Transmission Line Has 4,800-ft. Clear Span

High Voltage Overhead Construction Across St. Lawrence River Near Three Rivers, P.Q.—Largest Span of Its Kind in the World—Vibration and Other Problems Still To Be Solved—Detailed Description of Foundations

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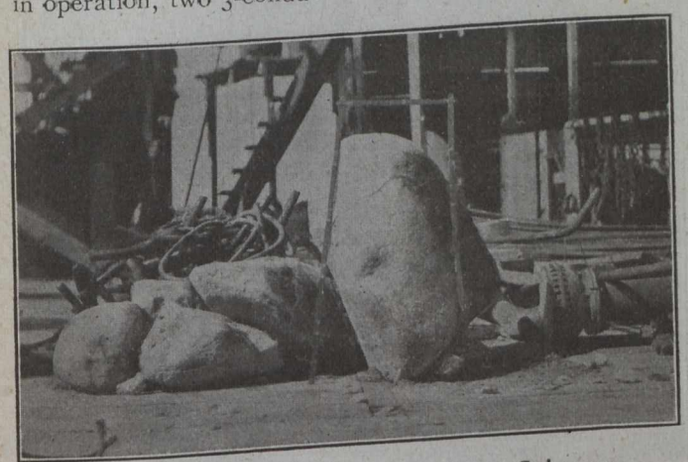
AT Shawinigan Falls, on the St. Maurice River, about 20 miles north of Three Rivers, where the St. Maurice empties into the St. Lawrence River, and about 85 miles north-east of Montreal, is located the principal hydro-electric development of the Shawinigan Water & Power Co.

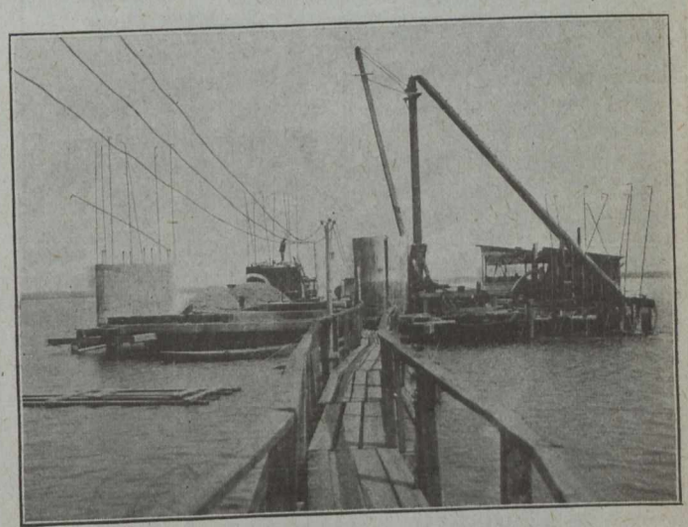
For a number of years the company has been transmitting power to the towns south of the St. Lawrence River. Two lines carry the current to a switching station at Victoriaville, 35 miles south of the St. Lawrence River. At Victoriaville the lines branch, one branch 50 miles long running to Sherbrooke and supplying various towns and industries between, the other branch, 40 miles in length, feeding the asbestos mines and other industries in the Thetford District. The current has been transmitted at 50,000 volts from Shawinigan Falls to the St. Lawrence where the voltage was stepped down to 25,000 for transmission across the river over submarine cables, then stepped up again to 50,000 and transmitted at this voltage to Thetford and Sherbrooke.

The first submarine cable was installed in 1906. At this time the alternative of putting in an overhead crossing was considered, but the amount of power to be transmitted was so small that it was decided that the expense of an overhead crossing was not warranted. However, the demand for power on the south shore steadily increased until by the beginning of 1916 five submarine cables were in operation, two 3-conductor cables and three single-conductor cables, and the capacity of the transformer house, 10,000 k.w., had been reached. The company was then faced with the necessity of increasing its capacity of the crossing, and the question of an overhead crossing to replace the submarine cables again came up for consideration.



Rock from One of the South Shore Caissons

Submarine cables had always been a weak point in this part of the system and a source of more or less trouble and expense. The river bed is hardly suitable for a submarine crossing. It is sandy but with a generous sprinkling of rocks and boulders. The bottom slopes out very gradually from both shores to the steamboat channel, the sides of which are rather steep. Owing to this abrupt change in slope, the cable in the channel is partly suspended and kept constantly swinging by the current in the river so that the armoring quickly wears through and the cable burns out at the points of suspension. The current in the channel carries the cable down stream and has even been strong enough to pull them loose from their moorings and break the connections in the cable house. In the winter the ice usually puts at least one of the cables out of commission, and it has been found necessary at times to erect temporary pole lines across the ice to maintain the service to the south shore. When, therefore, in the fall of 1916 the demand came for more power for the south shore, partly for war work, and it became a question of putting in an additional submarine or an overhead crossing, the company decided in favor of the latter.



View of North Platform, Looking South, While Caissons Were Being Sunk

In order to increase the capacity of the submarine crossing it would have been necessary, in addition to purchasing and installing new cables, to build extensions to our cable houses and install new transformers with their necessary switches, lightning arresters and other equipment. This would have involved an expenditure of at least $150,000 and at the same time the weak point in the line would not have been improved.

The overhead crossing was estimated to cost $200,000, the difference between the two being offset, in the opinion of the company, by the elimination of the weak link, by obtaining greater security from interruptions to the service and by a gain of from 2% to 3% in regulation by cutting out the transformers. A considerable amount of operation and maintenance expense would also be eliminated and the transformers, cables and other equipment tied up in the submarine crossing were needed and could be used to advantage in other parts of the system.

The two shores of the St. Lawrence River upstream as well as downstream of the cable houses, were carefully surveyed in order to find the most advantageous point of