Milton Madison Bridge: Construction of a Vital River Crossing in Kentucky

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Connecting Two Historic Towns

**Madison, Indiana**
- Largest National Historic Landmark District with 1,800+ buildings
  - Clifty Falls State Park & other tourist attractions, including Madison Regatta
  - Population 12,600

**Milton, Kentucky**
- Historic river town susceptible to flooding
  - Rural community divided by 400 ft tall bluff
  - Population 600
The Challenge

Existing Bridge

- 80+ year old bridge
- Sufficiency Rating of 6.5
- Remaining life <10 years

- 2009 Posted 15 Tons
- 2011 Posted 3 Tons

Functionally Obsolete

Structurally Deficient
Bridge Alternatives

- Do Nothing
- Rehabilitation
- Bridge Replacement
- **Superstructure Replacement**
  - Potential game changer
  - Lower costs
  - Less impacts to the historic district
  - But is it Feasible?
Pier Testing and Inspection

- Vertical Coring  *(Jan-Feb 09)*
- Physical Inspection Feb-Mar09
  - NDT, Lab Testing of Samples
  - Condition/Service life
- Results, Generally good
  - Some durability concerns
Keys to Success

- Superstructure Replacement
  - Saved cost and time
  - No R.O.W. Required
- Innovative Procurement
  - Minimized Closure
- Unique Construction methods
  - Reduced costs and schedule
Superstructure Replacement with Minimal Approaches

- Milton Approach Re-construction
- STR 1 Replace KY Approaches
- STR 2 Truss Replacement
  - Pier Strengthening And Scour Mitigation
  - Superstructure Replacement
- STR 3 – Replace IN Approaches
- STR 4 – Pedestrian Access To Park

No Right-of-Way required
Selected Alternative

Existing Bridge

Proposed Bridge
Typical Section

- Existing Bridge is 20 ft curb to curb
- 5 ft pedestrian walkway
Strengthen existing piers

Build a new truss on downstream piers while the existing bridge remains open to traffic

Build temp. ramps to existing bridge allowing construction of perm. approaches

Switch traffic onto new structure in temp. location

Remove old truss and slide the new truss onto the strengthened existing piers
Pier Strengthening

1. Drill holes into ex. caisson
2. Grout Rebar into Caisson
3. Add Stem Reinforcement
4. 2' thick encapsulation
5. Pier Cap Reinforcement
6. Cast new Pier cap
7. Scour Countermeasure

Existing Pier and Caisson

SECTION A-A
Pier Strengthening
- **Span 3 Lift**
  - ~727 ft Section
  - 1900 Ton lift
  - **24 hr River Closure**
  - 8 – 360T VSL jacks
  - 22” Stroke
  - 2.5 Safety Factor
Spans 1 & 4 – Stick Build
Topping Out!
Milton Approach
Madison Temporary Ramp

Courtesy Debbie Crawford
Madison Approach
Concrete Truss Deck
Maintenance of Traffic
Sliding Girders
Sliding Girder Pedestal
Unique Aspect of MMBP

- Nesting pair of Peregrine Falcons
- KDFWR “Cooperator of the Year Award”
Working on the Ohio River

River Flooding

Record Rainfall

152 Total Flood Days
Working on the Ohio River

PIRATES! Arrrrrrrgrggggggg!