Construction of PennDOT’s First Self-Propelled Modular Transporter Bridge Move: SHALER STREET BRIDGE

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District 11 Bridge Engineer
PennDOT

PATRICK HEER
Project Engineer
Mammoet
Shaler Street (4,849 ADT) passes over SR 19 (27,000 ADT), connecting Pittsburgh to I-376, I-79 and the Pittsburgh International Airport.

**Project Award**
- Bid: September 2018
- Low Bid: $3.66 Million
- Substantial Completion: December 2019

**PRESENTER:**
Shane Szalankiewicz, PE
PennDOT
### Flow of Design

**TIMELINE**

<table>
<thead>
<tr>
<th>Scoping</th>
<th>Prior to Prelim. TS&amp;L</th>
<th>PE and Final Design</th>
<th>Prior to Letting</th>
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**COORDINATION MEETINGS**

- **ABC Determination**
  - Involved:
    - DOT: ADE, Bridge Engineer, Structure Control (SCE), and ACE
    - Design Team

- **Pro Team Meeting**
  - Involved:
    - DOT: Bridge Engineer, SCE, and ACE
    - Design Team

- **Design, Construction, & Traffic Meeting**
  - Involved:
    - DOT: Bridge Engineer, SCE, Constructability Review Manager (CRM), and ACE
    - Design Team

- **Constructability Reviews (30%, 60%, 90%)**
  - Involved:
    - DOT: SCE, CRM, ACE, and IIC
    - Design Team

- **Pre-Bid Meeting**
  - Involved:
    - DOT: ADE, Bridge Engineer, Structure Control (SCE), and ACE
    - Design Team

- **Letting**

**Unique to SR 19/Shaler Street**
Flow of Construction

TIMELINE

<table>
<thead>
<tr>
<th>Project Startup</th>
<th>Construction</th>
<th>Project Closeout</th>
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<tbody>
<tr>
<td>Award / NTP</td>
<td>Bi-Wkly Project Control Meetings • Involved: ACE, CM, IIC, Field Staff, Contractor, Specialty Contractor, Design Team, and Structure Control (as needed)</td>
<td>Close Out / Open to Public</td>
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<td>Monitoring in Field • IIC monitoring to confirm construction based on design and submission decisions</td>
<td>After Action Review / Lessons Learned</td>
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<tr>
<td>BUILD PROJECT</td>
<td>RFI/RFC Submissions • Involve design team to help problem solve and develop solutions • Strong partnership among team members critical to success and addressing issues</td>
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BUILD PROJECT
SPMT Contractor Perspective

PRESENTER:
Patrick Heer
Mammoet
Managing Expectations

• Shutdown schedule and constraints
• Ground compactness and stability
• Transporter capabilities
• Design loadings
Unique Transport & Load Conditions

• Accommodate a load that sat on a 14% slope
• Two different center of gravities
• Ridged frame for jacking and transport
• Two different ground elevations
• Limited in width
• Limited in time
• Bridge Details
  • Section 1 : 519 kips
  • Section 2 : 522 kips
Self-Propelled Modular Transporters
Unique Aspects of SPMT Move

- Falsework arrangement
- Grade of transport
- Transport path preparation
- Trailer spacing
- Operating slope and camber of trailers
- Stability at extremes
Transport Path Preparation
Owner Perspective

PRESENTER:
Shane Szalankiewicz, PE
PennDOT
Public Outreach

- PennDOT engaged news stations and shared animation of bridge move before construction
- Held pre-season construction conference on project site
- Released progress updates via Twitter
- On Move Day created “Press Corral” for easy coverage and made staff available for interviews
- Released weekly road closure and restriction updates
- Coordinated with Heinz Field for major events (i.e., Steelers games)
Event Coordination

<table>
<thead>
<tr>
<th>October 2019</th>
<th>November 2019</th>
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<tbody>
<tr>
<td><strong>Sunday</strong></td>
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<td><strong>Saturday</strong></td>
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**October 2019**
- October 5: vs. Saints, 7PM
- October 6: vs. Bears, 7PM
- October 7: vs. Bears, 2PM
- October 12: vs. Eagles, 7PM
- October 13: vs. Cowboys, 7PM
- October 20: vs. Steelers, 7PM
- October 27: vs. Patriots, 4:15PM
- October 31: Halloween

**November 2019**
- November 1: vs. Chiefs, 7PM
- November 4: vs. Browns, 2PM
- November 11: vs. Bears, 2PM
- November 15: vs. Eagles, 7PM
- November 25: Thanksgiving
- December 1: vs. Bengals, 1PM

*Note: Times and locations subject to change.*
Design

- Abutment 1: Tangent caissons
- Precast pier
- Precast cheekwalls
- 2-day SR 19 Closure\2 Long Weekends

Construction

- Abutment 1: C.I.P. cantilever abutment
- C.I.P. pier
- C.I.P cheekwalls
- 2-day SR 19 Closure\1 Weekend – 1 (Sun to Tues)
Construction Durations

Sep 6       Shaler Street Closed

Sep 6-8     Bridge Demolition (2 Days)

Nov 3-5     Bridge Move (2 Days)

Nov 22      Shaler Street Opened

SR 19 Closed 4 Days
Shaler Closed 71 Days
Lessons Learned

Bridge Move Submission Briefing

• “One Stop Shop Meeting” - Hold with General Contractor, SPMT Contractor, Owner, Designer and Construction Field Staff prior to move submissions

• Discuss overall concept for move and facilitate coordination among disciplines

• Understanding and communication of transport loads to be considered

• Expedite reviews
Lessons Learned

On-site Pre-move Meeting
- Held after SPMT mobilization to site
- Discuss revisions to move plan based on actual field conditions

SPMT Move Path
- Horizontal dimensions (clearances and width of road) to avoid interferences with power lines, formwork, buildings, trees, rockfall fence, etc.
- Plywood shoulder reinforcing
- Move path elevations on move plan with available travel of SPMT’s
Lessons Learned

- Stakeout plan for superstructure in temporary location
- Maintain contact between jacking falsework and superstructure until final position is achieved
- Anchor bolt hole locations (drill after setting bridge or larger preformed holes to permit greater tolerances)
- Temporary diaphragms could have been permanent
- Contingency plan for equipment malfunctions or failures
Construction Team