

CONCRETE IN MUNICIPAL BRIDGE WORK.*

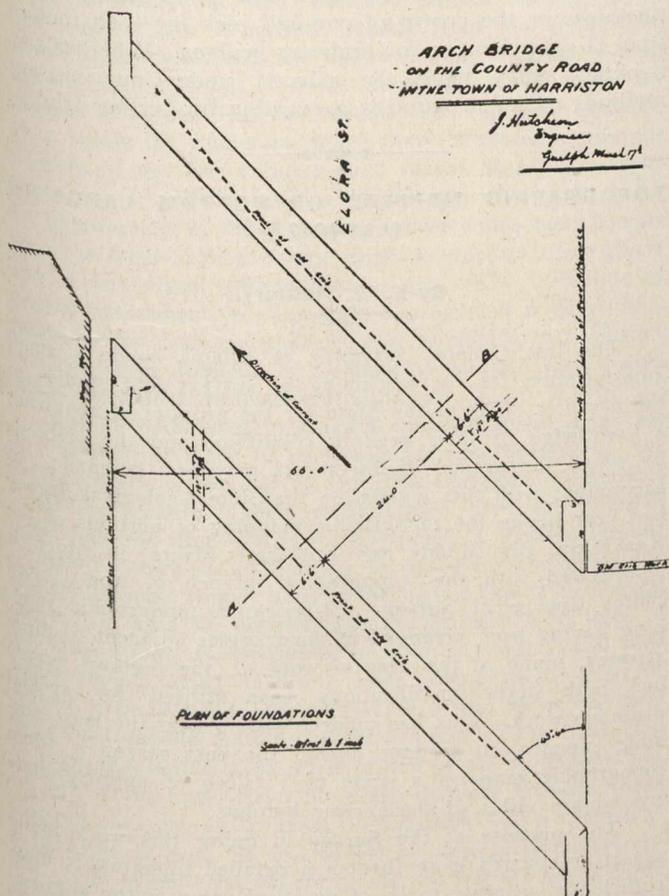
By James Hutcheon, O.L.S., Guelph.

Twenty years ago the use of Portland cement concrete was very limited in this Province. The manufacture of Portland cement in Canada was at that time still in the experimental stage. The cement then being used was imported from Europe, and, being high in price, its use was confined chiefly to difficult foundation work, and to a limited extent in sidewalks and street pavements.

The use of cement concrete for sidewalk construction came rapidly into favor, because of its substantial appearance and durable qualities, compared with the materials then in use.

So much prominence is, however, given to the newer methods of construction with reinforced concrete that we are apt to forget that plain concrete still has its uses, and, perhaps, think that if our designs do not provide for reinforcement they are not quite up to date.

The experimental knowledge of the action between steel and concrete is now so complete, and the experience with its use in construction so extended that its safety and durability are beyond question, when used

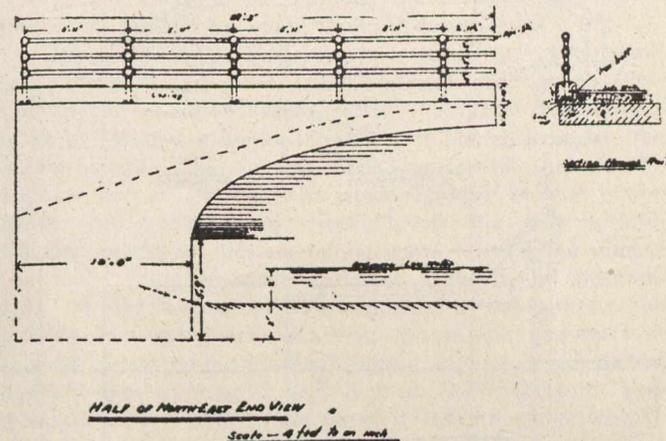


Plan of Foundations of Concrete Arch Bridge, Harriston, Ont.

Though its value for that purpose was at once recognized, yet even ten years ago there were very few municipal councils who would consent to its use in bridge abutments, though some would permit it to be used in the foundations. To-day concrete has almost entirely displaced both stone and wood in the construction of abutments, short-span bridges, and culverts.

It is in almost universal use for foundations and in the basement walls of large buildings, and even in the cellar walls of low-cost buildings it occasionally takes the place of rubble masonry, while in the form of concrete blocks or of moulded artificial stone it has a recognized place among the ordinary building materials. But the widest field for expansion in the uses of concrete lies in its combination with steel in the form of reinforced concrete.

Rapid though the increase in the uses of concrete have been, the literature on the subject has kept pace with the growth, till every phase of this subject appears to be covered.

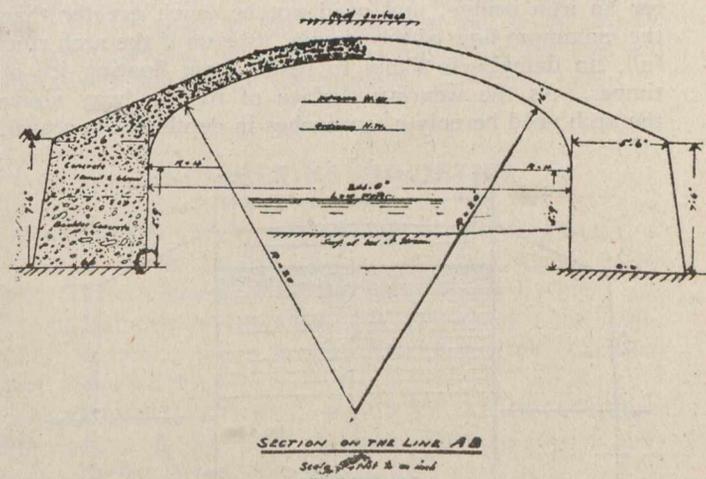


Side Elevation, Concrete Arch Bridge at Harriston, Ont.

with reasonable skill and intelligence. The want of this skill must for a time retard its use in municipal work, as the necessity for careful supervision of concrete work is not yet fully realized by the average council.

The work, as a rule, is let to the lowest bidder, and often goes to an inexperienced contractor to be carried out, under the inspection of a commissioner or a member of the council without previous experience or knowledge of the work.

Limited in this way, the engineer, however much he may admire other styles of construction, will confine his designs in concrete to types within the capacity of those who are to carry out those designs. The plain concrete arch is without exception the best form of construction for culverts or short-span bridges under such conditions, and spans up to 30 or 40 feet in length can



Section of Concrete Arch Bridge, Harriston, Ont.

be built by local building contractors at prices which compete with steel bridges, when we take the cost of the abutments for the steel bridge into account, while the appearance and durability of the arch gives it a decided preference. The span length should be limited to something like the length named, as an increase in span much above the length mentioned necessitates more expensive false work and more difficult construction, with the increased danger of settlement during construction, so that where a greater length of bridge is required the

* From the 1908 Proceedings of the Association of Ontario Land Surveyors.