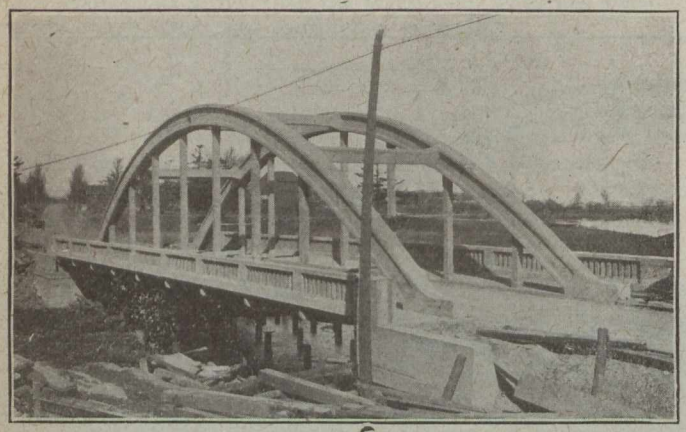
These quantities of steel were those specified in the original specification and were guaranteed by the engineers as to quantity, although the amount of concrete was not guaranteed to the contractor. The original plans and specifications were altered as a result of objections by the engineers of the city of Toronto and of the three counties

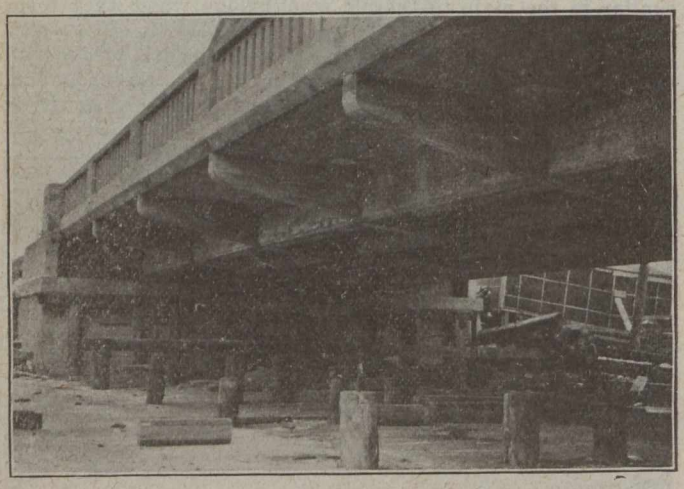


ANOTHER VIEW OF THE BRONTE BRIDGE

concerned in the payment of the bridges, and the quantities of steel were then somewhat enlarged.

The centre to centre distance between the arched chords and the lower chords at the centre of the bridge is 26 ft., and clearance above floor level (beneath bracings) is 16 ft.

The two parallel top chords are each 3 ft. 3 ins. deep, and 2 ft. 6 ins. wide at the centre of the bridge, tapering to 1 ft. 9 ins. wide at the skewbacks. Figs. 1 and 5 show the reinforcing in the top chord. Fig. 1, which is a section where the shortest hanger joins the top chord, shows 20 round bars, 8 of which are placed close together in the



VIEW FROM BENEATH BRONTE BRIDGE, SHOWING CANTILEVERED SIDEWALK

top of the chord and 8 close together in the bottom of the chord (10 of these 16 bars being 1⅝-in. diameter and 6 of them, 1⅜-in.). In the web of the chord there are 4 rods, each ½-in. diameter.

