Glenwood Connector Pedestrian Bicycle Bridge: Minimizing Environmental Impacts Through Sustainable Materials and Minimal Project Footprint

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Bundle 220 I-5: Willamette River Bridge
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- SB Ramp Soundwall
- Canoe Canal Liner
- Sign Bridge
- Patterson Slough
- Channel Liner
Why a Bridge Viaduct?

- Pedestrian Path Dead End at the Springfield - Eugene City Limits
  - No controlled crossing in the area required pedestrians and bicycles to cross 4 lanes of traffic
  - No space for sidewalk along McKenzie Hwy
Pirates Cove

- Similar Project North of Depoe Bay

Before

Similar Solution - Extend the River Front Bike Path West along the River

After
Existing Detour Structure

- Demolition and Removal Required
Opportunity

- Existing precast box girders were available from the detour structure
Advantage - Sustainability

- Reusing the box girders provided a sustainable and green solution to providing a viaduct structure
- Cost savings for reusing salvaged beams already on site
- Avoid storage of Beams, ODOT retained ownership
Site Challenges

- Access Limitations for Construction
Site Challenges

- Preserve the historic Mill Race Ruins
- Provide a viewing platform out of the typical jogging/bike path
- Coordinate with Willamette River Bridge Construction
  - Some elements of the viaduct needed to be constructed before the WRB was completed to allow for construction equipment to operate.
Opportunity

- Discontinuous Site Access for Construction of Foundations

- Avoid Falsework along the River Bank

Photo Courtesy Michael Kelley - OBDP
Advantage – ABC Design Techniques

- Use drilled shaft foundations with Hammer head configuration
- Use steel shells on columns as stay-in-place forms
- Precast Hammer heads, ABC design techniques, “Emulative” design
Advantage – ABC Design Techniques
Solution and Implementation

- Using the CMGC Process the Design and Construction Teams Developed a **Solution** Tailored to These Parameters:
  - Drilled Shaft Foundations
    - Discrete and Well Contained Construction Along River Bank
  - Precast Hammer Head caps
    - Avoid Falsework Support for Cast-in-Place
  - Stay-in-Place Steel Shell Used as a Column Form
    - Avoid Column Form Stripping Near Waterway
Basic Design Concept
Technical Design Challenges

- Cap to column connection
Technical Design Challenges

- Connection from column to shaft with pipe casing
- Using box girders on a curved alignment created added joint detailing
Technical Design Challenges

- Conduit for lighting required creative placement of conduit in retrofit curb
Technical Design Challenges

- Adapting/Repurposing Existing Box Girders
  - Refinishing of Existing Girders

Something to Consider when repurposing, to obtain a clean finish requires hand work at relatively high expense
Technical Design Challenges

- Retrofit of curb to Box Girder

Requires Large Number of Epoxy Anchor Bars Installed
Interesting Design - Staircase

Access to the Ground to View the Mill Race Ruins
Required special dispensation for a non-ADA access
Construction Process
Construction Process
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Construction Process
Construction Process
Construction

- Ensure proper placement of threaded rods before concrete is cast

Careful Placement Specifications required, should always check and double check. The bottom could have been raised slightly to avoid the short bar as shown.
Construction

- All bolting hardware can be black, and was. Should avoid hot dip galvanizing of high strength rods

- The portion of bolts in the column required sleeves to ensure proper determination of tensioning force
  - Use of corrugated sleeve has excellent performance
Construction

- Specify a class II finish on the exterior of reused beams to help with aesthetics
  - Can be costly, lots of hand work to accomplish
Construction

- Difficulty with casing connection into drilled shaft
- Some grout tubes were plugged or crimped
  - Required retrofit for placement, perhaps specify steel?
QUESTIONS?

Owner – City of Springfield
Contract Admin – ODOT Region 2, Springfield Office
Bridge Engineer – TY Lin International
Contractor – Hamilton Construction in Joint Venture w/ Slayden Construction
Alignment/Civil- OBEC
Construction Inspection – Oregon Bridge Delivery Partners