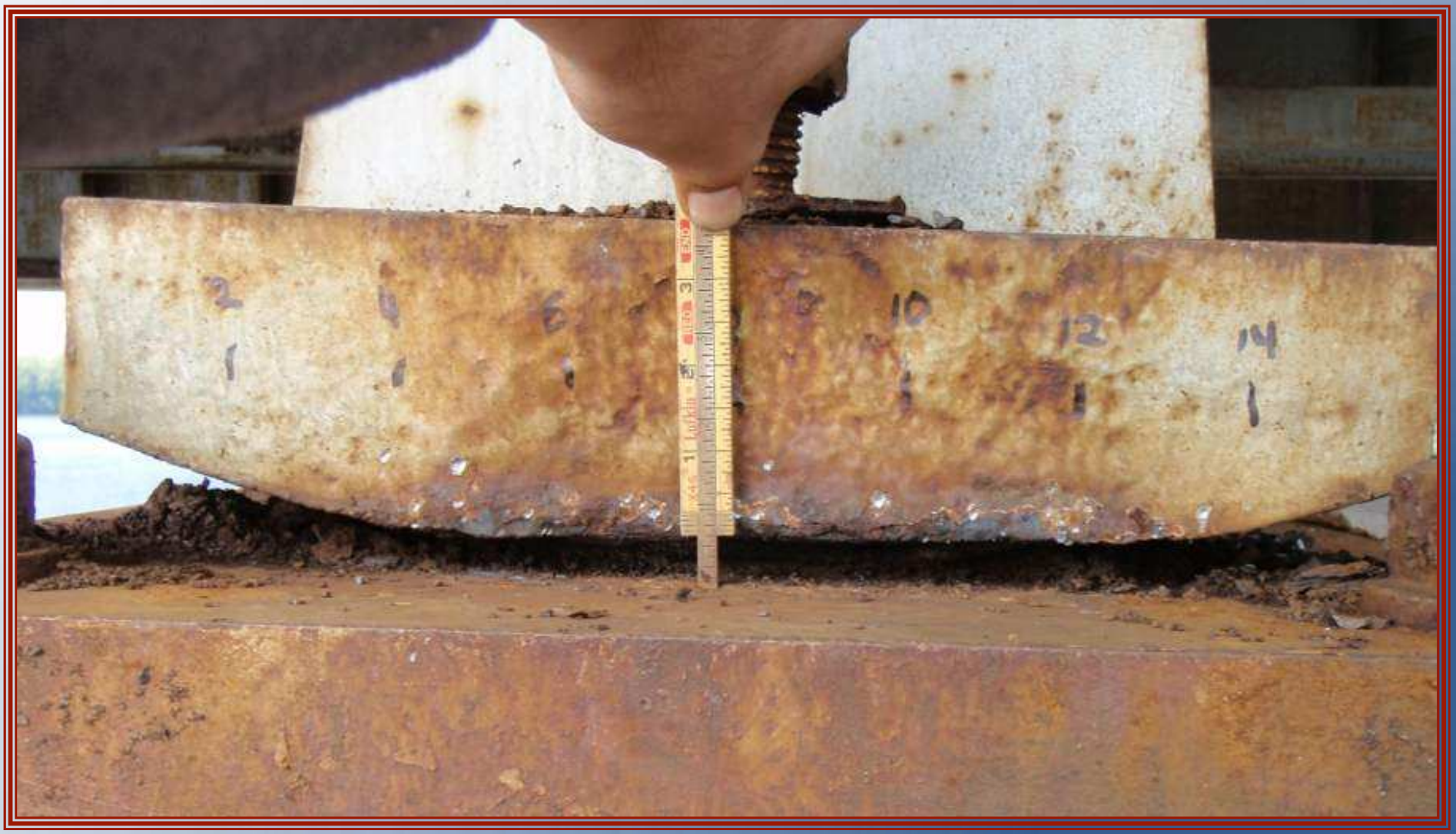