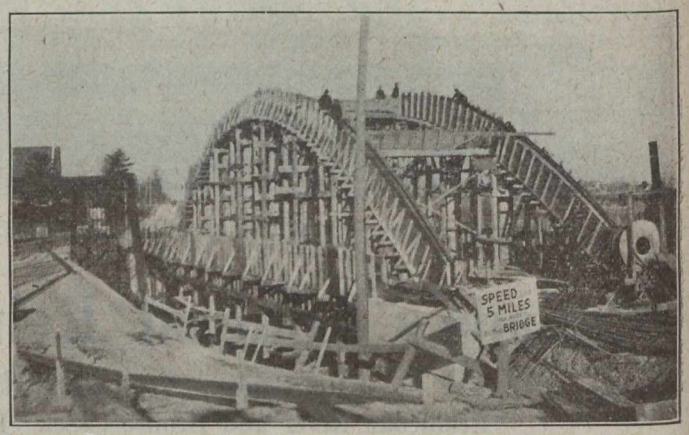
As will be seen from the upper part of Fig. 5, which is a section through the top chord at the centre of the bridge, the reinforcing there consists of twelve 1⅝-in. bars, placed six in the bottom of the chord and six in the top, in addition to the four ½-in. web reinforcing bars.

In the top chords there are ½-in. stirrups spaced 10 ins. apart between the first hanger and the second hanger, and ⅜-in. stirrups spaced 12 ins. apart between the second hanger and the crown of the arch and between the toe of the arch and the first hanger. The reinforcing in the top chord has lapped joints, with the ends of the bars turned up.

The reinforcing in each of the two bottom chords, or ties, consists of twelve 1¾-in. rods and two ¾-in. rods, spaced as shown in the lower part of Fig. 5, with ¼-in. stirrups spaced at 10-in. centres.

The original design of the bridge called for the reinforcing in the lower chords to be lapped 30 diameters and hooked, but the county engineers objected to the use of lapped joints in these tension members. Therefore the engineers for the bridge were requested to adopt turnbuckles with staggered joints.

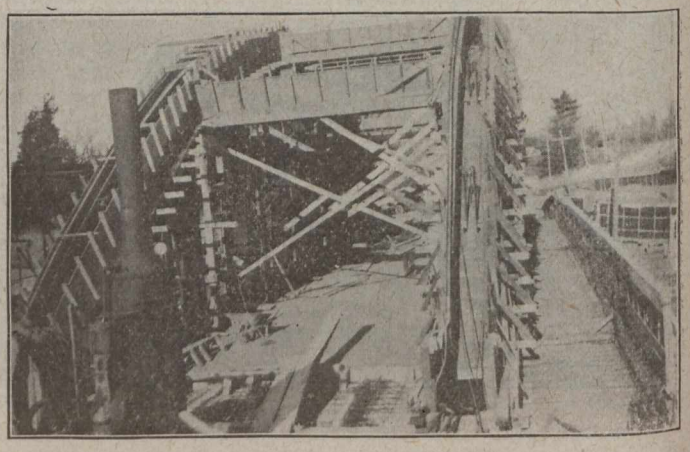
The contractor had a great deal of difficulty in placing these turnbuckles, as the bars were so heavy that it was found that the turnbuckles could not be used in the usual manner. It was necessary to screw the turnbuckle onto the end of one rod and then to screw the other rod into the turnbuckle by means of wrenches. This was not an easy



FORMS BUILT, READY FOR PLACING THE ARCH STEEL, BRONTE BRIDGE—OLD BRIDGE TEMPORARILY MOVED TO LEFT TO CARRY TRAFFIC

task owing to the weight of the rods and their tendency to sag and jam.

The original design called for the anchoring of the bars in the lower chord by bending them at the ends. This was not recommended by the Ontario government specifications, and it was thought by the counties' engineers that these rods would not develop their full strength by this anchorage, and those engineers suggested that the rods should be passed through vertical steel plates behind the junction of the upper and lower chords, and that the rods should be threaded and nutted behind the plates, which would be of sufficient size to resist the full thrust of the upper chords. It was



FLOOR SYSTEM CONCRETED TO FIRST HANGERS—WORK PROGRESSING ON THE ARCHED CHORDS—BRONTE BRIDGE

suggested that the two plates on the end of each lower chord would thus, in a sense, take the place of the skewbacks in an ordinary arch, and would be held together by the tension rods in the lower chord, which pass from plate