

Canadian Northern Railway Revision at Rainy Lake, Ont.

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The C.N.R. main line from Port Arthur to Winnipeg crosses Rainy Lake at the Narrows near Fort Frances, Ont., on a pile trestle upwards of two miles long. The present structure was completed in 1900, and has served to carry the large traffic up to the present. In constructing the trestle it was necessary to use piles as long as 80 ft., as the lake bottom was rather soft clay. Very little difficulty has been experienced in maintaining the pile trestle, but it was

satisfactory than winter work, as many as 28 soundings to rock bottom being secured in one day. Many of the soundings taken extended to 90 ft. below the surface of the water, the water sometimes being 40 ft. deep, with 50 ft. of clay underneath. The clay varied from a soft ooze to a compact clay in which the sounding rod would only penetrate an eighth of an inch with a 4 ft. drop of the hammer.

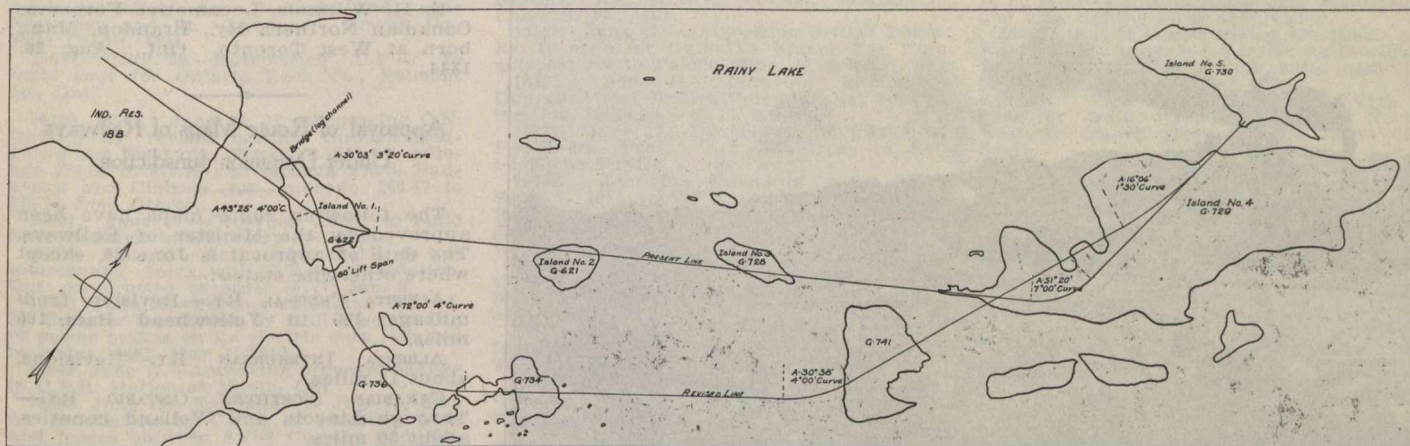
Following the taking of the soundings, a contour map of the lake bottom was made and a location for the new line was selected, giving much smaller quantities of fill as compared with any other line. The new line is 15,814 ft. long, 800,000 cu. yds. rock are required for a

The accompanying plan shows the relative positions of the present and revised lines. The profile illustrates the hugeness of the work. The illustrations from photographs on pg. 408, show the barges and girders in use.

Approximate Quantities for Timber Bridges on the Canadian Northern Railway.

By A. J. Taunton.

These figures refer to bridges on the C.N.R., and must be modified to suit other structures. For pile trestles the piles may be estimated directly from the profile, the deck and caps running at about 2,700 f.b.m. per opening of 14 ft. 9

