

BRIDGE CASE HISTORY



THE JEREMIAH MORROW BRIDGE I-71
Warren County, Ohio

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Rendering illustrates the new bridge that consists of twin, six-span, cast-in-place concrete, variable depth, segmental box girders. Bridge rendering courtesy of HNTB.

Design Criteria

- Twin 2200-ft-long six-span segmental concrete box girder structures
- Span lengths of 229 to 440 ft
- Pier heights of 60 to 220 ft
- Single cell box girders 55 ft wide with depths ranging from 12 to 25 ft
- Internal and external post-tensioning

When the Ohio Department of Transportation decided to replace the existing Jeremiah Morrow Bridge with a new concrete structure, they specified the use of epoxy-coated steel reinforcement to help achieve the desired service life of 75 to 100 years. Epoxy-coated steel reinforcement is used in all the bridge components including the drilled shafts, mass concrete footings, piers, and superstructure.

The Jeremiah Morrow Bridge, named after an Ohio governor, is located north-east of Cincinnati, Ohio and carries I-71 over the Little Miami River. The existing bridge was built in the 1960s and consists of two parallel steel deck truss structures similar to the I-35 bridge in Minnesota that collapsed in 2007. The decision to replace the bridge was based on existing structural deficiencies, maintenance of traffic during repairs, and future capacity requirements.

The replacement bridge consists of twin, six-span, cast-in-place concrete, segmental box girders with a variable depth. The total bridge length is approximately 2200 feet with span lengths ranging from 229 to 440 feet. Each box girder will carry two 12-ft wide lanes of traffic initially but is wide enough for additional lanes when I-71 is widened in the future.

Owner: **Ohio Department of Transportation**
Designer: **HNTB Corporation**
Contractor: **Kokosing Construction Company**
Construction Services: **Omnipro Services LLC**
Reinforcing Bar Fabricator: **Gerdau Ameristeel**
Estimated Cost: **\$88 million**
Epoxy-Coated Steel Reinforcement: **4987 tons**

*Cover photography:
Background photo courtesy of HNTB.
Inset photo courtesy of Dr. Henry G. Russell, Henry G. Russell Inc.*



Bridge rendering courtesy of HNTB.



The cross section of each structure consists of single cell box girders with depths ranging from 12 feet at midspan and abutments to 25 feet at the piers. The top flange width is 55 feet and the thickness varies from about

9 inches at the centerline and end of the flanges to about 2 feet 4 inches over the webs. The typical web thickness is 18 inches. The bottom flange varies in width from 25 feet 9 inches at midspan to 20 feet 0 inches at the pier

table and in thickness from 9½ inches at midspan to 3 feet 8 inches at the pier table. Specified concrete compressive strengths for the superstructure were 6.0 ksi for design and 3.5 ksi for post-tensioning.



Epoxy-coated steel reinforcement is used in all the bridge components including drilled shafts, mass concrete footings, piers, and superstructure. Photo courtesy of James E. Barnhart, Ohio Ready Mixed Concrete Association.

The balanced cantilever method of construction was selected because the bridge is 240 feet above the river valley—a designated scenic area with limited access and steep sides. Photo courtesy of James E. Barnhart, Ohio Ready Mixed Concrete Association.

The Little Miami River is designated a State and National Scenic River for recreation. The bridge is approximately 240 feet above the river valley, which has steep sides and limited access. For these reasons, the balanced cantilever method of construction was selected for the bridge. To reduce the environmental impact, none of the piers are located in the waterway.

The cast-in-place concrete piers consist of hollow boxes for about 135 feet above the water level. Above that, the boxes split into two walls. This provides flexibility to accommodate thermal movements, elastic shortening, and creep and shrinkage of the concrete. Sliding bearings are only provided at the abutments and at a short pier.

The new bridge will be built in two phases. The new southbound structure will be built between the existing northbound and southbound structures. When complete, this structure will initially carry the northbound traffic while the existing northbound bridge is demolished and a new northbound bridge is constructed. The traffic will then be switched to its final configuration and the existing southbound bridge demolished. Throughout construction, two lanes of traffic are being maintained except for some night time lane closures. The estimated quantities for the project are 58,000 yd³ of concrete and 4987 tons of epoxy-coated steel reinforcement.

When completed in 2015, the new Jeremiah Morrow Bridge will provide the Ohio Department of Transportation with a new crossing over the Little Miami River. The new bridge will be more aesthetically pleasing than the existing bridge, will require less maintenance, will be safer, and will have a longer service life due to the use of epoxy-coated reinforcement. ■



Each of the twin structures consists of a single cell, variable depth box girder. Photo courtesy of James E. Barnhart, Ohio Ready Mixed Concrete Association.

