



Canadian Society for Civil Engineering Commemoration of Designation of National Historic Civil Engineering Sites

**Angus L. Macdonald Bridge
Robie Street Reservoir
Halifax Shipyard Graving Dock**

Time May 30, 2014 at 2:15 PM

Place Halifax Shipyard, Irving Shipbuilding Inc.

Program

Opening Remarks	Carl Yates, P.Eng.
Welcome of Guests	Peter Williams Irving Shipbuilding
Remarks by CSCE President	Reg Andres, P.Eng.
CSCE Program of National Historic Civil Engineering Sites	W.C. (Cal) Sexsmith, P.Eng. CSCE History Committee
<u><i>Angus L. Macdonald Bridge</i></u> Historical Information Unveiling of Plaque Receipt of Plaque	Bruce Higgins, P. Eng. Reg Andres, P.Eng. Frank Robinson, Halifax Harbour Bridges
<u><i>Robie Street Reservoir</i></u> Historical Information Unveiling of Plaque Receipt of Plaque	Bruce Higgins, P.Eng. Reg Andres, P.Eng. Colleen Purcell CA, Halifax Water
<u><i>Halifax Shipyard Graving Dock</i></u> Historical Information Unveiling of Plaque Receipt of Plaque	Bruce Higgins, P. Eng. Reg Andres, P.Eng. Peter Williams, Irving Shipbuilding
Closing Remarks	Carl Yates, P.Eng.

Angus L. Macdonald Bridge

The Angus L. Macdonald Bridge is a suspension bridge crossing Halifax Harbour which was completed in 1955. The structure has come to be an iconic symbol of the Halifax-Dartmouth area. The bridge was designed by Philip Pratley, one of Canada's foremost long-span bridge designers who had also been responsible for the Lions' Gate Bridge in Vancouver. The bridges have a similar design, which is most notable in the towers. The total length of bridge is 1.3 km, including a 441 m main span. At the time of its construction, it was the second longest suspension bridge in Canada.

The bridge carries approximately 48,000 vehicles per weekday across Halifax Harbour. It is one of two suspension bridges currently linking the Halifax Peninsula to Dartmouth. The bridge was originally constructed with two vehicle lanes and two sidewalks. The superstructure was converted from a two lane to a three lane structure with a pedestrian walkway and bicycle lane in 1999. It now features a reversible centre lane that optimizes the bridge's traffic capacity. Plans are presently underway for a complete replacement of the bridge deck system.



Robie Street Reservoir



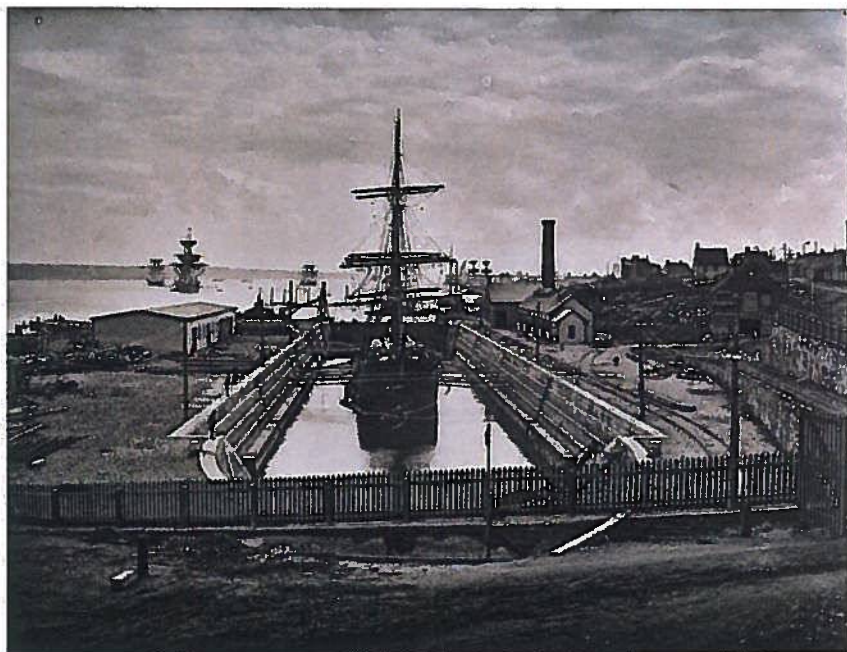
The 48 m diameter x 7.5 deep reservoir was originally built in 1913. It was one of the few structures in the area to survive the Halifax Explosion in 1917, less than 1 km away.

Severe deterioration to the walls and near failure of the roof required a major rehabilitation in 1946. The creative design-build solution included a prestressed concrete ring beam and gunite dome roof, together with extensive wall repairs. The project required specialized construction techniques and materials. Building the roof required a 5 day continuous gunite operation, and used 70 km of prestressing wire. When constructed, the roof replacement was the largest prestressed dome in the world. The American Water Works Association recognized the reservoir as a landmark structure in 1983. The project was a pioneer for the advent of prestressed concrete construction in Canada, which subsequently developed into an important form of construction for bridges and buildings.

A second innovative roof replacement was carried out in 1999. The demolition of the existing prestressed roof required delicate blasting to preserve the existing walls. The roof was replaced with a lightweight aluminum geodesic dome.

The reservoir is in active service today and is owned and operated by Halifax Water.

Halifax Shipyard Graving Dock



The Halifax graving dock is 173 m long x 24 m wide and was completed in 1889. The graving dock itself was built in the dry, thanks to a huge earthen cofferdam which extended into the harbour. The graving dock floor employs granite keel blocks solidly founded on bed-rock. The walls are concrete and rock masonry construction and are approximately 9 m high and typically 1m or more thick. The lower part of the walls is in rock excavation, while the remaining height acts as a retaining structure. Rail sidings were constructed on both sides, such that fully laden vessels could be unloaded while in dock for repairs. At the time, it was the largest dry dock in North America and could handle the world's largest vessels.

While adjacent buildings in the shipyard were completely destroyed during the nearby Halifax Explosion in 1917, the dock survived but with some repairs. While there has been considerable upgrading of the graving dock, the basic construction of the dock is largely unchanged. The culverts used for dewatering and filling the graving dock are largely original construction.

Thousands of vessels have been built or repaired at the graving dock. It is fully active today and remains a vital part of shipyard operations and the shipbuilding industry.