

**Innovation Description: Huey P. Long – Preassemble-and-Lift Scheme**

The Huey P. Long Bridge in Jefferson Parish, La., is a cantilevered steel through truss bridge that carries a two-track railroad line over the Mississippi River with two lanes of US 90 on each side of the central tracks. Opened in December 1935, the bridge was named for an extremely popular and notorious governor, Huey P. Long. The bridge was the first Mississippi River span built in Louisiana and the 29th along the length of the river.

Before the expansion, the widest clear span was 790 feet long and 135 feet above the water. There are three navigation channels below the bridge, the widest being 750 feet. The distinctive rail structure is 22,996 feet long and extends as a rail viaduct well into the city. The highway structure is 8,076 feet long with extremely steep grades on both sides. Each roadway deck is a precarious 18 feet wide, with 2 9-foot lanes, but because of the railroad component, is unusually flat for a bridge of this height. Normally, fixed bridges over navigation channels have steep grades to accommodate the vertical clearance required for marine traffic but this bridge is flat to accommodate rail traffic.

On June 19, 2010, a massive bridge segment was the first of three to be lifted in place using multiple barges and strand jacks. This event of the widening of the four-span bridge of the \$1.2 billion Huey P. Long Bridge Widening Project has been hailed as the most visually exciting in the project's seven-year course, and an extremely rare technical feat.

The widening truss panels are slender and tall (30 inches wide x 530 feet long x 110 feet tall) so there is no way to lift them by themselves without either erecting them piece by piece or stabilizing them externally. Furthermore traditional external bracing would conflict with the existing truss once it was raised. This is where HNTB's Hans Hutton drew upon his railroad experience and brought in the concept of a "through plate girder" which are long slender beams that use knee braces to brace the top flange of the plate girder to the floorbeams in the deck of the bridge. Hutton applied the concept on a massive scale to design knee braces that are more than 100 feet tall and connected to floorbeams to make a U-shaped structural system that stabilized the massive truss panels during erection.

The preassemble-and-lift scheme involved preassembled span sections, the first measuring 528 feet long and weighing 2,650 tons, that were hoisted into position using strand jacks. The first "big lift" – as it was referred to by the contractor - required a 48-hour closure of the road, in addition to a period of restricted railroad and river traffic. HNTB's John Brestin, working with Hans Hutton, conceived the big lift and engineered the process.

A four-barge assembly connected by three sectional barges was prepared. Two large stability frames were assembled on the barges to help support the bridge span section during the lift. The two stability frames were U-shaped to support truss halves and hold them plumb during erection. The 6-foot-deep, 160-foot-long box-section floor beams of the 850-ton stability frames connected to trusses on each side of Pier II and Pier III from underneath. At the same time, 22-foot x 22-foot x 30-foot tall lifting towers, topped by sliding cantilevered beams on the bridge piers at either end of the existing span, were fabricated to support the four 900-ton strand jacks that lifted the new span 130 feet to its final height.

The barges were moved into place following a well-choreographed sequence and the span section, along with the stability frames, and were lifted vertically and the span section slid 13 feet laterally into its final position and secured. The stabilizing frames acted like a large machine that moved the trusses laterally inward while the entire load was suspended from the strand jacks. Keeping the trusses stable during this lateral move was one of the most challenging parts of concept.

Based on the success of the first lift, a second lift was conducted in late 2010 to install the second segment and the final lift is scheduled for early 2011.

INNOVATION ILLUSTRATION:



Huey P Long Bridge pre-assemble and lift scheme