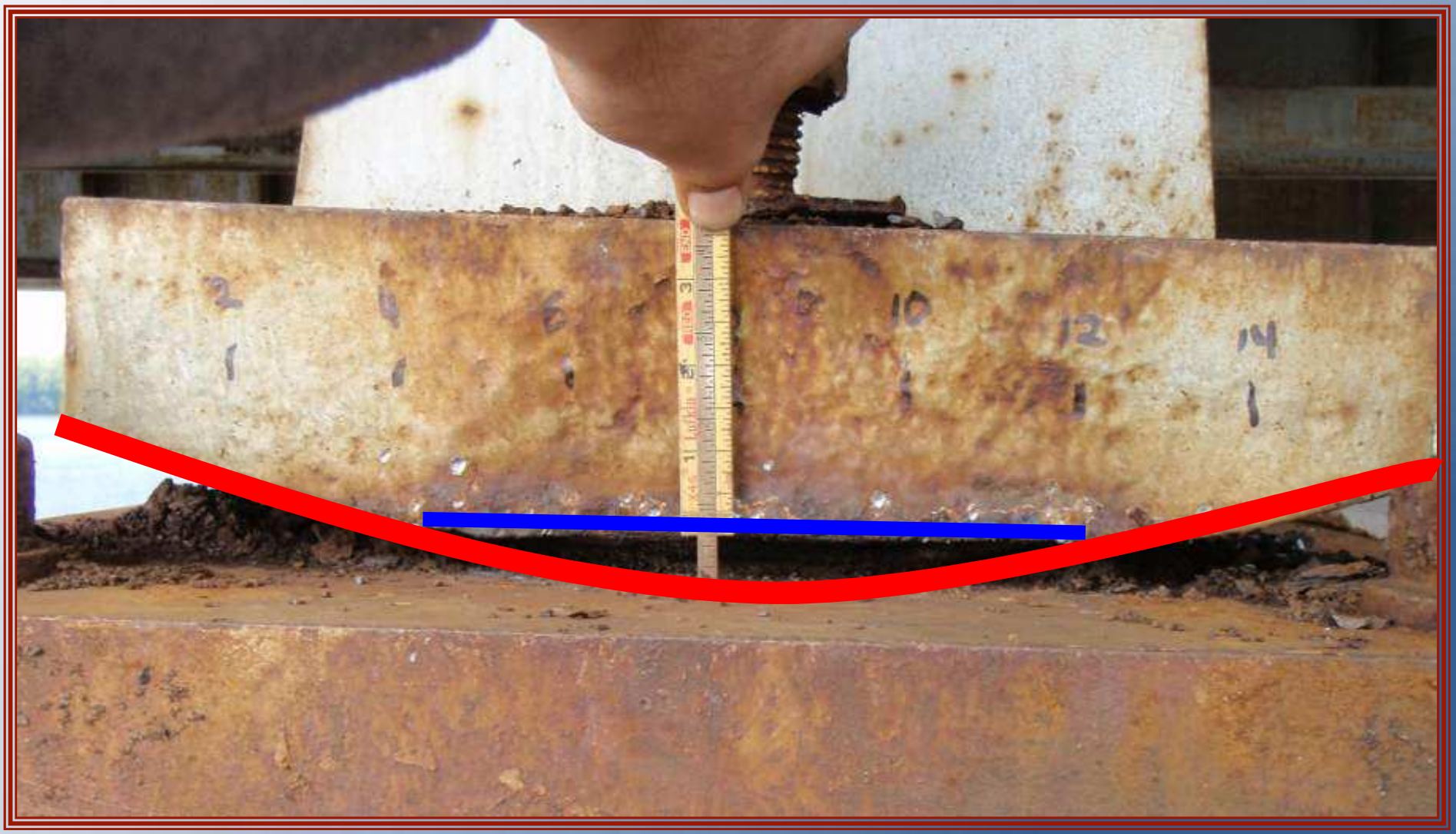
Suffield Bridge, CT (Route 190)



