

MISSISSIPPI RIVER POWER CORPORATION PIPE REHAB

Location: Almonte, Ontario, Canada

OVERVIEW

Carbon fiber reinforced polymer (CFRP), a repair alternative for failing pipe sections and joints as well as other emergency applications, offers a shortened construction schedule, minimal curing time and immediate return to service conditions and pressures.

The design and installation of the CFRP system was utilized for Mississippi River Power Corporation's 106-inch diameter concrete encased steel penstock for its hydroelectric generating station in Almonte, Ontario, Canada.

Due to alleged construction deficiencies, water penetrated under the 3/8-inch thick steel pipe. The resultant vacuum caused the plate to buckle and deform throughout a significant section of the concrete-encased pipe, leading to a partial blockage and reduced power output.

Replacement, which would have necessitated diversion of the overhead river, was not a feasible option. Welding a series of 500 to 700 pound steel plates was eliminated as an option due to cost, diameter reduction, safety and construction schedule concerns.

After a thorough technical review, the owner decided that using CFRP to line the interior of the designated pipeline segments was the most convenient and cost effective long-term strengthening option. Fibrwrap overcame significant leakage issues and installed a series of CFRP layers in the longitudinal and hoop direction to take the place of removed steel pipe. As an added precaution in the transition structure that had a unique geometry, the Tyfo® system was anchored into the concrete using carbon fiber anchors installed on a square grid. The repair provides a standalone, fully structural pipe enhancement.



CFRP application to interior pipe