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the loads producing critical failure of reinforced-concrete beams, in which the consistency of the mix was varied from a rather wet, plastic condition to a very wet condition. In the determination of these stresses, the ten-



Fig. No. 16.—Relation of Time of Mixing to Compressive Strength of Concrete

sile stress borne by the concrete was disregarded in all cases.

Fig. 15 was deduced from Fig. 14. It shows in a general way, by percentages, the relation between the strength of reinforced-concrete beams of the first con-



Cubes and Tensile Strengths of Mortar Briquettes, 1:3 Mix

sistency, seasoned 90 days, and the strengths of beams of varying consistencies and ages.

In the preparation of all specimens for consistency-ofmix tests, specially graded sand No. 2 was used.

Time-of-Mixing Test.—The cylinders composing the four groups were tested at the age of 162 days. From

the results of this test the curve shown in Fig. 16 was prepared.

The abrupt change in the direction of the curve at the location indicating the 1 to 2-minute period of mixing, together with the rapid increase of strength shown for mixing periods of less than 1 minute duration, show conclusively the advantage gained by continuing the mixing operation for a period of from 1 to 2 minutes after all the materials have been placed in the mixer.

Mortar Tests.—Fig. 17 shows the compressive strengths obtained from the tests of the 2-in. cubes and the tensile strengths of 1:3 briquettes. Each value is an average of the values of five specimens.



Fig. No. 18.—Relative Compressive Strengths of 2-in. Mortar Cubes, and 6 x 12-in. Concrete Cylinders

Fig. 18 shows the relative strengths of 2-in. mortar cubes, age 28 days, and 6 by 12-in. cylinders, age 90 days. The dissimilarity of the curves is of special interest.

(Continued in the next issue.)

The production of finished steel in Great Britain in 1916 is reported by the Iron and Steel Federation as follows:-Bloom, billets and rods, 1,945,000; sheet bars, 1,272,000; rails, 271,000; plates, 1,153,000; sheets, 78,000; shapes and angles, 757,000; beams and girders, 346,000; galvanized sheets, 132,-000; tin plates, 577,000; total, 6,531,000 gross tons. The production of steel castings was 207,000 tons, of which 18,000 tons were made in electric furnaces. The production of wrought iron was 960,000 tons.

At Norrköping, Sweden, a new shipyard is about to be constructed where the Motala River enters Breviken. Two slips are already so far completed that the keel of the first vessel can be laid, a vessel of 725 tons deadweight. A shed will be built over the slip, so that work can proceed in all weathers. In the first instance cargo motor-boats of moderate dimensions are to be built, but the intention is to undertake heavier work by degrees; a floating dock for good-sized vessels will also be constructed. It has been decided to start a new yard also at Korsör, Denmark, specially with a view to the building of wooden vessels. Three slips will be erected, and orders have already been received.