



Jefferson Avenue Footbridge



Jefferson Avenue Footbridge



AGENDA:

- Call to Order / Welcome
 - Introduction of Topic
 - Opening Comments – Phyllis Ferguson, Zone I
- Overview of the issue – Dan Smith, Public Works Director
- Structural Evaluation Presentation – Spencer Jones, GRE
 - Q&A & Public Comment

Dan Smith, P.E.
Director Springfield Public Works



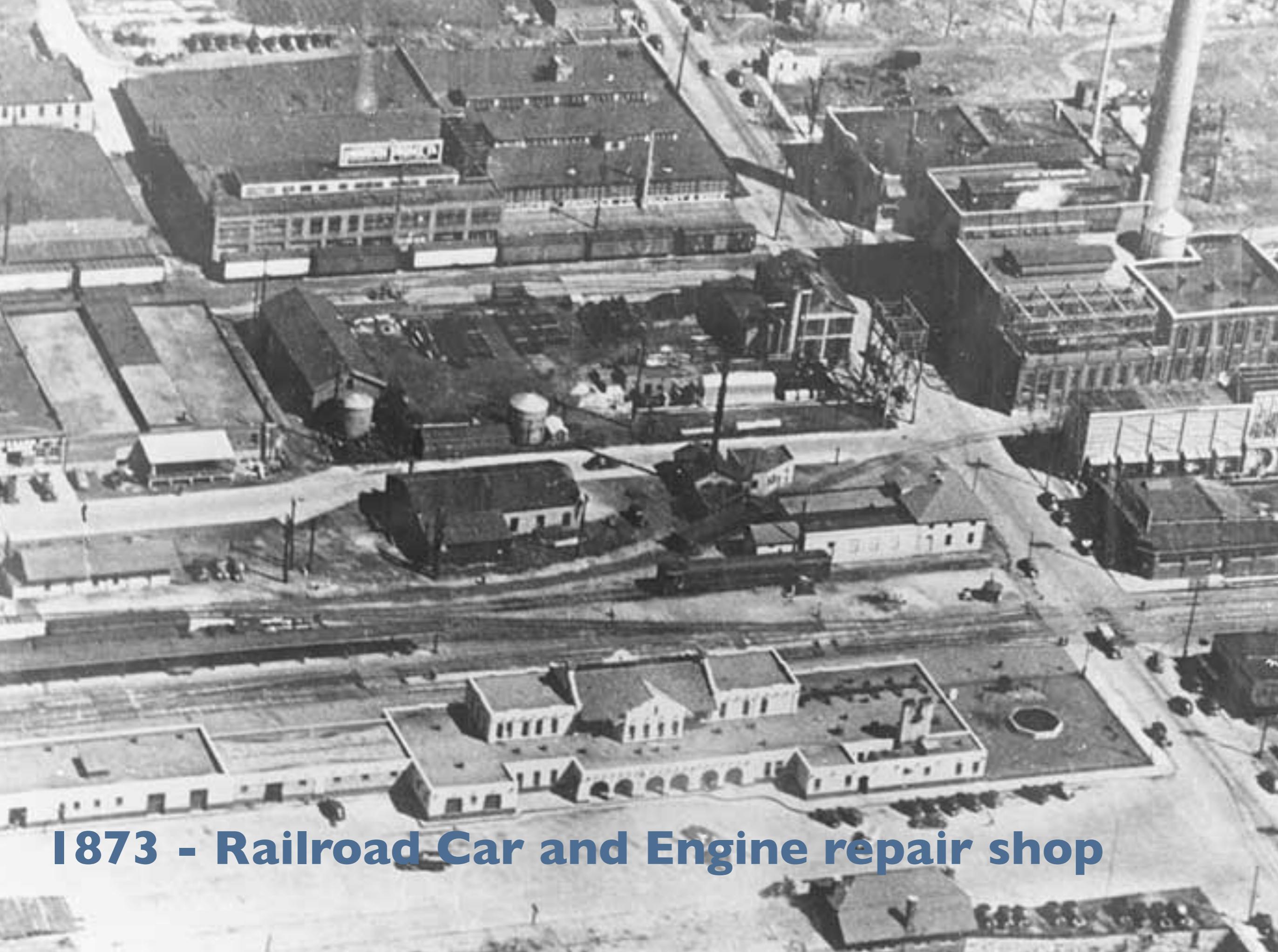
Jefferson Avenue Footbridge

Spencer Jones, P.E.
Great River Engineering

1870



The first Engine into Springfield.



