Excerpts from Better Bridges, May 2004. Original article written by Gini McKain

Equipment Helps Solve Bridge Foundation Problems

A contractor's creative solution to a ticklish extraction problem.

(...)

Gemini was the foundation subcontractor to Key Construction Company, Incorporated of Clarksville, Virginia. Owned by twin brothers, William H. (Blu) and William H. (Bret) West, the company was the general contractor on a major $25-million bridge replacement on Route 360 over the Dan River and the mainline Norfolk & Southern railroad tracks.

The brothers are convinced that embracing technology is a very positive method of remaining a leader in the field of deep foundation construction. And nowhere was this more evident than on the bridge foundation project Gemini had in South Boston, Virginia.

(...)

On site

The South Boston, Virginia project, being built for the Virginia Department of Transportation, called for the installation of 48 deep, large 78- to 92-inch-diameter steel caissons, plus one technical (test) caisson.

The drill depths of the shafts

(...)

A pour day on the South Boston bridge project, one in which the Gemini crew will pour and extract the caisson steel shell, is a long stressful day, according to Doskocil. It begins early, sometimes before sunrise, with the final drilling and cleaning of the shaft. This is followed closely by recycling the drilling mud or Bentonite from the drill shaft back to the filter to extract any sand that might contaminate the shaft concrete as it is pumped in place. The insertion of the full-length 2,600-pound rebar cage follows which, more because of its flexibility than from its weight, requires the use of two large conventional crawler service cranes.

A leased Terex American HC-210 machine with a 150-foot boom was used by the Gemini crew as a support and service crane for the ICE hammer. When lifting the reinforcing steel cages, Gemini also called into play a Link-Belt LS-218H crane with a 100-foot boom.

The next step is the concrete placement, followed closely by the shell extraction using the ICE 66-80 vibratory hammer. By this time, the sun has often crept down behind the horizon and darkness has set in.

(...)

Each shaft has required an average of 130 cubic yards of VDOT-approved Type 30 (5,000 psi) concrete. This is batched nearby and brought to the tightly restricted site in single transit mix trucks. They empty the 9-cubic yard loads into a mobile concrete pump for final placement.

"The unique thing about the concrete mix design for these drilled shafts is that it has a specified four-hour retarder in case of an emergency," says Bill Baker of Jacobs Engineering Company, special consultants on the drill shafts for VDOT.

The extraction of the steel shell begins almost as soon as the concrete fills the drill shaft to its preplanned elevation. Extraction with the driver/extractor was almost, but not quite, anti-climatic because the Gemini crews were already thinking ahead to the next challenge that they would face. **BR**

Men from GRL Engineers of Chicago, Ill check for concrete voids through the use of their Cross Hole Analyzer.