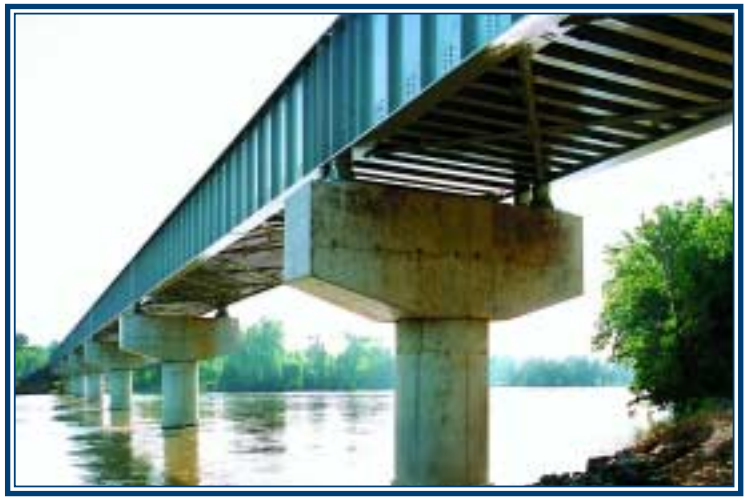
1996 Merit Bridge Award: Railroad
CSX Ninemile Bridge



Judges Comments:

"Very clean horizontal and vertical lines"

"Great use of steel for a clean, good looking bridge"

Project Data

Steel wt./sq. ft. of deck:
n.a.

Cost:
$6.75 million

Steel Tonnage:
2,100

When, after 94 years of heavy use, the Ninemile Bidge over the James River nine miles downstream of Lynchburg, VA, had reached the end of its service life, its owner opted to not just replace it, but to improve it with a 1,024'-long, eight-span steel through-girder structure.

Track alignment crosses a relatively straight segment of the river at an approximately 30 degree skew and has curves at each end of the crossing. While the James River is normally 500' wide, during flooding it rises and widens dramatically—and the existing bridge had experienced scour and erosion during flooding when the river had reached the existing superstructure. To better accommodate the river during flooding, the new bridge is 240' longer than the old bridge and the grade of the relocated mainline was raised 1.5'—the greatest rise that could be practically obtained. While the new bridge is 30' above the river during normal flow, the bottom of the superstructure has less than 2' of freeboard above the historical highwater level reached in 1985.

Selection of a through-girder superstructure was a matter of eliminating alternatives. The longer spans available with truss bridges were not needed and a through-girder was less expensive and would have less future maintenance.

The small difference in elevation between the track and the design flood dictated that there be minimum structure below the track elevation. This influenced the selection of both girder and deck system. A deck-girder bridge was ruled out because of this clearance situation. However, a through-girder with a steel plate deck, in lieu of a deeper concrete deck, was determined to provide maximum clearance. In addition, the steel deck also reduced deadload and was believed to be superior based on past experience with each deck type in similar situations.

The bridge includes: eight 128' spans with a total bridge length of 1,024'-6";

welded steel plate girders approximately 12' deep and weighing approximately 67 tons each; and wide flange floor beams and a ⅝"-thick steel plate deck with steel ballast retainer plates. All of the steel, except for the deck plate, is ASTM A709, Gr. 36. Deflection requirements controlled the girder design and a higher grade of steel was not required. The main girders were fabricated in the shop as one piece as field splicing of the girders was not permitted. During fabrication, all butt welds in girder webs and bottom (tension) flanges were radiographically tested, while all of the web-to-bottom (tension) flange welds were ultrasonically tested. ASTM A709, Gr. 50W was selected for the deck plate.

The owner has had good experience with painted structural steel in similar applications, so a three-coat system was specified for all of the steel except the top surface of the deck, which was protected with a waterproofing system.

Project Team

Designer:
Hayes, Seay, Mattern & Mattern, Inc.
Roanoke, VA

G.C. & Erector:
W.C. English, Inc.
Lynchburg, VA

Fabricator:
Williams Bridge Co.
Manassas, VA*

Owner:
CSX Transportation, Inc.

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