1873 - Railroad Car and Engine repair shop

**1901?- Railroad major employer/
Threatens to move headquarters**

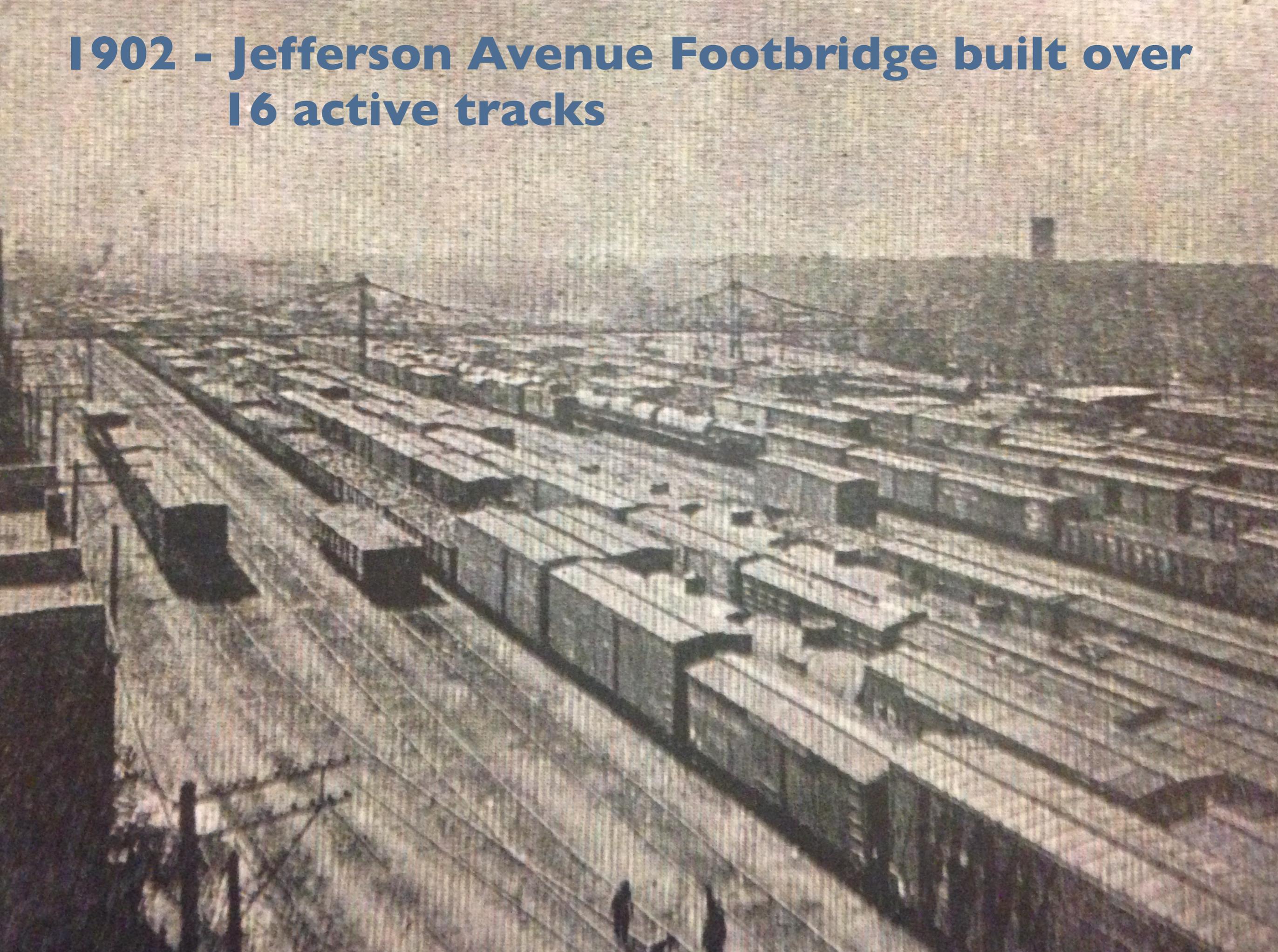


COMMERCIAL ST., SPRINGFIELD MO.

1902 - Underpass built at Lyon and Washington Avenue



**1902 - Jefferson Avenue Footbridge built over
16 active tracks**







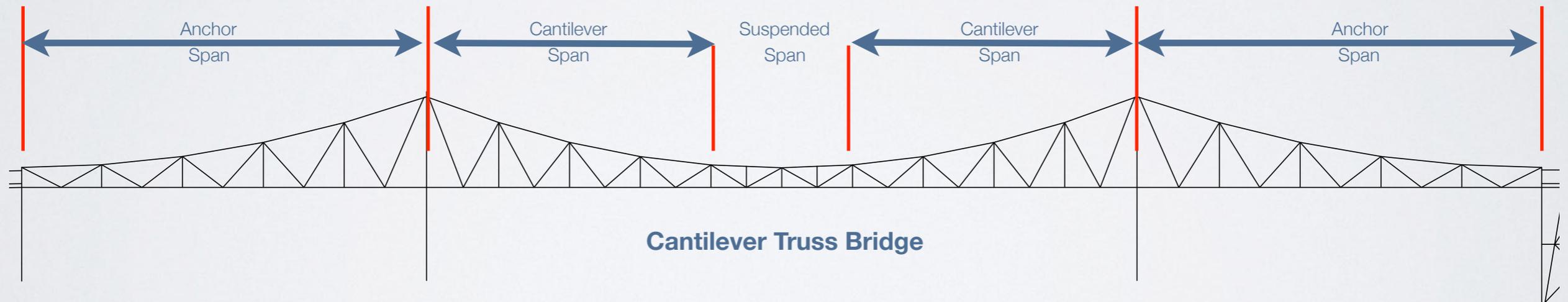
History

- Built in 1902
- Cantilever Through Truss Footbridge
- Length: 562 feet
- Width: 6 feet
- Towers: 45.5 feet (track-top)
- Bridge Rehabilitation in 2002.
- Placed on the National Register of Historic Places in 2003.

History

Engineering Significance

- First use of cantilever construction for bridge in US was 1877 (Kentucky).
- Jefferson Ave. Footbridge first cantilever bridge built in Missouri (1902).



History

Engineering Significance

- Innovative design to construct bridge with minimal impact to RR service.



Construction of Cantilever Arm

Source: Transactions of the American Society of Civil Engineers
Volume 73, 1911. Digitized By Internet Archive

- Constructed from readily available materials which are lightweight and able to be handled by workers.
- Floorbeam that support the timber deck are constructed of railroad track pieces.



