ABC Techniques – Case Studies

• Prefabricated Steel Trusses:
  *Dutchess County Rail Trail over Route 55 – Dutchess County, NY*

• Precast Concrete Deck Panels:
  *Hutchinson River Parkway over Route 1 – Westchester County, NY*
Prefabicated Steel Trusses

Dutchess County Rail Trail over Route 55
Prefabricated Steel Trusses

Outline

- Project Location and Scope
- Why Prefabricated Trusses?
- Lessons Learned:
  - Design & Fabrication Details
  - Communication & Coordination
Dutchess County Rail Trail
Dutchess County Rail Trail

- 11.8 Miles of Multi-Use Trail
- 5 New Bridges
- 15 Bridge and Culvert Rehabilitations
Dutchess County Rail Trail over Route 55

- 4 Span Bridge
- Approximately 745 ft Long
- 200 ft Long Prefabricated Steel Truss
Dutchess County Rail Trail over Route 55

- 12 ft Trail Width
- 9 ft Clear Height Inside Truss
- Design Load = 90psf Pedestrian Load & H15 Truck
Prefabricated Steel Trusses

Outline

- Project Location and Scope
- Why Prefabricated Trusses?
- Lessons Learned:
  - Design & Fabrication Details
  - Communication & Coordination
Why Prefabricated Trusses?

- Cost
- Aesthetics
- Geometric Constraints
- Work Zone Traffic Control
Geometric Constraints:
Geometric Constraints:

- Proximity of Turning Lane
- Fixed Object Hazard
- Long Term Lane Closures
Work Zone Traffic Control:

- Strict WZTC Requirements
- Reduced Lane Closure
- ABC Technique to Satisfy WZTC
Truss Erection:

Staging and Assembly
Truss Erection:

Lift and Setting in Place
Truss Erection:

Lift and Setting in Place
Prefabricated Steel Trusses

Outline

• Project Location and Scope
• Why Prefabricated Trusses?
• Lessons Learned:
  ▪ Design & Fabrication Details
  ▪ Communication & Coordination
Lessons Learned

Design & Fabrication Details

• Contact Approved Manufacturers
  ➢ Truss Geometry
    ▪ Span Length
    ▪ Structure Depth
    ▪ Truss Width and Clear Height
  ➢ Truss Design Loads
  ➢ Preliminary Cost Estimates
Lessons Learned

Design & Fabrication Details

- What to Show on the Plans
  - Distinguish Responsibility
  - Notes & Specification *(Special Spec 564.80010016)*
  - Camber for Vertical Curve
    - Vertical Clearance
    - Camber Truss vs. Varying Deck Thickness
Lessons Learned

Design & Fabrication Details

Deck Finishing Options
Lessons Learned

Design & Fabrication Details

Railing and Mesh Expansion
Design & Fabrication Details

Rust Staining on the Deck
Prefabricated Steel Trusses

Outline

• Project Location and Scope
• Why Prefabricated Trusses?
• Lessons Learned:
  ▪ Design & Fabrication Details
  ▪ Communication & Coordination
Communication & Coordination

Lessons Learned

• Construction Stakeholders
  ➢ Bridge Owner
  ➢ Contractor
  ➢ Sub-Contractors
  ➢ Fabricators
  ➢ Vendors

• Schedule of Contractor Submittals
Lessons Learned

Communication & Coordination

Railing Transition
Lessons Learned

Communication & Coordination

Bridge Rail

Approach Rail

Mesh Panel Types
Summary

- Benefits:
  - Installation & Erection Time
  - Cost Effective

- Lessons Learned:
  - Contact Approved Manufacturers
  - Coordinate Construction Details
Precast Concrete Deck Panels

Hutchinson River Parkway over Route 1
Outline

- Project Location and Scope
- Why Precast Panels?
- Lessons Learned & Benefits
NYS Accelerated Bridge Program, Phase 1B, Zone 2

- Region 8
- 13 Total Bridges
- Dutchess, Orange, Putnam, & Westchester Counties
- Contractor: Harrison & Burrowes
- Design Team: CHA & Hardesty & Hanover
- Main Goal: Increase Condition Ratings & Bridge Load Ratings
Hutchinson River Parkway over Route 1, BIN 5500019

- Built in 1933
- Steel Rigid Frame w/Riveted Connections
- Concrete encased columns
- General Recommendation of 4
Outline

• Project Location and Scope
• Why Precast Panels?
• Lessons Learned & Benefits
Why Precast Panels?

- **Speed**
  - 4 Days to Remove and Replace

- **Decrease Impact to Public**
  - Right outside of the City
  - AADT of 79,018
  - Governor Cuomo’s preferred route to and from Albany
The Hutch & Route 1 Closed
Day 1 – Remove Deck & Backwall
Day 2-3 – Install Deck Panels
Day 2-3 – Install Deck Panels
Day 4 – UHPC Joints and Pockets
Day 4 – UHPC Joints and Pockets

- Ultra High Performance Concrete (UHPC)
- High percentage of fiber reinforcement
- Compressive Strengths in excess of 21.7 ksi
- Can be loaded after 24 hours
Day 5 – Install Barriers & Overlay
Lessons Learned & Benefits

- Detailing and Preparation
- Communication
- Benefits
  - Speed of Construction
  - Decreased Impact to the Traveling Public
Detailing & Preparation

- Survey
  - 3D Lidar scan
- 3D Modeling
- Contractor Input during Design
3D Survey Scan
3D Modeling

- Possible interferences would be detected prior to construction
- Would have greatly helped with shear stud placement
- Time
Contractor Input

- Paramount due to constricted schedule
  - Input on details – Time to complete
- Staging and Crane setup
- All parties were involved during Fabrication
Communication

- **With Contractor**
  - Prior to Construction
  - During Construction
  - Control Center for Monitoring
- **With Public**
  - Public Meetings
  - Mailings
Benefits

- Quick Redecking Option
- Great for areas with extensive detours
  - Eliminates long closures
- Less impact to the traveling public
Question 1:
What was the design load for the prefabricated truss?

Answer:
90 psf Pedestrian Load & H15 Truck
Question 2:
What factors contributed to the use of prefabricated trusses?

Answer:
Cost, Aesthetics, Geometric Constraints, WZTC
Question 3:
What are two methods to accommodate a vertical curve on a prefabricated truss?

Answer:
Camber the Truss
Vary the Deck Thickness
Question 4:
What was the total allotted time to complete all work on the Hutchinson River Parkway?

Answer:
4 Days
(Work was completed in 5 days)
Question 5:
What is the 28 day compressive strength of UHPC?

Answer:
Over 21 ksi