Accelerated Bridge Construction

FHWA/DeL DOT Workshop | September 17, 2015
Core Values

Work Safely: Safety is our culture

Value People: Take care of employees and they will take care of clients and stakeholders

Act with Integrity: Honesty builds trust

Provide Solutions: Better solutions yield greater satisfaction
ABC Preparation

- Suppliers
- Subcontractors
- Contractor Crew Coordination
- Shop Drawing Coordination
- Superstructure Erection

- Construction Staging Area
- Utilities
- Site Access
- Equipment
- Materials
- Weather
Montour Run Bridge No. 6
Accelerated Bridge Replacement

Allegheny Co. Dept. of Public Works
October 2012 – May 2013
ABC – November 21-25, 2012
Coraopolis, PA | $827,000

• Road closure allowance: 5 days due to sole access to five local businesses
• Demolition and rebuild completed over a Thanksgiving holiday weekend
• ABC construction was the only means to meet these requirements
• Won 2013 Outstanding Highway Engineering Award from the American Society of Highway Engineers’ Pittsburgh Section
• No real feasible alternate location for the bridge – extensive property takes and costly approach work
Bridge Design: Elevation

**VERTICAL CURVE DATA**

**CONSTR B SCOTT ROAD**

**PVI STA 101+20.00**

**ELEV 852.22**

**VC 37°**

**MO 0.08**

**+0.15%**

**+1.79%**

**NEOPRENE STRIP SEAL (3” MOVEMENT CLASSIFICATION)**

**NEW CONCRETE BRIDGE SEAT (TYP)**

**PROPOSED BARIER**

**PROPOSED GRADE**

**EXPECTED WATER**

**EL = 839.30**

**EXISTING AND FINISHED GROUNDLINE**

**PROPOSED STRUCTURE**

**EXISTING ABUTMENT AND WINDWALLS TO REMAIN (TYP)**

**ROCK, CLASS R-7 CHOKED WITH ROCK, CLASS R-4**

**EXISTING GROUND**

**GUIDERAIL (TYP) (ROADWAY ITEM)**

**ELEVATION**

**DATUM 820**

**LAMINATED NEOPRENE BEARING**

**FAY**

An Hicon Company
Bridge Design: Cross Section

TYPICAL CROSS SECTION

NO SCALE
Preparation for Closure Schedule

- **8/28/2012**
  - NTP
- **10/8/2012**
  - Superstructure Steel Delivered
- **10/15/2012**
  - Grid Deck on Superstructure
- **10/25/2012**
  - Concrete Barriers Placed

**Shop Drawing Review & Fabrication > EXPEDITED**

- **10/9/2012**
  - Superstructure Steel Assembled
- **10/22/2012**
  - LW Concrete Deck Placed

**Approach Pavement - Business Side**
- 4/5/2013 - 4/7/2013

**Approach Pavement - Trail Side**
- 4/12/2013 - 4/14/2013

**THANKSGIVING WEEKEND**
Road Closure and ABC Schedule

- **5PM**
  - Bridge Closure/
    MPT Set Up

- **6PM-9PM**
  - Superstructure Demolition

- **7AM-2PM**
  - Prep and Precast
    Abut Caps Placed

- **1PM-4PM**
  - Abutments
    Backfilled

- **7AM-1PM**
  - Backwall
    Concrete Set

- **8PM-12AM**
  - Guiderrail
    Placed

- **6 AM**
  - 11/26/12
    Official Open
    to Traffic
Preparation Prior to Closure

Superstructure Framing

Superstructure Grid Deck

Superstructure Concrete Deck and Barriers
Day 1: Demo

58° | 31°

Wednesday
Day 2: Abutment Placement

60° | 29°
Day 3: Superstructure Placement

Heated Curing of HES Backwall
Day 4: Moment Slab Placement

Saturday, Nov 24
32° | 30°
Day 5: Open to Traffic

Completed Structure

After the winter the approach was paved
Main Street over Wampum Creek Accelerated Bridge Replacement

- Bridge closure meant a 21-mile detour for truck traffic
- Project deadline was only 9 days; completed in 7
- ABC Bridge Construction was the only means to meet these requirements
- Won Best Project in the Prefabricated Bridge Elements and Systems category at the 2014 National Accelerated Bridge Construction Conference
Prefabricated/ Precast Structure

Bridge length 78’
Typical Section

- Deck Module with Attached Barrier
  - Architectural Surface Treatment
  - W36 x 170 Steel Rolled Beam
- Deck Module
- Deck Module with Attached Barrier
  - Field Cast Ultra High Performance Concrete Connection

Bridge width 35’ 3”
Precast Abutment and Approach Slabs

- Pre-Cast Wingwall
- Precast Pile Cap
- Architectural Surface Treatment
- HP12x74 Pile
- 27” Corrugated Metal Pipe
- Pre-Cast Cheekwall
- Grout Port
- Bituminous Roadway Approach
- Leveling Bolts
- Pre-Cast Sleeper Slab
- Grout
SR 288-L10 3-D Model

3-D Model prepared by Newcrete
Schedule

- **April 4/20/2014**: Let
- **May 5/14/2014 - 5/27/2014**: Rolled Beam Shop Drawing Review
- **June 6/16/2014 - 6/18/2014**: Beams Delivered To Newcrete
- **July 7/29/2014 - 7/31/2014**: Structure Dry Fit
- **August 8/18/2014**: Demo, Excavation, Pile Driving
- **August 8/20/2014**: Precast Placement
- **August 8/18/2014 - 8/24/2014**: Road Closed

*Month: April, May, June, July, August
Preparation Prior to Closure
Day 1: Demo

Monday

80° | 60°

FAY
An iCon Company
Day 1: Excavation for Abutment Cap

Monday

80° | 60°
Day 2: Preparation Abutments and Slope Protection

Slope Protection in Front of Integral Abutments

Took 3 Shifts to Set Up Crane (Delivered on 9 Trucks)
Day 2: Abutment Cap Prep

Tuesday

84° | 60°
Day 3: Place Abutment Cap & Wing Wall
Day 3: Set Deck Modules
Day 4: Place Sleeper/Approach Slab

Day 4: Place Sleeper/Approach Slab

Day 4: Place Sleeper/Approach Slab

Day 4: Place Sleeper/Approach Slab
Day 5: Closure Placements

Closure pour Abutment 1

UHPC Joints
Day 6: UHPC Joints

UHPC Concrete

Add Mixtures and Ice
Day 6: UHPC Joints

Steel Fibers

Dispensing UHPC from Mixer to Buggies
Day 6: UHPC Joints
Day 6: UHPC Joints

Curing Process
Day 7: Bridge Completion

Approach Paving

Line painting and guiderail installation
Opened to Traffic at 10:30pm
Epoxy Overlay
Any Questions?