Field Inspection

- Measure:
 - Dimensions
 - Corrosion of the steel
 - Alignment
 - Deformation
- Hands reach of all members
- Length inspected 6,658 feet







ORE
Jefferson Avenue Footbridge
Bridge Inspection Form
Revision 2/2015

WORKER INFORMATION
Name: _____
Title: _____
Company: _____

INSPECTION
Date: _____
Time: _____
Weather: _____

LOADING CONDITION
1. Presence of material on the bridge deck: _____
2. Presence of material on the bridge structure: _____
3. Presence of material on the bridge approach: _____

REMARKS
1. _____
2. _____
3. _____

LOADING CONDITION
1. Presence of material on the bridge deck: _____
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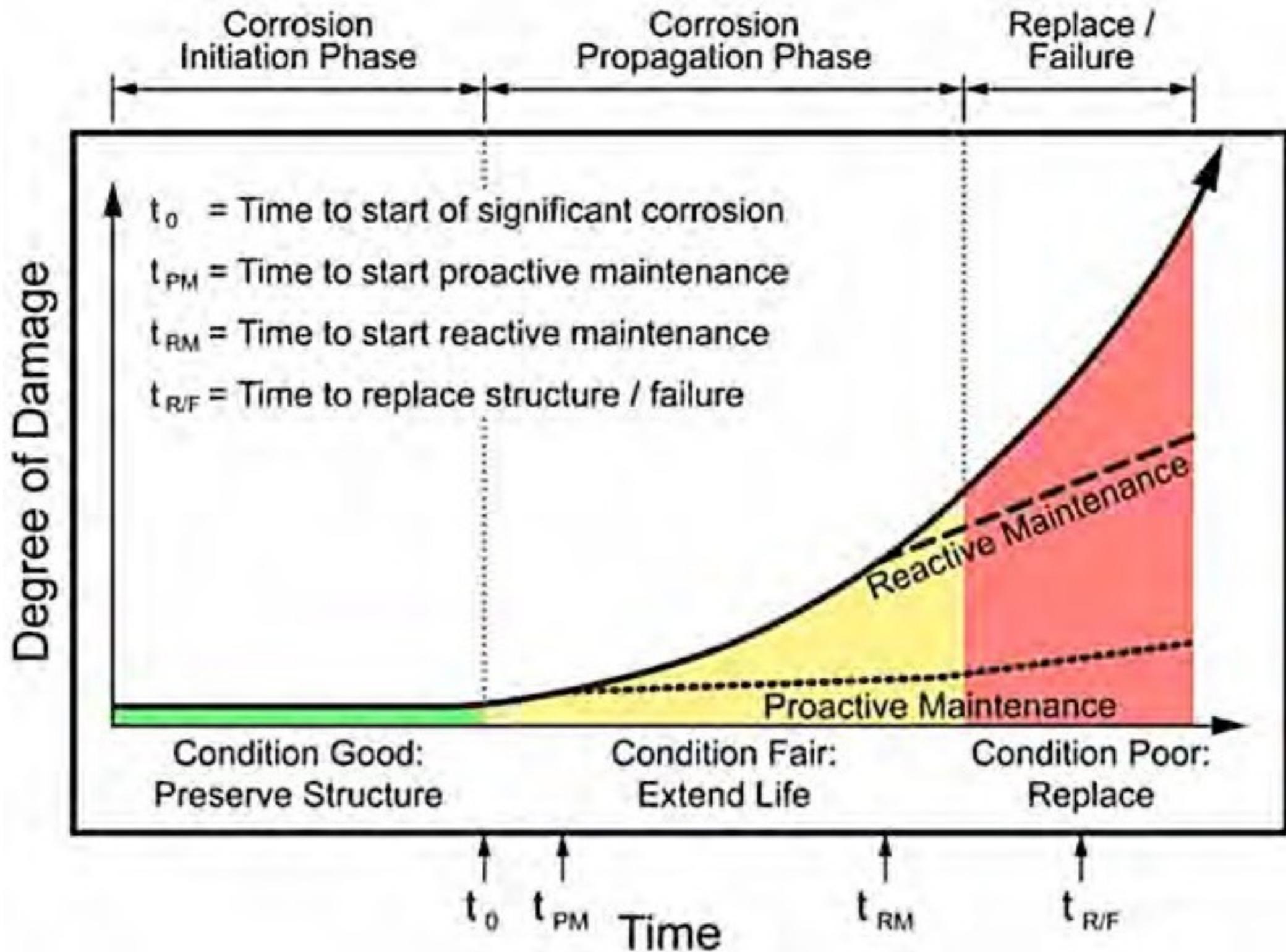
REMARKS
1. _____
2. _____
3. _____

