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discussion as possible at earliest date.

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DISCUSSION, DESIGN, AND SPECIFICATIONS FOR A REINFORCED CONCRETE BRIDGE ABUTMENT.

By T. M. FYSHE (S. Can. Soc. C. E.)

(To be read in the autumn of 1907.)

The past few years have seen a tremendous growth in the use of concrete, plain and reinforced. One has only to look at the remarkable growth of the Portland Cement Industry, both in the United States and in Canada, to realize this fact. Cements have, of course, been known for a very long time, but within the past twenty-five years the cost of the manufacture of Portland Cement has, through a great deal of scientific study, been very much reduced, and at the same time the quality and uniformity of the cement have been greatly improved. These facts in a large degree account for the great increase in its consumption.

With the increase in the use of Portland Cement Concrete, the study of its qualities has gone hand in hand. The use of steel to overcome the inability of concrete to resist tensile stresses was a remarkable discovery. This combination of concrete and steel is made possible by the fortunate coincidence of their coefficients of expansion and contraction. It virtually gave the world a new material, steel concrete, the possibilities of which, with further study and knowledge, will certainly be very great.

In the use of every new material mistakes are bound to occur, sometimes through lack of knowledge, sometimes through carelessness or through attempts at the impossible. These failures should not discourage the use of reinforced concrete when carefully and conservatively applied by one who has sufficient knowledge of its possibilities.