West Jefferson Bascule Bridge
REHABILITATION AFTER A SHIP COLLISION

AASHTO SCOBS MEETING – June 28, 2016
West Jefferson Bascule Bridge

- History and Background
- Objectives of Project
- Field Investigations
- Field Findings
- Design Phase
- Bidding and Construction
- Questions
West Jefferson Bascule Bridge circa 1882
West Jefferson Bascule Bridge circa 2013
CURRENT BRIDGE FACTS

- Built in 1922
- Chicago Style Single Trunnion Double Leaf Bascule Bridge
- Owned and Operated by Wayne County
- Only Surviving Pony Truss Bascule in Michigan
- National Registry of Historic Places under Criteria C – Significant to Early 20th Century Engineering
- Lots of Aesthetic Detail Including Stone Abutments and Control Houses
1938 – New Deck Replaced Original Timber Deck and Street Car Rails
1949 – Extensive Electrical Rehabilitation
1980 – Major Rehabilitation Work
  - Stringer Replacement
  - Repairs to Floorbeams
  - Repairs to Lateral Bracing and Various other Members
  - Machinery Repairs, Reconditioning of the Racks
  - Cover Installation over the Racks
  - New Motors, New Brakes,
  - New Wiring
SHIP ALLISION

- 12K Ton Vessel Traveling West Collided with North Leaf on May 12, 2013
- Bridge was Inoperable after Collision
- Wayne County Immediately Stabilized Bridge to Allow Passage of River Traffic using Exterior Cables and Interior Struts connected to the Pit Walls.

View of the damaged Jefferson Avenue Bridge from the pilothouse of the *Herbert C. Jackson*. (Photo by the Coast Guard)
North Leaf - Looking South
Objectives of Project

- Rehabilitation to Achieve Bridge Operation
- Preserve Historical Significance of the Bridge
Field Investigation

- Arms Reach Structural Visual Inspection
- Underwater Inspection of Counterweight Pit Walls
- Visual Inspection of Machinery and Electrical
- NDT Testing of Trunnions, Pinion Shafts, and Anchor Rods
- LIDAR Survey of Entire Bridge
- Trunnion Machinery Laser Scan Survey
- Anchor Column Structural Section Loss Inspection
West Jefferson Bascule Bridge

LIDAR Survey
West Jefferson Bascule Bridge

- Bascule Bridge Basics
Field Findings

- Structural Damage of the Superstructure
- Leaf Racked out of Alignment
- Trunnion Bolts Sheared Off
- Northeast Longitudinal and Machinery Girders Moved
- Cracking of the River Wall
- Damaged Center Lock Machinery
West Jefferson Bascule Bridge

- Structural Damage of the Superstructure
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- Leaf Racked out of Alignment
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- Trunnion Bolts Sheared Off
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- Northeast Longitudinal and Machinery Girder Moved Forward
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- Cracking of River Wall
Design Phase

- Damaged Structural Members Replaced in Kind
- Jacking and Repositioning of the Leaf
- Realignment and Re-anchoring of Longitudinal and Machinery Girders
- Temporary Operation of Leaf for Alignment Check
- Realignment of Leaf
Damaged Structural Members Replaced in Kind.
West Jefferson Bascule Bridge

- Damaged Structural Members Replaced in Kind.
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- Jacking and Repositioning of the Leaf

Suggested Vertical & Horizontal Bridge Span Jacking System Elevation
West Jefferson Bascule Bridge

- Shoring and Repositioning of the Leaf – Cont’d
West Jefferson Bascule Bridge

- Shoring and Repositioning of the Leaf – Cont’d
West Jefferson Bascule Bridge

- Shoring and Repositioning of the Leaf – Cont’d
West Jefferson Bascule Bridge

- Realignment and Reanchoring of Longitudinal and Machinery Girders
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- Temporary Operation of Leaf for Alignment Check
West Jefferson Bascule Bridge

- Realignment of Leaf
  - Trunnion Collinearity Checked using Piano Wire System
  - Leaf Squareness Checked using Survey
Bidding and Construction

- Engineering’s Probable Cost - $16,717,096
- Low Bidder - $17,008,889
- Second Lowest Bidder - $18,984,656.94
- Construction Started – 8/12/15
- Current Progress:
  - 87% Complete
- Scheduled for Reopening
  - August 12, 2016
Construction Photos
Construction Photos