INSTRUCTIONS
Start Engine
Operate Functions
Stop

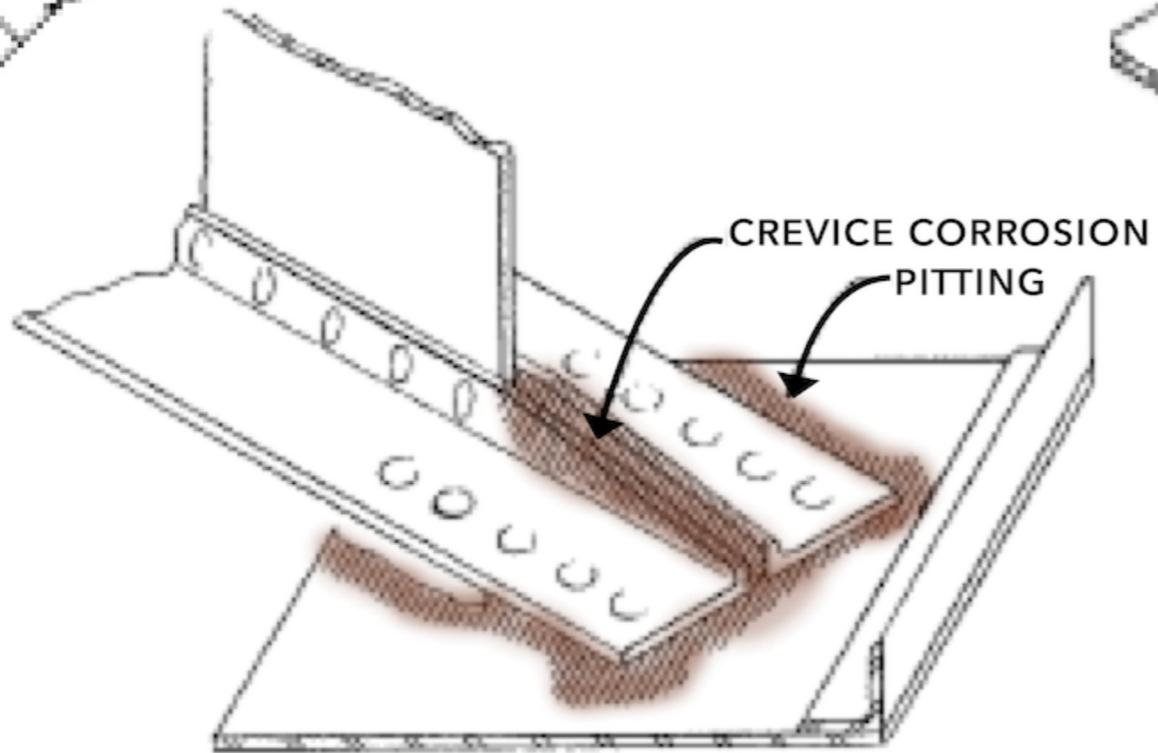
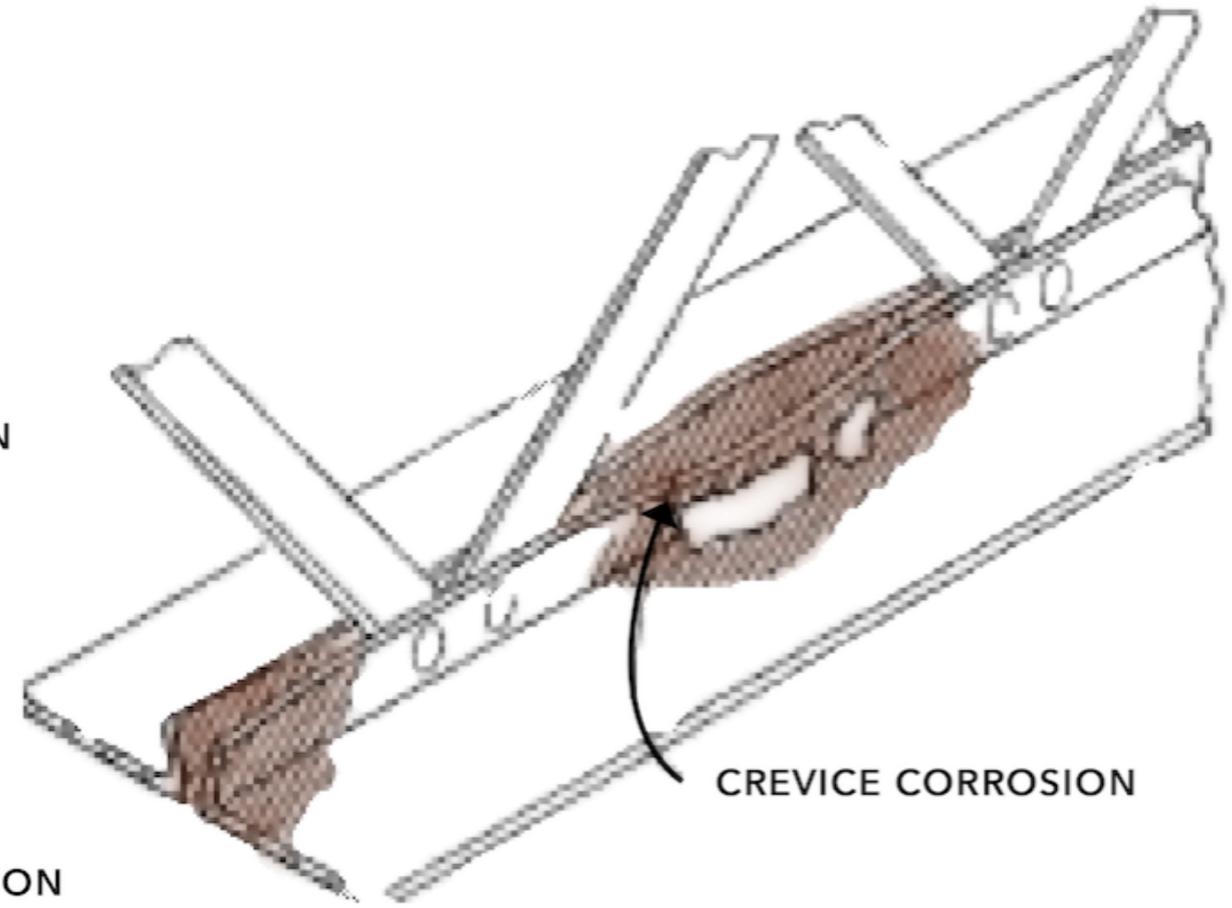
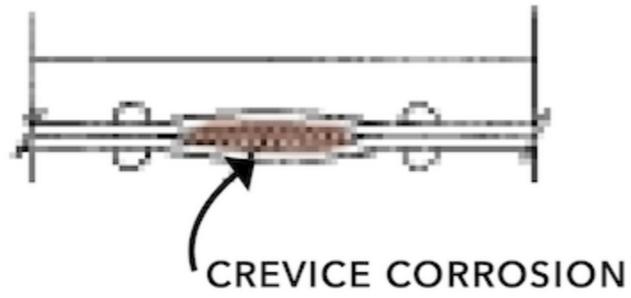
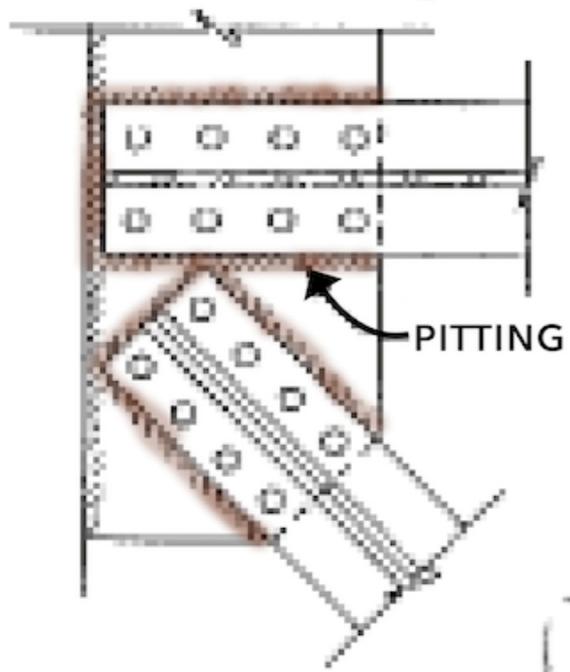
HUSKY

