

## Case Studies of Complex Girder Erection

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### Abstract

This presentation will discuss four case studies associated with girder erection of complex, long span plate girder bridges. The four bridges are located in four different geographic locations (Chicago, St. Louis, and two in Tennessee) and erected by four different Contractors using four different methods of construction. Each method of construction was selected to address constraints that were unique and specific to each project. This presentation will illustrate the challenges associated with these various methods of plate girder bridge erection and how they addressed the constraints. There will also be a brief synopsis of common themes of girder erection that are applicable to all methods.

The first bridge is 1,980 foot long with a main span over the navigation channel equal to 490'. The Contractor elected to erect the center segments of the main span via strand jacking in order to minimize impacts to channel navigation below. This method involves installing jacking brackets on the cantilever girder ends on each side of the main span. The strand jacks would then lift pre-assembled center segments, weighing 1.6 million pounds, 60' into their final position. The second bridge is 1,600 foot long with 335' middle spans and is located in a river gorge in Tennessee with 80 foot deep water and piers that were about 100' above the water level. The method here involved the use of pier brackets with balanced cantilever construction and drop-in segments.

The third case study highlights a curved flyover girder structure that is 2,100 feet long and consists of 3 separate units with two different curves and maximum span lengths of 250 feet. The presentation will cover multiple methods of maintaining plumbness of the girders during erection while picking the girder

and during the partially erected phases of the structure. The last case study is for a 2,100 foot long bridge over the Clinch River in eastern Tennessee. The center spans of this structure are 278' and again over deep water. The method of construction for this bridge involved the use of a shoring tower that was mounted on a floating barge. Ballast tanks in the barge were used to maintain a level shoring tower while addressing multiple load scenarios associated with the various stages of erection.

**Keywords: Girder Erection—Strand Jacking—Pier Bracket—River Construction—Curved Girder**