Case Study

Enerpac's Jack-up System Used for Elvira Railroad Bridge Span Replacement

The Enerpac jack-up, a multi-point hydraulic lifting system, uses an incremental stage-lifting principle.

The Elvira Railroad Bridge, built in 1906, spanned across the Cahaba River in Helena, Alabama. The old double-track open deck superstructure had reached the end of its useful life and was scheduled for replacement with a new single-track ballasted deck superstructure. Burkhalter, lifting, rigging and transport professionals, was selected to execute the replacement of Span 2 over the river.

An initial challenge of the project was the location of the bridge. The river below the bridge had a strong current in an area utilized by recreational kayakers and rafters. With focus on safety, the team created a plan to build the new bridge in a specific area that would allow for an efficient transport onto the old span.

The team approach to the heavy move was to utilize their BPU-750 Jack-up System supplied by Enerpac. The old span weighed 1.1 million pounds and was 180' L x 35'W x 43' H. The new span weighed 1 million pounds and was 180' L x 19'W x 13.5' H. The jack-up, a multi-point hydraulic lifting system, uses an incremental stage-lifting principle. The lifting frame of each jack-up unit contains four hydraulic cylinders, one in each corner, which synchronously lift and stack steel barrels, forming lifting towers. For this application, two of the four bases of the jack-up system were set on opposite sides of the river.

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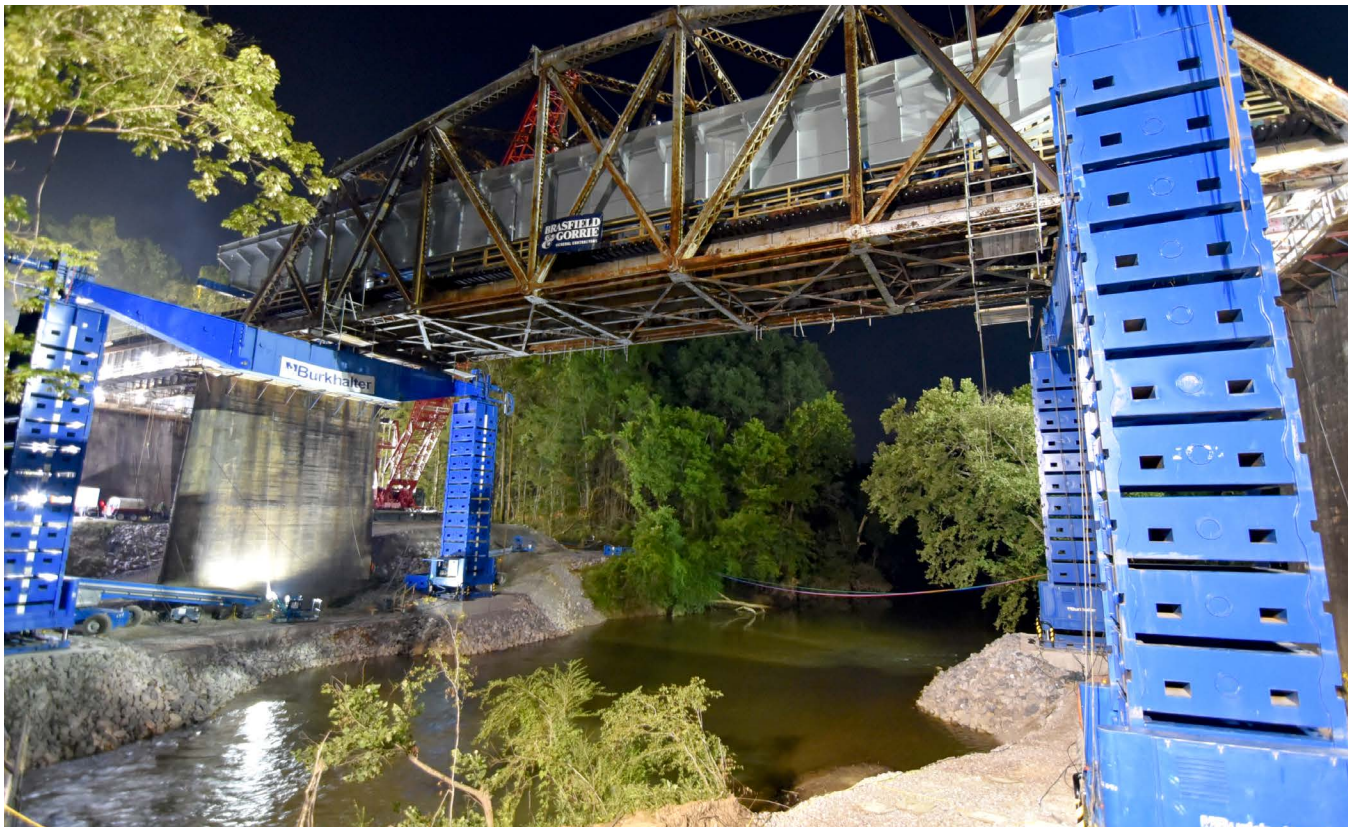
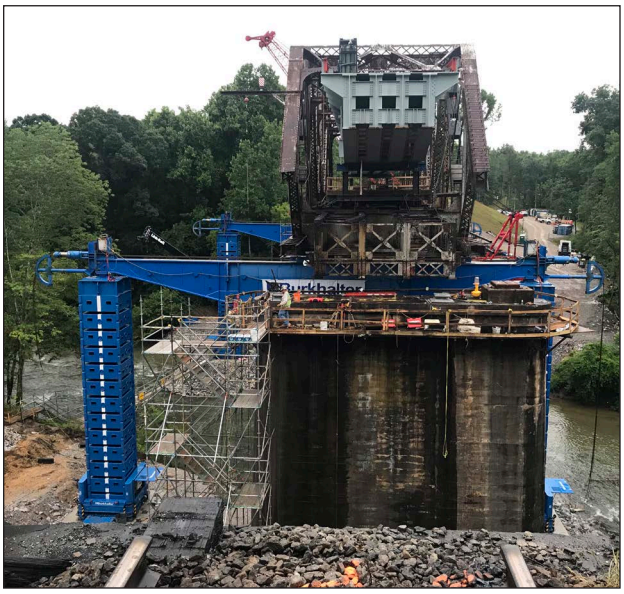