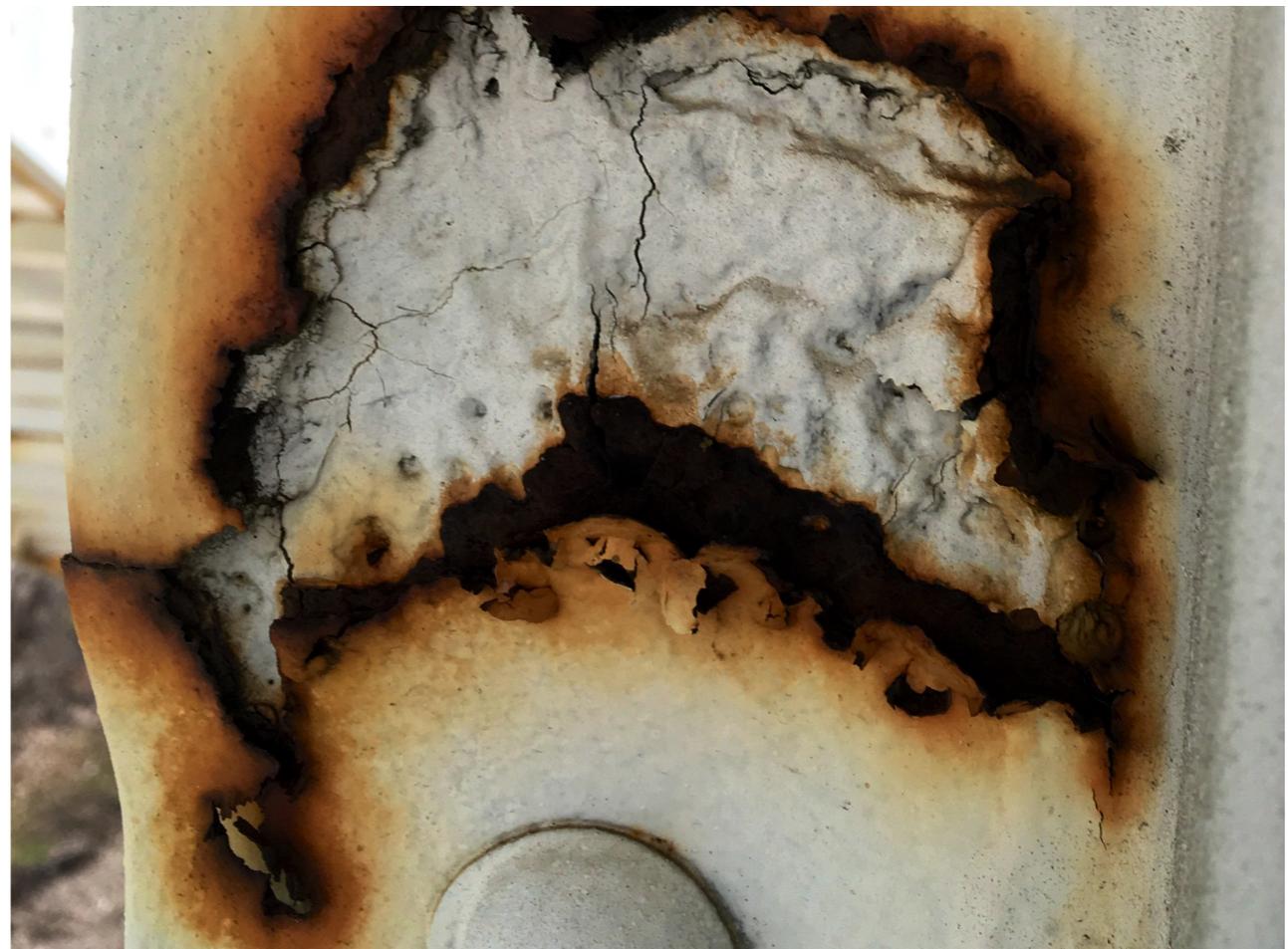


Corrosion



Corrosion

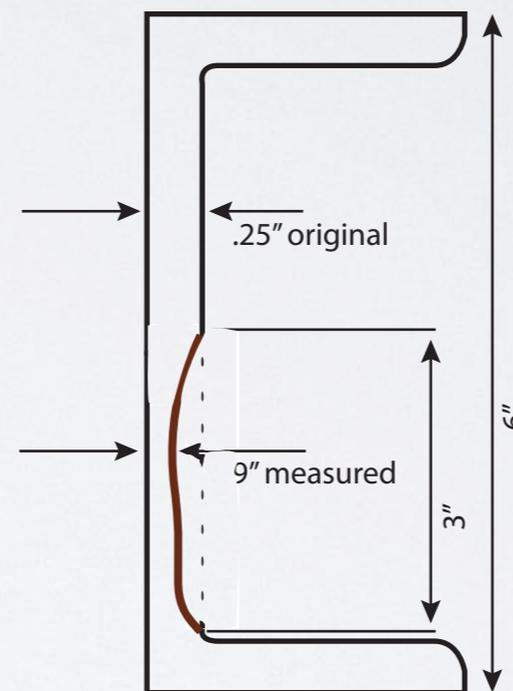




Corrosion

- Reduces structural properties
- Section Loss of Truss Members

Section Loss	Number of Members
50%	1
40-49%	6
30-39%	16
20-29%	44
10-19%	66
10%	117



$$\% \text{ loss} = 3/6 \times .06/.25 \times 100 = 12\%$$

Enter 12% under depth. (Area loss)

