

CSP Caissons Extend 100 Year Steel Bridge Prediction

The History of the County of Lunenburg, by Judge Mather Byles DesBrisay recounts the building of what is now known as the Old Bridge over the La Have River. Bridgewater, originally a ferry crossing, is known to this day as a place where many roads meet. It brings together several communities that were first settled in the 1700's when British military villages began to spring up inland from Nova Scotia's scenic Southern Shore.

"The present bridge, (the fourth on the site since 1825), was built by the Dominion Bridge Company, and completed in 1891. It is a Warren girder (truss) deck bridge. The abutments are of solid granite masonry, and the piers are formed of filled tubes, three to each pier. The length is 300 feet and, with a roadway of 18 feet width and two footways of 6 feet each. The total cost was \$23,342. It is considered as likely to last, with proper care, for one hundred years. The materials are of excellent quality, and it is one of the best bridges of its kind in Canada."

www.town.bridgewater.ns.ca/museum.htm

The steel bridge has lasted for more than the 100 year prediction despite heavy ice flows and the daily rise and fall of a 3 metre high tide. It survived a fire that destroyed the town in 1898. The east span was knocked off its piers by ice in 1971 and quickly repaired. Recent inspections by the Nova Scotia Transportation and Public Works Department noted that the piers had deteriorated and had been pushed off of some of the supporting piles. As the now 113 year old steel bridge was in generally good condition, the decision was made to rehabilitate the supporting piers.

The challenge was to gather together the six clusters of 25 timber piles and construct new, larger reinforced concrete piers on top of them. The timber piles were found to be in sound condition despite their age and some shifting.



OLD BRIDGE, BRIDGEWATER

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All work was carried out from a barge. Work was done at low tide when most of the 3 metre high piers would be exposed. Much of the work took place in the dark of night to correspond with the low tide. Installation had to be precise yet fast with all new work secured before the tide could rise and fall again. The concrete would have to be protected as it was poured and cured. It would also require protection in the future when ice flows returned in spring to batter the piers.

Corrugated Steel Pipe was selected to facilitate construction of the piers. Pipes 2400mm diameter x 3 metre long x 3.5mm thick were used. Each was fitted with four, 4" x 4" x 1/4" steel angles. All angles were match punched for bolting and then hot dip galvanized. The steel angles were welded to each side of the pipe before the pipe was cut lengthwise to form the two matched halves of the CSP caisson. Rolled angles were attached at the bottom of each caisson. These served to support short, vertical timber forms that were field trimmed to match and sealed against the irregular surface of the river bottom.

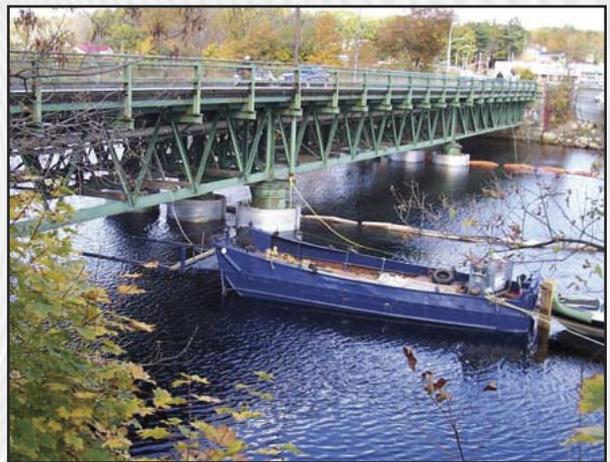
Caissons were securely bolted to form a strong continuous ring around an epoxy coated steel reinforcing cage. Each was filled with concrete at low tide and allowed to cure within the caisson as the tides continued to rise and fall.

This spring the ice went out quietly as the Old Bridgewater Bridge marked it's 114 th birthday. May there continue to be many happy returns!

Corrugated Steel Pipe is widely used in the rehabilitation of aging bridges, culverts and storm sewers. CSPI and its members have developed several innovative products and construction techniques that make rehabilitation a viable, environmental, heritage preserving and economical alternative to demolition and new construction.



CAISSONS & REINFORCING STEEL IN PLACE



CONSTRUCTION BARGE AT HIGH TIDE