



Falsework Towers Anchor 400-Foot-Long Steel Arch Over Des Moines River

Contractor Devises Unique Solutions for Shoring and Placement

by Julie Devine

Des Moines, Iowa, now boasts a beautiful pedestrian bridge, with a 400-foot-long, 90-foot-high steel arch and artistically curving decks. To get there, Cramer and Associates, Inc., of Grimes, Iowa, had to wait through a year-long fabrication delay, devise ways to support 15 heavy sections over the river and seamlessly connect all the pieces.

Dual-Purpose Towers

Designed by Arup in San Francisco, the \$9.5 million Center Street Bridge is part of The Principal Riverwalk, a 1.2-mile looping trail in downtown Des Moines. The bridge's glass deck panels provide a bird's eye view of the Center Street Dam below. Separate walkways for walkers/joggers and bicyclists rest on artistic trapezoidal forms on both sides of the arch.

With over 1.3 million pounds of structural steel in the arch and deck, Cramer and Associates needed an elaborate shoring system. Genesis Structures, Inc., in Kansas City, Mo., helped design it.

"We drove piling down into the shale [of the riverbed], then built towers using steel beams and H-pile – mostly from what we had in our yard," said Robert Cramer, president/chief administrative officer.

The arch came in five pieces. "Everywhere two pieces would join, we put a tower," Cramer said. "The towers held the arch pieces in place until we could weld them together."

Because each deck section also came in five pieces with splices in the same locations as the arch, the falsework served a dual purpose. "Each of the steel tower bents is tall enough in the center to hold up the arch and wide enough at the bottom to support the deck sections," Cramer said.

180,000 Pounds Going Up

With construction starting in fall 2007, the project initially targeted November 2008 for a completion date – but with the arch changing in three directions at once and complicated trapezoidal shapes in the deck, fabrication took almost a full year longer than expected.



The special design of the falsework towers supported the arch pieces at the top and the deck pieces closer to the river.
Top: The Center Street Bridge allows pedestrians to cross the Des Moines River from the east and west sides of The Principal Riverwalk in downtown Des Moines. Pedestrians can see the Center Street Dam through 16 four-foot-square glass panels in the bridge deck

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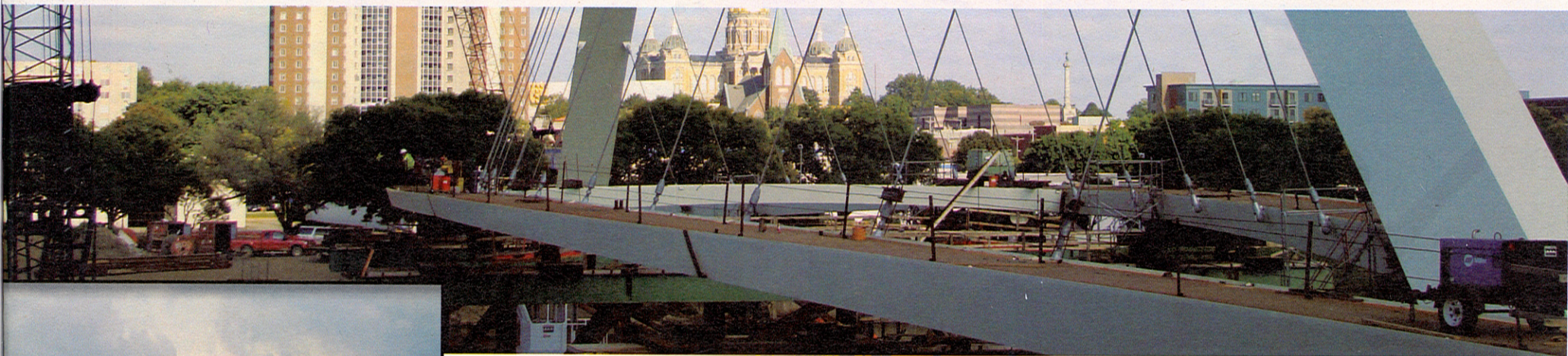
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The fourth arch piece floats into place on the left as cranes on barges prepare to lift it onto the falsework towers, where it will rest while being welded to the other pieces.



Falsework towers supported the arch and decks until they could be welded into place.

Once the pieces arrived, some weighing as much as 180,000 pounds, Cramer and Associates needed to figure out how to lift them into place. At first they tried heavy-duty straps, but they slipped or were cut on the sharp corners of the arch pieces.

Next, Cramer and Associates devised a system of clamps with small steel beams. "Then we could hook to those clamps and lift the pieces," Cramer explained. "But it was a consistent challenge of getting the cranes in the exact right spot so they were close enough to lift the pieces."

Cramer and Associates' Terex American HC 165 and American 7260 cranes, along with a Terex American HC 180 crane rented from Gethman Construction of Marshalltown, Iowa, sat on barges in the river. The construction crew floated the arch and deck pieces into the river, then lifted them into place.

With all the challenges conquered, work on the bridge was completed last month, with lights installed by Baker Electric of Des Moines. ■

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