Structural Evaluation



- **Current Design Code**

Pedestrian Live Load = 90 psf

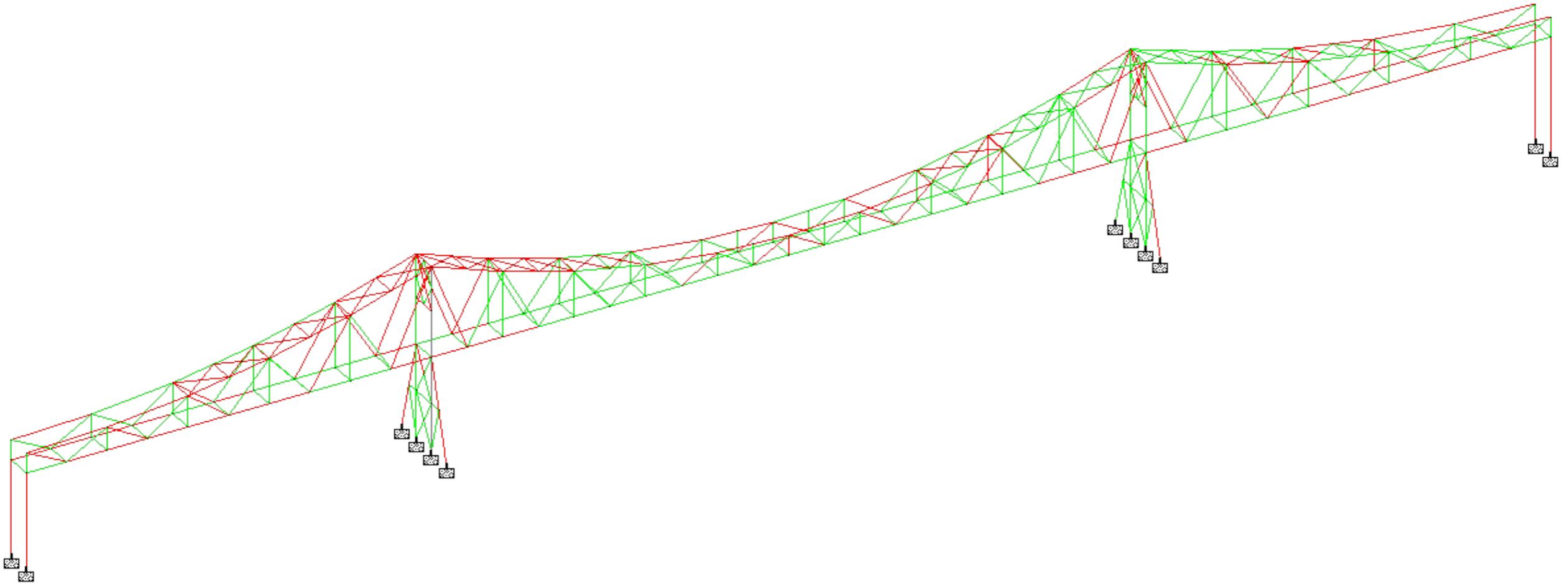
- **Rating Factor (RF)**

$$\frac{\text{Capacity of Member}}{\text{Maximum Load}} = \text{RF}$$

- RF less than 1.0 member fails

Rating Factor	Number of Members
Greater than 1.0	159
0.90-0.99	35
0.76-0.89	36
0.41-0.74	20

