The Jeremiah Morrow Bridge
Jeremiah Morrow Bridge Tallest Bridge In Ohio
• Built in 1964/65
• Built by Bethlehem Steel
• Type: Steel Deck Truss
• Cost: $5,000,000
Reasons for Replacement

- Need for new deck and parapets
- Deficient shoulder width
- Steel truss need paint & Modified
- Load restrictions of 80,000 lbs
- Difficult to be upgraded
ALTERNATE A

- Steel Composite Multi-Girders with 325 foot main span

- Spans vary between 200’-325’
- Smallest main span considered
- 2225 feet structure
- 132” Constant Depth, 11’
ALTERNATE B

- Steel Composite Multi Girders with 425 foot main span
- Spans vary between 200’-425’
- 2225 feet structure
- Constant Depth, Vary between 13’ – 10’ (156” - 120’)
- Haunched Girders avoided to allow for potential launching
ALTERNATE C

• King Post under deck with 425 foot main span

• 175 foot span followed by 4 identical 425 foot spans, a 200 foot and finally a 150 ft span
• Arrangement eliminates foundation interference with the existing
• Resembles an inverted cable stay bridge
• Aesthetically pleasant scale of span length to valley depth
• Extradosed with a 550 foot main span

• Cable-stayed was considered but the towers would be tall
• The extradosed concept consists of a short pylon with relatively flat cables
• Heavier superstructure, concrete precast segmental or steel framing
• Concrete Box Girder with a 450 foot main span

• Post-tensioned concrete box girder with spans of 265, 450, 450, 450, 400, and 210 feet
• 55 feet wide roadway is supported by one cell single box girder
• Depth varies between 27 feet at the piers and 12 feet at midspan
• Spans dictated by 10 ft segment lengths and balanced cantilever construction
• Total length 2240 ft
• 6 Spans 270 - 440 - 440 - 440 - 416 - 229 ft
• Pier height from 60 to 220 ft
• Piers 1-4 integral, Pier 5 on bearings
• Variable Girder Depth
• Single Cell, Single Box
• 55 feet deck width, with 12’- 6” overhang
• Typical Web thickness 1’- 6”

• Bottom Slab Thickness varies from 9 ½” at mid span to 3’ - 8” at Pier Table
• Large thickness at Pier Table based on strength and creep deflection
• Girder has variable depth
• Girder depth is 25 ft deep at pier and 12 ft at mid-span
• Typical Segment length is 16 ft
• Pier Table length is 40 ft
• Box Haunch function is considered carefully
Pier 1

Pier 2 – Tallest one

- Large variation of surface condition and rock profile
- 8’ dia drilled shaft and steel piles
- 65’ twin wall & concrete box shaft
- Pier 5 – Shortest with twin wall only
- Pier 2 – Tallest at 220’ height

Pier 5
Design and Analysis Features

Design Standard and Specifications:
- AASHTO Standard Specification 17 Edition
- AASHTO Guide Specifications for Design And Construction of Segmental Concrete Bridges
- Creep and Shrinkage (CEB-FIP 1990)

Analyses Tools used:
- AASHTO Standard Specification 17 Edition
- In-house computer program T-187
  - Global Model
  - Local transverse box model
- Larsa 4D for rating tool influence surface and special designs
- Homberg Charts
- Strut & Tie for many general zone features
• Cast-in-Place Segmental Structure
• Post Tensioned
• Balanced Cantilever Construction
• 100 year Service Life
• Lower Life Cycle Cost
• Higher Sustainability
• Low Construction Cost
• Aesthetics Appearance
• Minimize Environmental Impact
Project Team

- Project award: $88,133,160
- Start: June 26, 2010
- Completion: Spring, 2017