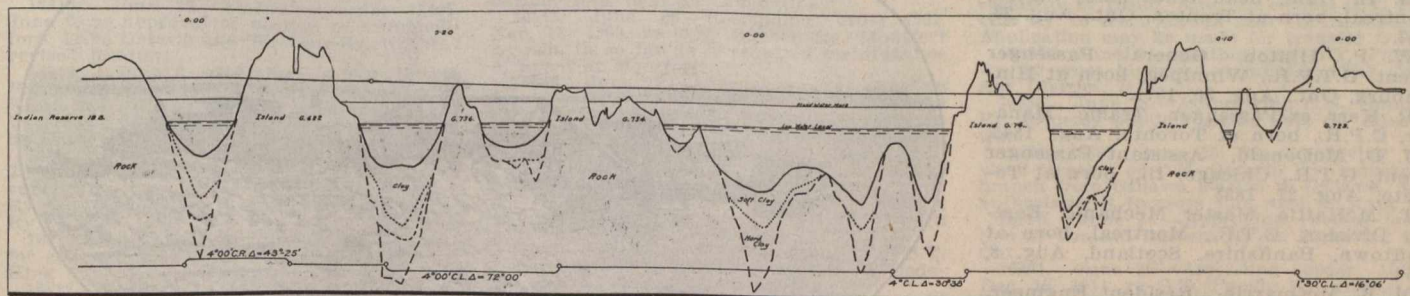


Canadian Northern Railway Rainy Lake Revision. Plan.

necessary to take continual precautions to guard against trouble. When the lake froze over in the fall, the water was usually higher than later on in the winter, and as the water gradually fell it was necessary to keep the ice cut away from the piles to avoid settlement from the weight of ice. In the spring there was always the possibility of a strong north wind driving the ice against the trestle. However, the latter caused little trouble and any slight damage from this cause was immediately repaired. The increase in traffic during the last few years made it apparent that the trestle must soon be replaced. It was not possible to make an embankment on the present line and keep the line open for traffic at the same time, besides the depth to rock on the pre-

double track embankment, about 95% of this being obtained from an adjacent island. Contractors are using drills operated by compressed air, the power being obtained from the hydro-electric development recently completed at Fort Frances. Steam shovels are employed for loading the rock into cars, and switching locomotives are used between the borrow pit and fill. The contractor has devised an unusual arrangement for building the fills. To obviate the necessity for a trestle, he placed two plate girders 140 ft. long across a supporting barge 32 ft. by 112 ft. by 6 ft. deep, the inner end of these girders being supported by a cross girder 80 ft. long, the ends of the cross girder being in turn supported by two smaller barges 12 ft. by 24 ft. by 5 ft. deep. The two long gird-

in., and a small allowance for dump plank and bracing depending on the height being made. Allow for lengths of pile in ordinary soil 15 ft. more than the height from the ground to cut-off. The iron will be about 60 lbs. per m. The piling on frame trestles is also obtained from the profile. The f.b.m. timber may be approximately obtained by multiplying the area of the opening between end bents, the ground, and the base of rail by a factor K, the value of which may vary from 11 to 13½. For long low trestles K may be as high as 13½, and for short deep ones the low limit (11) will be reached. The ratios of the area of the toe slopes at the ends to the whole area, and the timber in the deck to the total quantity, will considerably influence the value of K. Good guessing on the part



Canadian Northern Railway Rainy Lake Revision. Profile.

sent line was such that the embankment quantities would have been excessive.

In order to choose a new location it was necessary to take soundings to rock over a large area adjacent to the present line. This work was started during the winter with only fair success, owing to the difficulty experienced in handling the sounding rods, as they became quickly coated with ice. The work was continued during the summer, using a barge 22 ft. wide by 34 ft. long, on which was erected a small pile driver with a 75 lb. hammer operated by hand. The sounding was done through a well in the centre of the scow, using extra heavy 1½ in. steel pipe in 10 ft. lengths for sounding rods. This proved much more

ers are spaced 30 ft. c. to c., and are connected by floor beams on which track stringers are placed to carry cars as they came from the borrow pit. The cars are dumped in the space between the barges, the outer end of the long girders serving as a tail track for empties.

This arrangement has proved entirely satisfactory, and the work has progressed without interruption, the embankment being now about 75% completed.

On making comparison between excavation and embankment quantities it is found that the embankment is almost entirely displacing the clay in the bed of the lake.

of the estimator is necessary; this, combined with experience and judgment, should give very fair approximate results. The iron will be 57 to 60 lbs. per m.

The following figures are for Howe trusses, exclusive of falsework:

Span in feet.	Equivalent D.G.S. Loading.	f.b.m. Timber.	lbs. Iron.
60	Class III.	33,000	13,000
60	" Heavy	42,000	28,000
80	" III.	56,000	40,000
120	" II.	—	58,000

From the Transactions of the Engineering Society, Manitoba University, in The Manitoba Engineer.

The Ottawa Car Co. is going to build a new and larger plant at Britannia, a suburb of Ottawa.