Truss Members without Capacity

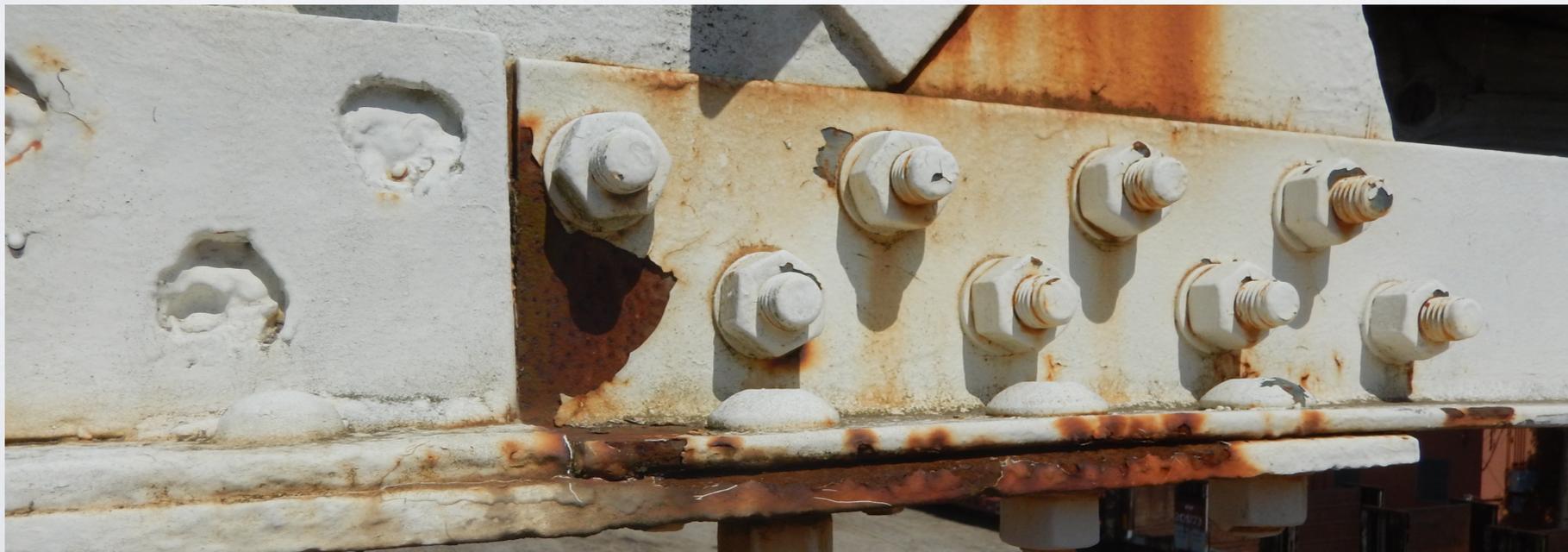


Fracture Critical Members



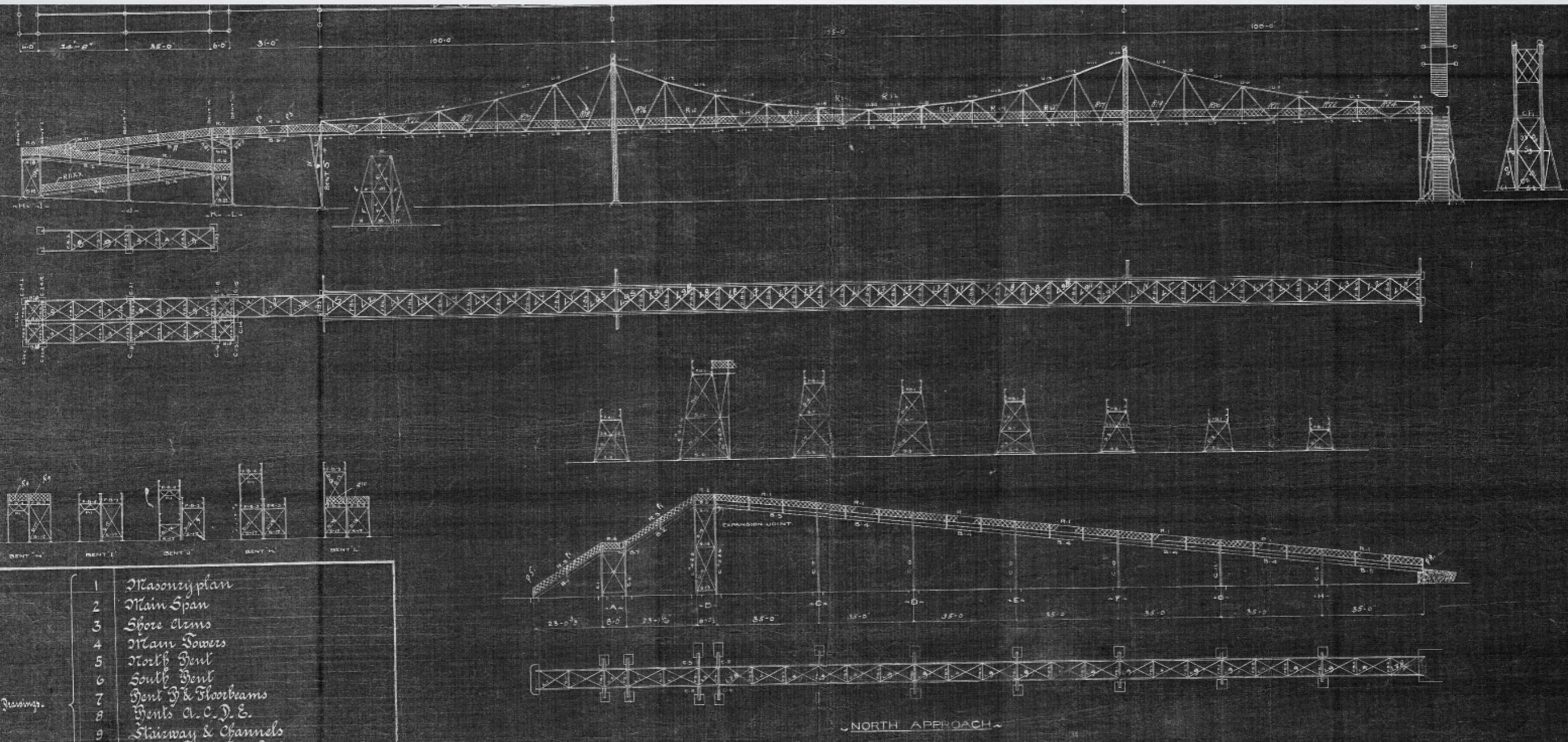
Results of Evaluation

- Truss & Towers: 1 out of every 3 members need repaired or strengthened (36.4%)
- South Approach: 6 of 10 vertical columns need strengthened
- Stairs (North & South): Both need replaced
- Paint: Paint system failing in numerous locations - new paint needed
- Bridge has 3 coats of paint (lower 2 coats contain lead based paint)



