

NASHWAAK RIVER BRIDGE NO. 1 PIER STRENGTHENING

Fredericton, New Brunswick, Canada

OVERVIEW

In 2014, Fibrwrap Construction completed the rehabilitation and protection of the Nashwaak River Bridge No. 1 pier columns over the Nashwaak River in Fredericton, New Brunswick. Vertical cracking on twelve pier columns generated suspicion of the presence of alkali-silica reaction (ASR) within the pier columns. Because the cracking may have been caused by ASR, the Engineer of Record (EOR) wanted to mitigate future crack growth and provide added confining capacity to the columns. The risk of future concrete spalling by means of freeze-thaw and ice abrasion was another issue that directed the New Brunswick Department of Transportation and Infrastructure towards a cost-effective solution with proven environmental durability; especially knowing that significant portions of the rehabilitation are located at or below the water line.

The Tyfo® system applied on the 1.83 meter diameter pier columns was three layers of Tyfo® SEH-51A glass composite applied 300mm beyond all existing longitudinal crack locations. Completed 10,000 hour long-term testing demonstrated the excellent durability of the Tyfo® system in varying environmental conditions; including in alkali solutions which are believed to have caused the vertical cracking on the concrete pier columns. Because the applications existed at or below the river's water line, Tyfo® SW-1 underwater curing epoxy resin was utilized and installed by a local dive team.

Ultimately, the Tyfo® system was installed to effectively cease the development of the ASR by confining and sealing the pier columns at the specified locations.



Bridge prior to rehabilitation



Tyfo® system applied to pier columns



Tyfo® system applied to pier columns