



1999 ??? Beaufort and Morehead Railroad Trestle Bridge

Description

Meta Fields

Project Summary : The replacement bridge included pretensioned concrete adjacent T beams with parapets; and precast pile caps, abutment caps, backwalls, and wingwalls.

Project Location : US Highway 70 over Newport River between Morehead City and Radio Island

Mobility Impact Time :

- ABC: Weekly track closure of 4-day duration
- Conventional: ABC is conventional for railroads

Impact Category : Tier 3 (within 2 weeks)

Dimensions : 495-ft-long (15 spans @ 33 ft) 12-ft-wide prestressed concrete adjacent T beam trestle-span approaches on the west side of the bascule span and 1,749-ft-long (53 spans @ 33 ft) 12-ft-wide prestressed concrete adjacent T beam trestle-span approaches on the east side of

Traffic Management : railroads require ABC to limit downtime

Existing Bridge Description : The existing railroad bridge consisted of 85 trestle-span approaches on the west side and 310 trestle-span approaches on the east side of a single-leaf rolling bascule span. Built in 1960, the trestle-span approaches were deteriorated and required replacement.

Replacement Or New Bridge : The ballasted, trestle-span cross-section consists of two 6-ft-wide 3-ft-deep precast prestressed concrete adjacent T beams. The T beams are supported on precast reinforced concrete caps on composite piles (24-inch steel pipe piles protected by 36-inch concrete cylinder pile sleeves). The bridge was designed and constructed to AREMA standards and to meet NCDOT's highly-corrosive coastal environment criteria. All environmental documentation and permits, design, construction, and construction engineering were done by the design-build team.

Construction Method : The project replaced the trestle-span approaches on existing alignment during weekly track closures of 4-day duration between scheduled trains. Approximately 99 ft of existing trestle was removed, two bents constructed, three spans erected, ballast placed and rails attached during every 4-day track closure. The contractor fabricated the pretensioned concrete T beams in a precast yard near the bridge site. The T beam shape was chosen by the contractor for ease of handling and to make use of available forms. The parapets were cast onto the beams at the precast yard after release of the prestressing strands. The precast pile caps were cast upside down with pile reinforcement extending from the cap, and with tapered voids formed inside the pile reinforcement to allow concrete to be pumped into the pile to make the moment connection between the cap and pile. Other precast elements included flat slab transition spans at the abutments and at the transition to bascule rest piers, and precast thrust block ribs. The contractor used templates and a vibratory hammer to drive the 24-inch-diameter steel pipe piles. The 36-inch-diameter concrete cylinder piles were then driven over the steel pipe piles to three feet below scour depth to provide corrosion protection. Grout was pumped in the annular void between the two piles. The caps were erected with the pile reinforcement extending from the cap, and the caps were lowered onto the piles. Concrete was pumped into the cap and pile voids to make the moment connection between the cap and the pile. The precast abutment caps were erected on the piles, and the precast backwalls and wingwalls were erected atop the caps. The embedded structural plates on the backside of the abutment cap and wings were overlapped, welded together, and covered by grout to make the abutment a continuous structural element. Elastomeric bearing pads were placed, and the beams were erected onto the pads. Anchor bolts, connecting the T beams to the precast caps were installed and grouted. A fiberglass ballast stop was placed in the joint between the T beam flanges. The contract specified completion in 365 consecutive calendar days after the date of availability, with a completion date no later than March 14, 1999. The contract specified liquidated damages of \$750 per calendar day for final completion. No incentives were offered for early completion.

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Costs : The engineer's estimate for the project was \$4.00 million. The low bid was \$6.94 million (73% higher than engineer's estimate; however, the percentage was reduced once technical scoring was applied to the bids). There were three bidders. The cost per square foot of bridge was \$253 compared to \$95 for conventional construction in this region in 1999.