Ramps and ADA Compliance

(can mimic the original construction - ramps were removed in 1954)



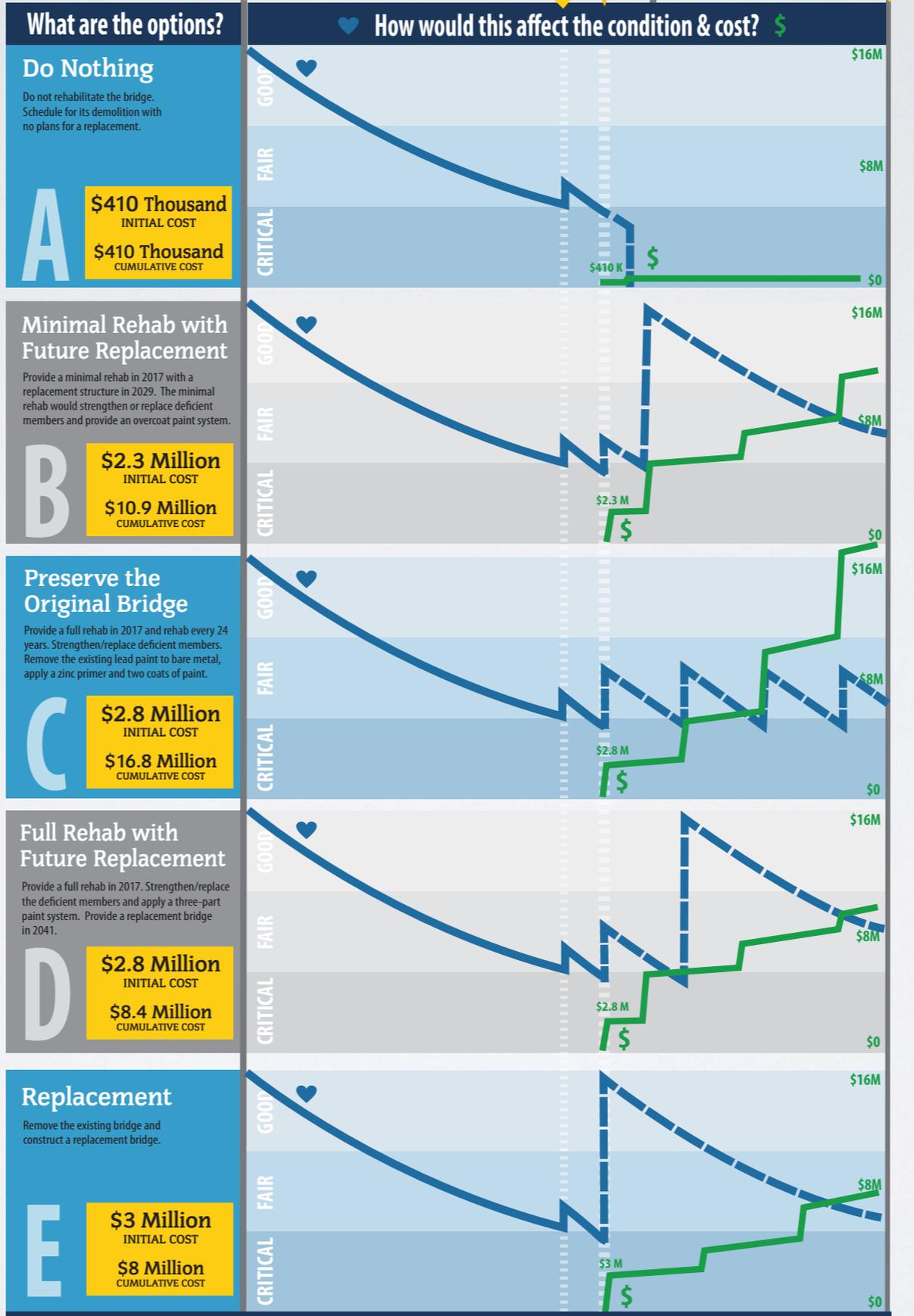
Options

Project Cost

- **Do Nothing** \$414,154
Removal of the bridge.
- **Minimal Rehabilitation** \$2,299,500
Strengthen members by replacing or add plates to existing members and paint over existing.
- **Preserve Original Bridge** \$2,784,300
Replace existing members with new members, remove existing paint to bare metal and apply 3-coat paint system.
- **Replacement Bridge** \$2,997,300
Construct a replacement bridge with similar characteristics of existing bridge.

JEFFERSON AVENUE FOOTBRIDGE

Rehabilitation & Life-cycle Options





Questions and Public Comment



THANK YOU!

For more information, visit springfieldmo.gov/footbridge

2nd Opportunity for public input:

OPEN HOUSE

Thursday, Nov. 17 | 4-6 p.m.
White River Brewing Company