

Penstock.

The penstock is of steel plate 9 feet 6 inches in diameter, carrying the water from the thimble in the dam, down stream 650 feet to the distributing section in the power house. The penstock is carried on reinforced concrete columns of varying heights spaced 16 feet apart, and suitably anchored at different points. The penstock will be built in places and shored up, the supporting columns being constructed afterwards.

At the end of the penstock there will be a large steel standpipe. This will be 18 feet in diameter and 56 feet 6 inches in height, mounted on a solid concrete foundation 22 feet above the tail water level. This will bring the top of the standpipe 15 feet above the level of the head water, and with its large cubical capacity will reduce the strains on the penstock and water wheel governors to a minimum.

The Power House.

The power house is built on solid rock just above the point where the Magog River empties into the St. Francis. It is built of concrete up to the level of the window sills, and finished in red brick. The framework for the crane and roof trusses is steel. The main section comprising the water wheel and generator room is 110 feet long by 90 feet wide. To this will be added a gate house over the tail-race, a transformer house at the down-stream end, and an office section. A 15-ton travelling crane running the whole length of the building will be part of the equipment of the power house.

Hydraulic Equipment.

The three main water wheels take their water from the distributor in the penstock through 66-inch motor operated gate valves. They will be of the twin horizontal type, having a rated capacity of 1,325 h.p. each with three quarter gate at a speed of 360 r.p.m. The water will enter at one end of the steel plate casing and be discharged into the tail-race through a draft tube 22 feet long, inclined at 30 degrees to the vertical. The governing of these units will be effected by Lombard governors of liberal capacity to insure a very close regulation. One of these wheels already completed has just been tested at Holyoke. The results of the test show that a very high efficiency of 85 per cent. was obtained at slightly over three quarter gate.

The two exciter turbines having a capacity of 100 h.p. each at 750 r.p.m., will be of the single horizontal scroll case type. They will take their water from a common feeder opening from the stand pipe through hand operated gate valves. They will be controlled by Woodward governors.

Electrical Equipment.

This part of the installation has been carefully designed to conform with the very best modern standards. The three main units will have a rated capacity of 940 k.v.a. at 2,300 volts, 3 phase, 60 cycles, 360 r.p.m. These generators are of rather special design in order to insure close regulation and absence of hunting. The rotors will have a weight of 24,000 lbs. each, giving a fly-wheel effect of 100,000 ft. lbs.

The exciters will each have a capacity of 50 k.w. at 125 volts.

The power from the main units will be taken to the switchboard and distributed to the local feeders, railway motor generator sets, and transformers for long distance transmission lines.

The power for the railway will be obtained from two induction motor-generator sets having a capacity of 250 k.w. each at 500 volts. As in the case of the main units, these machines are of special design to meet the requirements of the fluctuating load on the railway without inter-

fering with the voltage regulation of the plant.

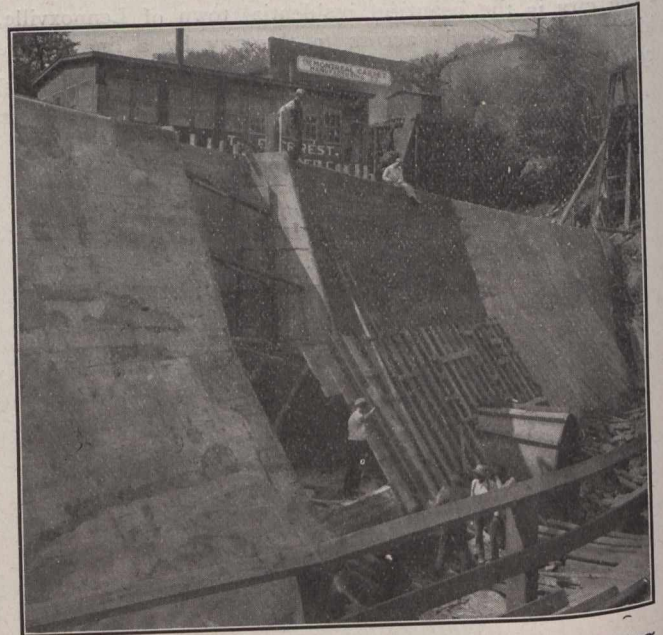
The power for transmission will be raised at 22,000 volts by means of three single phase transformers having a capacity of 677 k.v.a. each.

The switchboard consists of 11 marble panels and will be equipped with instruments and protective devices of the most modern type to guarantee against break down, and to insure a constant and reliable service with good regulation.

The power house equipment is protected from lightning troubles by electrolytic lightning arresters.

Transmission Lines.

The charter of the company gives it the right to transmit and sell power throughout the St. Francis district. This will open up to the company a large district rich in minerals and timber, which has hitherto been greatly handicapped in its development by reason of a lack of power. A very close study of the district has been made, and transmission



Reinforced Concrete Dam on the Magog River, Being Constructed by Sherbrooke Railway and Power Company.

lines will be run from the power house covering the district within a radius of 30 miles. The transmission will be at 22,000 volts, the lines being carried on wooden poles spaced 100 feet apart. Already several large contracts have been made for power, and the transmission lines will be pushed forward as rapidly as possible, along with the rest of the development where the work has been carried on by both night and day shifts since the spring.

The Railway.

The street railway was built some twelve years ago, and while the traffic has been large and the returns good, it was felt that they could be greatly increased by extensions and a general reconstruction of the system, the population of the city having doubled since the road was constructed. The present system consists of 7 miles of track, including the line to Lennoxville, sixteen cars, a freight car and a snow plow, car barns, power house, and office.

The old system will be entirely relaid and extensions amounting to 6 miles run this summer. The rails to be used for this work will be of the 70-lb. girder type, 60 feet long, 7 inches deep. These will be laid on new ties, and will be held by the rods and well bonded.

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