

# The Canadian Engineer

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## Construction Methods Used at Drummondville

In Damming the St. Francis River and Building Power House to Develop About 19,000 h.p.—2,900 ft. of Cofferdams Required for 1,890 ft. Dam—Concrete Distributed Over Long Distances in V-Shaped, Steel Cars During Winter

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CONSTRUCTION work has been completed on the hydro-electric power development for the Southern Canada Power Co., Ltd., situated on the St. Francis River at Drummondville, P.Q. The general layout of this development was described in *The Canadian Engineer* for January 30th, 1919.

The company is now provided with an additional 7,000 h.p. to meet the growing demand for power in that territory. The dam and the headworks of the power house are built to provide for the full capacity of the plant, which will be attained when the remaining two units of 6,000 h.p. each are installed.

The accompanying drawing shows the general plan of the work and the layout of the construction of the plant. There is a continuous fall in the river from the site of the old dam to below the highway bridge north of the railway. The placing of the power house near the latter point utilized the full head available, with the crest of the new dam at the same elevation as that of the old.

The total length of the dam as constructed is 1,890 ft. and is longer than the length planned owing to certain changes made in its direction in order to secure better foundation and economical construction; of this length, 1,340 ft. runs in a direction practically parallel to the river.

With the exception of 260 ft. of stop-log section, comprising ten sluiceways 20 ft. wide, separated by piers, the dam is an overflow type, with a maximum height of 16 ft. The crest is 12 ins. wide and the greatest width at the base is 19 ft. The portion between the stop-log openings and the railway is of a wider section owing to the tunnel running throughout its length, which provides means of access to the deck of the stop-log section.

The diversion of the flow toward the west bank of the river submerges a considerable area of land lying adjacent

to the tunnel section, and to provide a suitable waterway through this to the forebay, considerable excavation had to be done. The material was a sandy clay mixed with boulders and varied in depth from 3 to 6 ft., overlying very irregular ledge rock. This was removed in carts and scrapers, after which all rock ridges and points were levelled to a given elevation, and in addition a channel 45 ft. wide and 6 ft. deep was cut through the rock, extending from the original shore line to meet the excavation in the canal under the railway bridge.

One of the chief features of construction was the large amount of cofferdam work that had to be done, particularly in the unwatering of the dam. This work was further complicated by the necessity of keeping the old power plant in operation. In all, 2,700 ft. of this class of work was required, 800 ft. being placed to unwater the site of the tail race excavation, and the remaining 1,900 ft. for the dam. The latter amount was increased by 1,000 ft. which represented the rebuilt portions swept away by heavy floods, on one of which occasions



EXCAVATION FOR POWER-HOUSE

the flow of the river increased from 7,000 to 60,000 cu. ft. per sec. in a period of 12 hours.

About 75,000 lineal feet of round timber was used in the construction of the cofferdams, all of which material was cut off the property of the company adjacent to the work.

The cofferdams were built in sections, the cribs being from 20 to 25 ft. in length. Accurate soundings were taken over the site of each crib and the framing of the first few courses of timber was done on the sounding raft, from which the crib was floated into position and loaded with rock placed on the pole-ballast floor, the additional courses of logs required being added as the crib settled into place. The stream-face timbers were dressed to a true face and were all placed in the same vertical plane, to provide an