

BRUCE HAMMER SUCCESS STORY, BRIDGE PILING
Model SGH-4719 Pile Hammer (Max. Energy 89.3 ton.m)

Sakonnet River Bridge

The Bruce SGH-4719 successfully completed the pile driving of Sakonnet River Bridge at RI, USA

By Portsmouth Patch (www.patch.com), August 27, 2010

Government

RI DOT : Pile Driving Completed at Sakonnet River Bridge Project

The [Rhode Island Department of Transportation \(DOT\)](#) announced Thursday that it has concluded pile driving operations on the Sakonnet River Bridge project in Tiverton and Portsmouth.

The last round of pile driving concluded on Tuesday, and positive test results available Thursday on the success of that operation means that the department can conclude this phase of the bridge project.

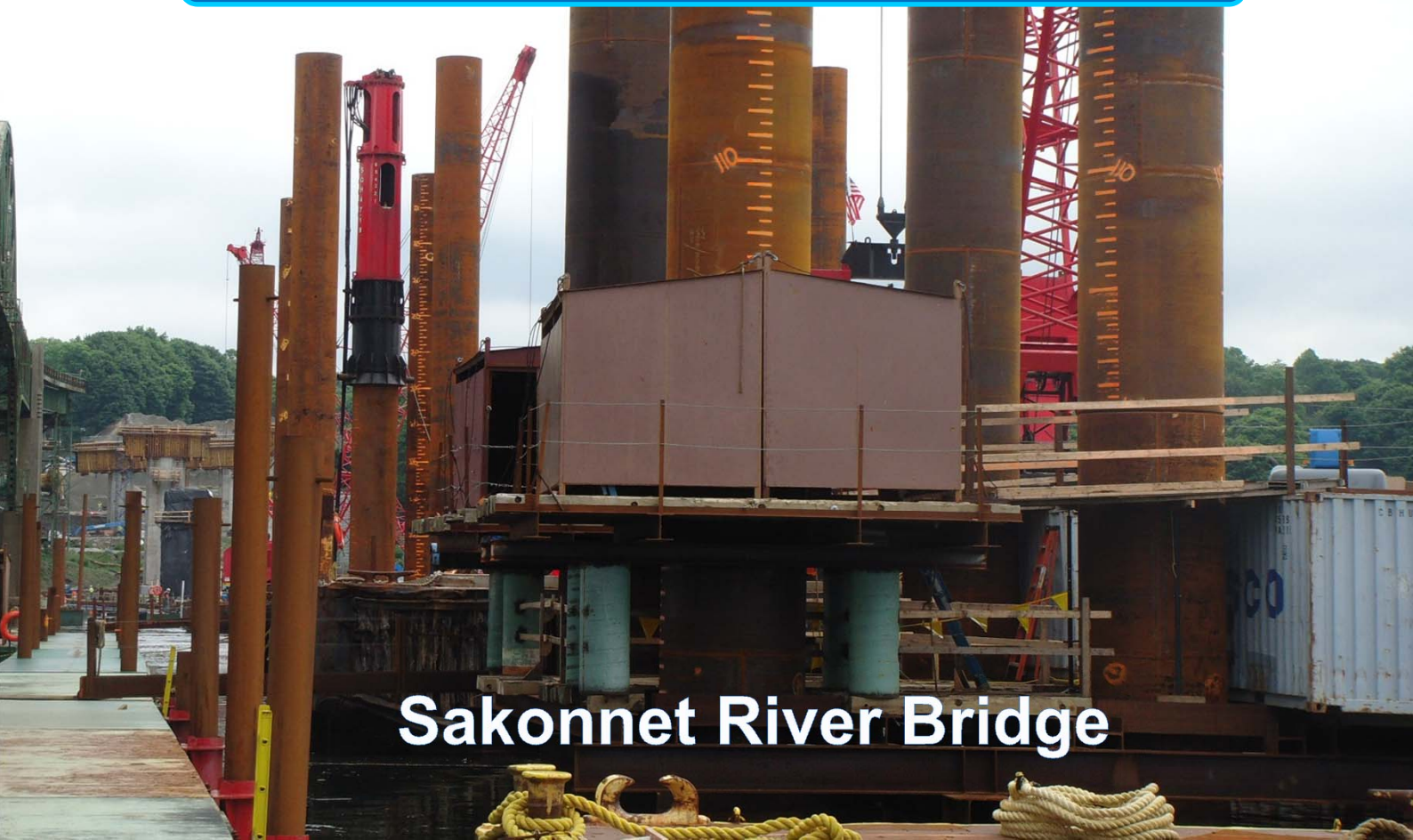
"We appreciate the patience of the residents and business owners near the bridge and apologize for the noise and disruption the pile driving operations caused," DOT Director Michael P. Lewis said. "We are excited to reach this milestone thanks to the efforts of our contractor, Cardi Corp., as we continue replacing this valuable transportation link to Aquidneck Island."

The DOT broke ground on the bridge replacement project in April 2009.

The \$163.7 million contract with Cardi Corp. for the construction of *the new bridge is the largest single contract in DOT's history.*

The department anticipates the new bridge to be open to traffic in spring 2012; however, the contract with Cardi Corp. includes an early incentive clause which could result in the bridge opening to traffic earlier.

