HIGH VOLTAGE TRANSMISSION LINE TO SPAN ST. LAWRENCE RIVER.

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THE Shawinigan Water and Power Co., which furnishes electric power to all of the large industrial centres of Quebec Province, in order to transmit properly the increased amounts of power to its receiving stations located south of the St. Lawrence River, has found it necessary to undertake an engineering feat of considerable interest.

Designs are being prepared for the construction of a 5,000-ft. clear span of the St. Lawrence River for the conductors of the electric transmission lines, thus supplementing the existing submarine cable installation already supplying power to the mining and manufacturing districts. This span is the longest known of its kind, and will be located about 1¼ miles upstream from Three Rivers, P.Q.

The three electrical conductors will be made of the highest grade of plough steel, spaced fifty feet apart, all in the same horizontal plane, arranged thus to prevent contact with each other due to swinging. In order to connect with existing transmission lines, the crossing conductors will be insulated from the steel towers and earth against a difference of electric potential of 100,000 volts. Because of the very high tensile stresses in the cables they will not be anchored at the towers, but will be supported on the top of the towers by saddles, permitting the movement due to temperature changes, and be anchored to concrete blocks some distance behind each tower.

The mechanical problems of this arrangement of anchoring permit of easier solution than do the problems of the electrical insulation of the conductors from the earth potential of the anchorage. The magnitude of the ceramic and mechanical engineering involved in the electrical insulating problem can better be appreciated when it is pointed out that in addition to the electrical stress incident to the 100,000 volt transmission potential the insulation for each conductor must provide sufficient mechanical strength of above 100,000 pounds in compression, due to the tension of the cable. Further, the arrangement of the insulation must permit the replacement of any portions showing electrical failure without incurring hazard to the mechanical safety of the span. An elaborate arrangement of porcelain insulators of a new type, held in compression only, has been designed to fulfil the conditions specified.

The structural steel towers, one on each side of the river, weighing approximately 200 tons each, are to be built upon concrete piers located in the river, 500 ft. from each shore. These towers rise to a height of 350 ft., which is the same height as the top of the Quebec Bridge. This great height is necessary in order to provide 160 ft. clearance above the water level under maximum conditions of ice-loading of the conductors. As the river is navigable for the largest ocean vessel, this clearance must be provided.

The river bottom is composed of sand to extreme depths at this point, so the concrete footings are of considerable interest. The footing piers will be excavated by the use of concrete caissons, which, when sunk to full depth, will be filled with concrete, remaining as a part of these piers. The piers are cylindrical in section, 11 ft. in diameter, extend to a depth of 40 ft. into the river bottom, and 25 ft. above the bottom, being partially submerged. At the top, above the water level, the piers are tied together by concrete struts, forming a square, 60 ft. by 60 ft.

It is expected that the work on this long-span river crossing will start as soon as the St. Lawrence River conditions will permit. It is planned to complete the whole work in the year 1917.

SURVEY OF CANADA'S RESOURCES.

The Advisory Council for Scientific and Industrial Research is making a broad survey of the possibilities of the Dominion in the way of scientific research and other work with the available laboratories, technically trained men and other facilities, with a view to mobilizing these forces for the speedy and satisfactory solution of the many problems facing the Dominion in the readjustment of business after the war. A series of questionnaires is being sent out, chiefly to the universities, to professional men, and to the managers and directors of the Canadian industries.

The Canadian Mining Institute, the Canadian Society of Civil Engineers and the Canadian Society of Chemical Industry are co-operating with the Council in conducting this work.

A central committee has been appointed at Montreal, with branches in the various provinces, to look after the work of taking the census in such a manner as to learn the research requirements and future needs of the Canadian industries, with a view to providing for their requirements in such manner that in years to come they will not be dependent for supplies upon Germany, for instance, as in the past.

H. Mortimer Lambe is chairman of the central committee, supported by Prof. Ernest Browne, for the Canadian Society of Civil Engineers; Mr. G. M. Murray, for the Canadian Manufacturers' Association; Dr. Milton Hersey, for the Society of Chemical Industry, and H. H. Couzens, representing the Joint Committee of Technical Organizations, Ontario branch.

The provincial organizations have divided their work into districts, under local captains, so as to ensure a thorough distribution of the questionnaires.

As replies are received, they will be sent to the secretary of the Advisory Council at Ottawa, where the information gained will be considered and collated. The work is being done under the advisement of Sir George Foster, minister of trade and commerce, and under his direction further developments will depend upon the information gained.

INTERNATIONAL JOINT COMMISSION MEETINGS.

The International Joint Commission met in Toronto last week for four days. There was a full attendance, all three United States members being present, and all three Canadian members, together with both secretaries and both consulting engineers. The finishing touches were put to the Commission's report on the levels of the Lake of the Woods, and the document is now believed to be ready to be submitted to the Canadian and United States governments. It is said to be in seven volumes, three containing engineers' reports and maps, the others including the evidence and recommendations.