

crib-work of square timber, before building the permanent abutment.

In the design of the pedestals and west abutment, borings and test pits were first made to determine the character of the soil. This proved to be of compact sand, gravel and hard pan, so that no piling was required, the footings being designed to distribute the load at a pressure of from 2.5 to 4 tons per square foot. The four pedestals near the water line at the banks of the river were built with curved cutwaters, the axis of piers being parallel to the direction of the current, forming suitable icebreakers. The anchor bolts for pedestals consisted of two rods, two inches in diameter, the lengths varying according to the up-lift to be resisted. These rods were anchored at the bottom by spacers of 10" channels and washers, the concrete being built around them. In order to give room for a little variation in their position, conical forms were set around each bolt, a lip being left at the top extending beyond the base plate of column through which these voids were filled with grout after the steel was erected. The west abutment or buried pier was about 40 ft. in height above the footing course, and in order to reduce the pressure on the soil and allow the embankment to run through and surround it, an arched void was left in a longitudinal direction. No difficulty was experienced in building to this design. Details of pedestals and abutments are shown on Plate No. 2.

In laying out the work no triangulation was required and an ordinary steel tape was used, the writer's experience being that, as provision is made in the girders for expansion, a slight variation in the position of the anchor bolts is permissible, providing the expansion slots are made longer than the theoretical length requires. The chief difficulty consists in maintaining the anchors in a vertical position and protecting them from rough usage from swinging buckets of concrete and other causes.

Concrete.—The materials used in the concrete were International Portland Cement, manufactured in Hull, Que., at present by the Canada Cement Company. The sand and gravel were obtained on the bank of the river near the bridge site. In this locality good sand is very difficult to obtain and, after a test of sand from several pits, the local material was selected, the sieve test showing after the gravel was screened out:

Retained on 20 mesh sieve	64 per cent.
" " 30 " "	17 " "
" " 50 " "	15 " "
" " 74 " "	2 " "
" " 100 " "	2 " "
100%	