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Pile driving was necessary to set large steel piles into the river bottom. Upon these piles, driven in various patterns and to varying depths, the DOT will build the concrete piers that will support the new bridge.

Nearly 500 piles were driven in the past year, including 30 large cylindrical pipe piles that were driven to more than 200 feet below the river bottom.

An estimated 40,000 vehicles per day cross the Sakonnet River Bridge, which carries Route 24 between Portsmouth and Tiverton.

The bridge currently has an 18-ton weight limit, requiring truck traffic to and from the Aquidneck Island communities of Newport, Middletown and Portsmouth to seek alternate routes—often resulting in a detour up to 30 miles long.

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Bruce SGH-4719
Powered by
Bruce PQ-1200
Hydraulic Power Pack

By Providence Journal (www.projo.com) & Eyewitness News (www.wpri.com), January 20, 2010

One of The Worlds Biggest Hammers will be used on the Sakonnet River bridge Project

TIVERTON, R.I., (WPRI) - One of the world's largest hammers is coming to Rhode Island.

The new Sakonnet River Bridge that connects Tiverton and Portsmouth has hired a hydraulic pile hammer known as "*BRUCE SGH-4719.*" *The hammer is made in South Korea, it weighs 86.6 tons.*

The remote controlled hammer will pile drive 200 foot long steel casing pipes, 72 inches in diameter, for the foundation of the new bridge.

The design of the hammer was made for tough projects like this.

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“Bruce Hammer”
Among World’s Most Powerful

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By EastBayRI.com (www.eastbayri.com), January 6, 2010

Sakonnet Bridge Job Ahead of Schedule

AREA — A mild November has Cardi Corporation six months ahead of schedule and halfway toward its \$5 million Sakonnet River Bridge bonus. But now real winter weather has arrived and it remains to be seen whether the bridge building company can keep up its early brisk pace, said Charles St. Martin, spokesman for the state Department of Transportation.

Cardi apparently has no intention of slowing down for bad weather. Crews were out early on the Monday after the big snowstorm despite bitter northwest winds.

“But if the river ices up,” their progress will certainly be slowed, he said.

The bridge is scheduled to open for vehicle traffic in May, 2012 but Cardi stands to earn a \$5 million bonus if it can finish work one year earlier.

As people who live all around know well, the focus in recent weeks has been on driving the bridge’s enormous support piles deep into the Sakonnet River bottom and into the Tiverton-side shore. It’s work that goes on most days from 7 a.m. to 3:30 p.m. The roar of the engines that power the hammer, and the rapid impact of the hammer itself, can be heard from a mile away.

Barges arrived last month carrying loads of the 72-inch diameter hollow pipes, each of which is 65 feet long. These are being driven nearly a football-field deep into the river bottom to support the three mid-river support piers. Each support pier will be held up by ten of the big pipes which, since they won’t reach a firm rock footing, rely on friction from the sediment on all sides for their holding power.

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The pipe piles are arranged in a pattern described as a double five on a domino.

“Using a huge custom-built hammer, they pound each pipe down to a point just above the water’s surface and then weld the next one onto that,” and keep going down, Mr. St. Martin said. That **‘Bruce Hammer,’ built in Korea specifically for this job, is among the world’s most powerful. Weighing 186,000 pounds, it delivers 645,000 foot pounds of force** — around 320 tons, Mr. St. Martin said.

For efficiency sake, the hammer, crane and barge are moved from one pier to the next so that while one pier is taking a pounding, the welders are at work on the others. On the Tiverton side, both on shore and in the shallows, piers are being set using so-called H-piles — H-shaped steel beams that are driven down to bedrock (which lies much closer to the surface on both shores). The H-piles, which range from 45 to 60 feet long, are smaller than the river-bottom pipe piles but each pier will contain from 80 to 100 of them. For these piles, a driving hammer is used. Each pier is surrounded by sheet steel —“like a coffer dam on shore” — driven into place by a vibratory hammer.

This work will soon shift to the Portsmouth shore. “The goal is to get all the piles set in winter, over the next two or three months, but it’s very weather sensitive work,” Mr. St. Martin said. Then, when the weather becomes warmer, they’ll be able to tackle the concrete work that comes with the next stage.

Around each pier’s assemblage of ten pipe piles in the river, a watertight cofferdam will be built to keep out water to a depth of about two feet below mean low water. Into these, cement will eventually be poured to create heavily reinforced concrete ‘pier caps.’ These will provide firm, level footing for the bridge’s concrete legs and steelwork. Work on the large earthen berm that will provide the foundation for the Route 24 approach on the Tiverton side will not start until spring although some materials are being delivered.

What about rust?

Although the pilings are steel in a harsh saltwater environment, bridge engineers say they are confident that rust won’t be a problem even though corrosion doomed the existing bridge after about 50 years of use. Mr. St. Martin said that the H-piles being used on and near shore are being treated with an epoxy rust barrier because they are exposed to both saltwater and air.

But the steel pipe piles will receive no treatment. “First, the steel is much thicker and a very high grade,” Mr. St. Martin said. “Plus, it will all be below the water so it will be exposed to saltwater but not air.” That is unlike the old Jamestown Bridge whose badly corroded steel supports were subjected to both salt air and water. He said that the DOT has been assured that the piles’ life expectancy exceeds that of the bridge itself.



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