



NATIONAL STEEL BRIDGE ALLIANCE

**2001** Prize Bridge Award

merit award: RAILROAD

# Sweetwater Creek Bridge

Austell, GA

**N**orfolk Southern Railroad, a major Class I railroad, sought the versatility and strength which only structural steel could provide to achieve a solution to a difficult bridge replacement over Sweetwater Creek in Austell, GA, near Atlanta. Norfolk Southern was investing \$60 million for construction of a sophisticated new Intermodal Facility

at Austell and needed additional track capacity and operating flexibility. To efficiently switch train traffic off the mainline and into the new facility within the constraints of limited space, an existing 109', single-track, through-girder ballast-deck bridge, fabricated in 1915, was replaced with a longer, 129' double-track, through-girder, ballast-deck bridge.

The new bridge is the main span in Norfolk Southern Railroad's 589' crossing of the Sweetwater Creek in Austell, spanning the creek's main channel. The entire structure includes the 129' steel bridge span, a 29' pre-stressed concrete box beam approach on the southern end and a 20span, 431' pre-stressed concrete trestle approach on the northern end. The new Sweetwater Creek Bridge was designed to accommodate



both the existing mainline track and the new siding track with 16' track centers. The new double-track bridge was assembled adjacent to the existing main-line bridge with the precision needed to roll it into its permanent position with no tolerance for error. In addition to limited room available for construction, the existing mainline railroad track handled as many as 81 trains per day and any construction activities, including girder unloading, bridge assembly and the final span changeout, had to be accomplished with minimal interruption to existing train traffic.

The substructure supporting the new main span was constructed behind the existing stone piers, at an elevation with less than 1" of clearance beneath the approach spans. This method of substructure construction allowed for continuous, uninterrupted train operations on the existing main line track and bridge. These construc-

tion limitations determined the overall length of the new steel main span at 129', with center-to-center bearings at 126'. The main through-girders were set at 37', center to center, to accommodate the 16' track centers, train clearance requirements and girder flange width. The web plates and bottom flange plates were considered fracture critical members and specified to meet the ASTM requirements of S84-F2, S91 and S93. The top flange members of the main girder and floor beams were designated as CVM (Charpy V-Notch Toughness Test) and specified to meet the ASTM requirements of S83-T2 and S91. The main girders were designed using ASTM A709, Grade 50 steel and consisted of 3" x 32" flanges and a 1<sup>3</sup>/<sub>4</sub>" web with an overall depth of 13'. Intermediate web stiffeners were spaced at 5'-3" center-to-center with the knee braces spaced at 10' 6" center-to-center. The floor beams, supporting a 3/4" steel

plate deck, waterproofing, ballast and track, are spaced at 31'-1/2" center-to-center and designed using ASTM A709, Grade 36 steel.

**Owner**

Norfolk Southern Railroad, Atlanta, GA

**Structural Engineer**

Carter & Burgess, Inc., Dallas, TX

**Steel Fabricator**

PDM Bridge, Eau Claire, WI (AISC member)

**Steel Detailer**

Trevian Projects Ltd., Winnipeg, MB Canada (NISD member)

**General Contractor**

Scott Bridge Company Inc., Opelika, AL