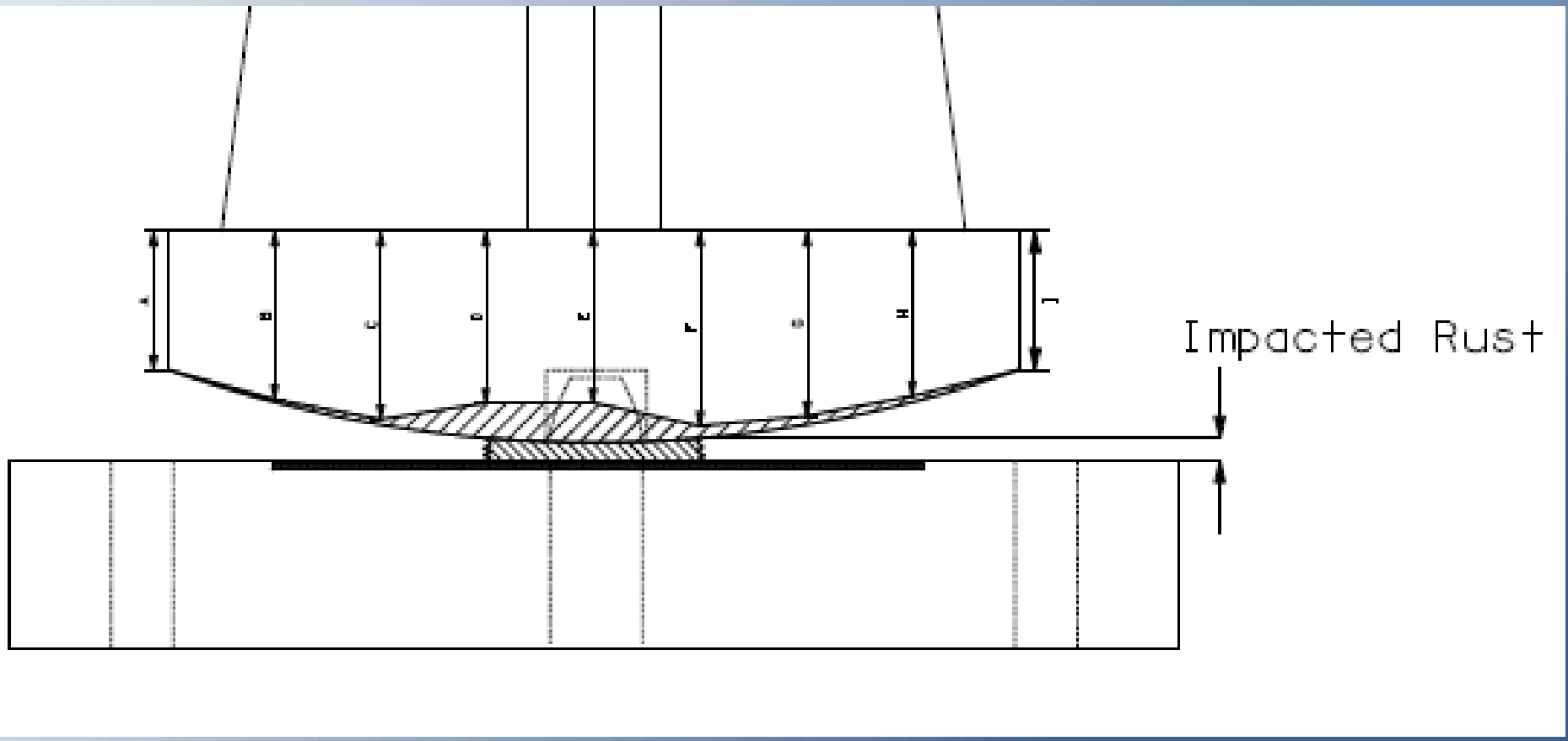
Pack Rust – Displacements

Suffield Bridge, CT (Route 190)



Flattened Rockers – Inhibited Movement

Suffield Bridge, CT (Route 190)



Documentation – Section Loss & Pack Rust

Suffield Bridge, CT (Route 190)

Impacts:

Pack Rust - Displacements

- Deferential Displacement
- Racking Floorbeams
- Pintles exposed
- Potential for walking

Flattened Rockers – Inhibited Movement

- Increased stresses on girders
- Lateral loading on substructures

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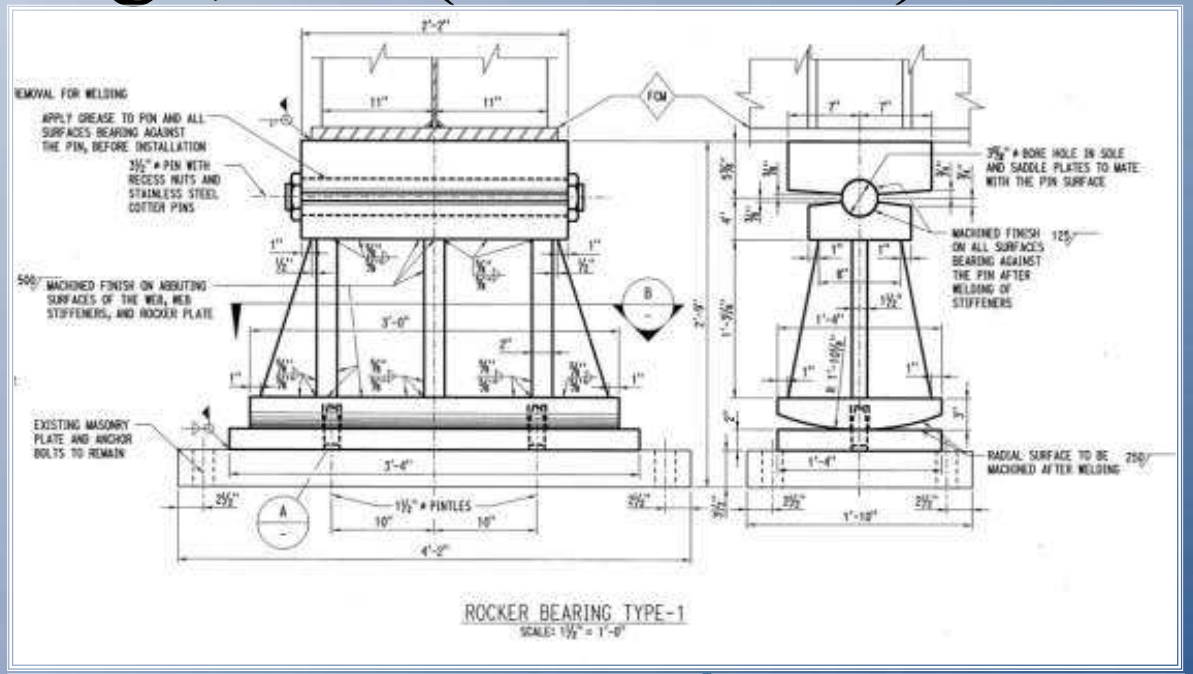
Suffield Bridge, CT (Route 190)