Creatively, the team transported the new railroad span onto the old bridge using 24 lines of Goldhofer E-Steer SPMT with 90-degree traverse movement capability to align the span with the railroad track. A mat road was built across the old railroad bridge so that the weight of the transporters and the new span were evenly distributed during transportation. The team designed, fabricated and provided specialized beams and transferred the weight of the new span down to slide shoes mounted on girders affixed to the jacking system to receive the weight of the new span since the old span could not support the weight of the new span and the transporters carrying it.

Using the SPMT hydraulics, the new bridge weight was transferred onto the old bridge. The jack-up system formed the four towers system supporting this double bridge setup from below. The team utilized its synchronized slide system powered by Enerpac strand jacks to side-shift both bridge spans in order to line up the new single-track railroad line that replaced the old two-track line. Upon alignment, the new span was then lowered into place with Enerpac's BPU-750 jacking system while simultaneously lowering the old bridge. Lastly, the old span was additionally lowered and removed.

"The project required a unique creation of engineering and craftsmanship to develop and provide a method to transport and set the new bridge in place while lowering the old



bridge, all in one operation," said Christine Burkhalter. "We have worked with Enerpac on past projects that needed a specific solution. We continue to be impressed by their willingness to develop systems to meet our specifications."

Christine and Delynn Burkhalter along with Mike Beres, account representative for Enerpac will be attending the International Bridge Conference June 10 - 12, 2019, to showcase creative use of equipment on bridge projects.

About Enerpac

Enerpac is an international market leader in high-pressure hydraulics, with 28 offices in 22 different countries and over 1,000 employees. Enerpac produces thousands of **high-pressure hydraulic products** that are distributed worldwide. Enerpac focuses on the design of products, from the smallest **cylinder** to complete electro-hydraulic **lifting & positioning systems**, which increase productivity and make work safer and easier to perform.

About Actuant

Enerpac is wholly owned by Actuant Corporation, a diversified industrial company serving customers from operations in more than 30 countries and is headquartered in Menomonee Falls, Wisconsin. Actuant trades on the NYSE under the symbol ATU. For further information on Actuant and its businesses, visit the company's website at **www.actuant.com.**

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