Innovative Bridge Designs – Buried Bridges

Steel Bridge Essentials – 6 Part Summer Webinar Series

June 25, 2021

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Buried Bridge Design Innovations - Outline

• Design standards in AASHTO LRFD Bridge Design Specifications Section 12.8.9
  o Buried Bridges are not proprietary – all info needed for design, manufacturing, & construction is available in ASTM & AASHTO standards.
  o Design involves Finite Element Analysis with inputs for foundation & site soils, backfill, structure shape & material properties, and loading conditions.
  o Design innovation happens on almost every project - Most innovations are driven by developing custom geometries to meet project specific clearance requirements & site limitations and optimizing to best fit site & loading conditions.
  o Many project innovations occur after design when working with contractors to address construction challenges

• Innovations to accommodate modular construction
  o Pre-assembly of large sections of structure, setting on foundation, and connecting sections to each other
  o Limited space for material staging & equipment
  o Limited access to inside of structure
  o Time limitations for road / track closure
  o Size of modules is driven by lifting equipment capacity & site constraints
M5 Conveyor Cover
South Jordan, Utah

• Cover for active conveyor to allow for access to new mining area

• High cost to disruption or halting of conveyor operation

• Design for 4 million lbs mining shovel

• Built in 20’, 25’, and 40’ sections (two different structure geometries) and transported ~1 mile to project location

• Modules connected from outside using a rolled angle flange connection

• Modular section weights ~24,000 – 30,000 lbs

23’ span x 11.5’ rise single radius arch & 32.2’ span x 19.9’ rise Dual Radius Arch (~1200 ft combined length)
HANGER ATTACHMENT PLATES TO BE PLACED INSIDE AND OUTSIDE OF STRUCTURE. HANGER BEAM, PLATES AND ATTACHMENT BY OTHERS.
Captain William Henry Moore Bridge
Skagway, Alaska

- Replacement for suspension bridge unable to support mining equipment loads
- Crossing deep ravine - ~100’ from bottom of structure to top of road
- 18° skewed ends needed because of site constraints
- Backfilled with roller compacted concrete
- Assembled on foundation in 3 pieces

75’ span x 25’ rise Dual Radius Arch
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Thank You!

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