Replacement Recommended

- New Expansion Bearings
  - designed by ConnDOT
  - On-site
- Replacement
  - October 2010



Suffield Bridge

Gold Star

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Gold Star Bridge, CT (Interstate - 95)

Vital Infrastructure Link

Largest Complex Bridge in CT

- ADT = 120,000 +
- Length = 6000ft
- Deck Area = 1,000,000sf
- Main Span: L = 540ft
- 140' Vertical Clearance

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Gold Star Bridge, CT (Interstate - 95)

Frozen Rocker Bearings

Pack Rust

- Bearing Pin / Gusset Plate Interface

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Gold Star Bridge, CT (Interstate - 95)

Impacts:

Seized Rocker Pin

– No Movement

- Increased stresses - Truss members
- Lateral loading on substructures

Excessive Wear

– Pin / Gusset Interface

- Non-uniform gaps and contact area.

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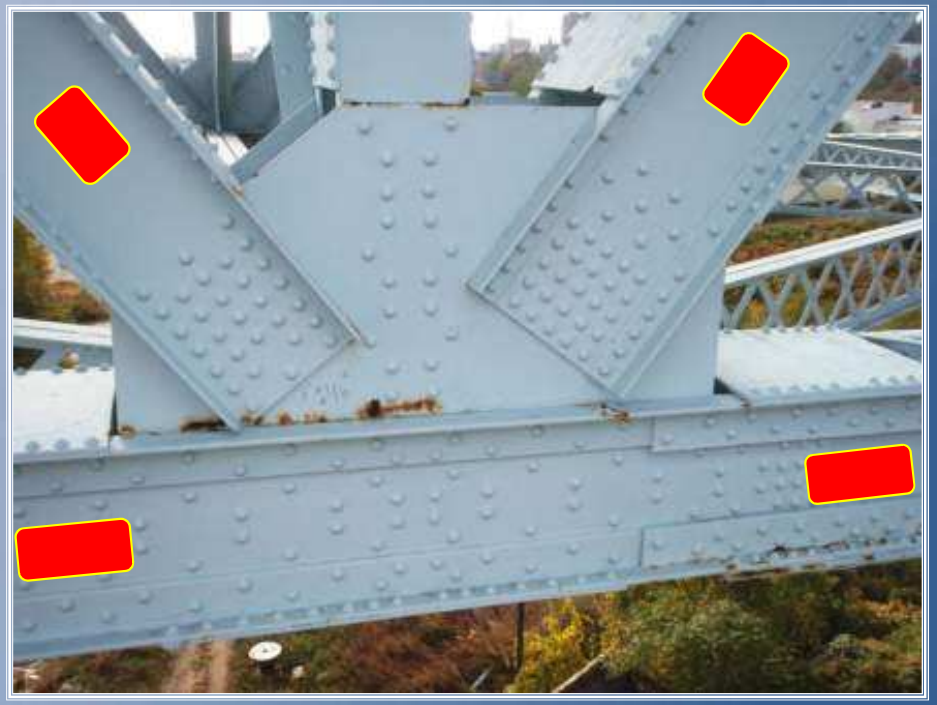
Gold Star Bridge, CT (Interstate - 95)

Replacement Recommended

Intermediate Steps:

Determine the urgency of replacement:

- Instrumentation of Truss Members
- Quantify Induced Stresses
- Scheduling Bearing Replacement



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? QUESTIONS ?

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