

Trent Canal Hydraulic Lift Locks

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Thorough and Technical Description of Great Peterborough Lock—Process of Construction, System Applied and Materials Used

BUILT for the Canadian Government, by Canadian contractors, under the direction of Canadian engineers, the hydraulic locks on the Trent Canal may properly bear the label, "Made in Canada." In view of the fact that the German Government has recently completed a high canal lift at Heinrichsburg, and that the United States Government has made a careful study of the problem of mechanical lifts in connection with the reconstruction of the Erie Canal, a detailed description

independent of the reach and free to move vertically. The box with the water and the floating vessel is then raised or lowered to the other reach. The chamber or box about to descend is loaded with a few inches more water than the other chamber thus giving it the necessary additional load or "sur-charge" to enable it to cause the ascent of the other when water communication is established between the two presses. The construction of the Canadian locks varies materially from those of Europe, and as far as outward appearance goes there is little similarity. The departures are largely due to the climatic conditions and to the different practices adopted by American and European engineers in steel construction.

SELECTION OF SITE.

For purposes of detailed description the Peterborough lock will be dealt with first.

A gradual slope was selected for the site of the Peterborough lock and the excavation was completed in 1899. The location was chosen so that the average depth of excavation was about 40 feet, and the material thus obtained was used in building embankments to carry the level of the upper reach to the back of the structure. The excavated material was found to be hard clay mixed with small stones and boulders, underlying a thin layer of fertile soil. At the upper end of the excavation a small amount of hardpan was encountered, and below this a shaly limestone rock. The rock was in layers of from half inch to 8 inches in thickness, between which were thinner layers of clay and shaly material. The layers of crystallized limestone stand the weather quite well but the shaly parts disintegrate very rapidly under the action of rain and frost. The elevation at which rock was found was exceedingly fortunate, being practically at the bottom of the pits. When the rock was cleaned off less than two feet of concrete brought the floor to its proper grade.



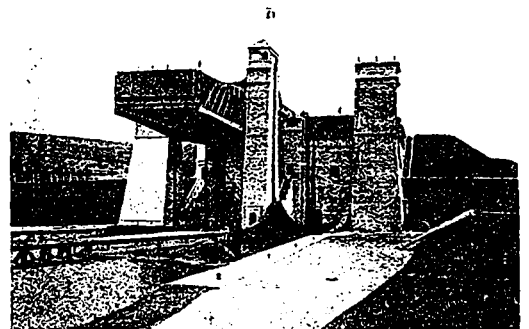
VIEW OF PETERBOROUGH HYDRAULIC LOCK LOOKING FROM LOWER REACH.

of the Canadian hydraulic locks may be considered appropriate at the present time.

The larger of the two Canadian locks is situated on the Trent Canal, within the limits of the corporation of the city of Peterborough, and has been in operation for the past two seasons. The other lock, near the village of Kirkfield is practically completed in a stretch of canal joining Balsam Lake and Lake Simcoe.

The hydraulic lock is theoretically an automatic machine, and is designed to take the place of ordinary locks where a great difference of level is found in a short distance. Besides the Peterborough lock, there are three other locks of this type in operation, one being in England, another in Belgium, and the third in France. The English lock has been in continuous use for over thirty years, while those in France and Belgium have been completed about twelve years. They all have a lift of nearly fifty feet. The depth of water in the French and Belgium locks is 7 feet 10 inches, and the lock chambers are 140 feet long, and 19 feet wide. Several others having similar dimensions are now being built by the Belgian Government. The chief dimensions of the Peterborough lock are 65 feet lift, chambers 140 feet long with 33 feet clear width, and 8 feet normal depth of water. The Kirkfield lock has the same general dimensions with a lift of 50 feet. It will thus be noticed that in the Peterborough lock the water load is double that of the larger European ones, while the height of the lift is increased over thirty per cent.

In principle the hydraulic lock may be likened to two immense hydraulic elevators of the simple plunger type, having their presses connected together so that the descent of the one causes the rise of the other. In place of the ordinary elevator platform we have a large watertight box or tank closed at either end by a gate. The lockage is performed by towing the vessel into this box of water and then closing the gate on the end of the box as well as that of the canal, thus leaving the box



GENERAL SIDE VIEW, PETERBOROUGH HYDRAULIC LOCK.

No footings were required under any of the walls, all being built upon the solid rock.

THE PRESS WELLS.

The wells in which the large presses stand were excavated about 75 feet below the floor of the pits, the diameter of the rock excavation being 6 feet 6 inches. The nature of the rock rendered this work comparatively easy. In the bottom of each well there is a foundation of granite, the object of which will be quite apparent since the whole weight of the lock chamber and its burden is concentrated on the bottom of the press and from there