

where P = percentage of strength as compared with the 1-minute strength of the same concrete;
 t = mixing time in seconds; and
 l and m are constants, depending upon the same factors as k and n in equation (6).

Equation (9) is, of course, only another way of writing equation (6). The values are based on the general trend

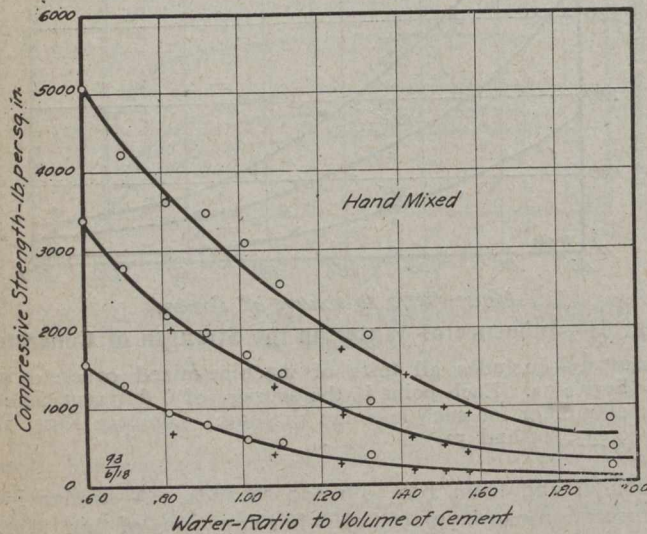


Fig. 33—Influence of Water on the Strength of Concrete
 Series 93—Hand-mixed concrete in Table 8. Each value is the average of 4 tests made on different days. Compare Figs. 7, 9, 31, 44 and 52.

of the results found in these tests. It should be borne in mind that these values do not necessarily represent conditions for mixers of other types or sizes.

Concrete of Different Consistencies

The tests in Series 89 show the effect of time of mixing when concrete of different consistencies is used. The relative values in Table 12 show that the drier mixes are

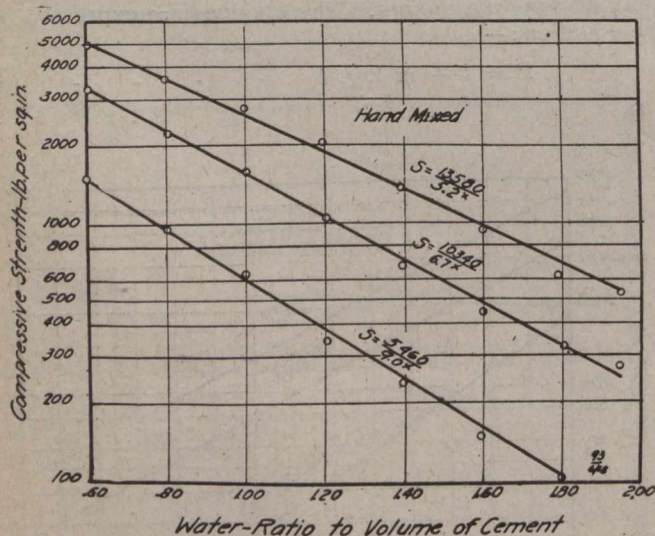


Fig. 34—Influence of Water on the Strength of Concrete
 Series 93—Same data as in Fig. 33, except strength platted to logarithmic scale. Compare Figs. 8, 10, 32, 45 and 53.

more affected by continued mixing than the wetter ones; for instance, from $\frac{1}{2}$ to 2-minute mixing we find an increase from 89 to 112 per cent. for 90 per cent. consistency and from 98 to 105 per cent. for 200 per cent. consistency. For the usual range in consistencies which should be aimed at in most work, say, 100 to 125 per cent., chang-

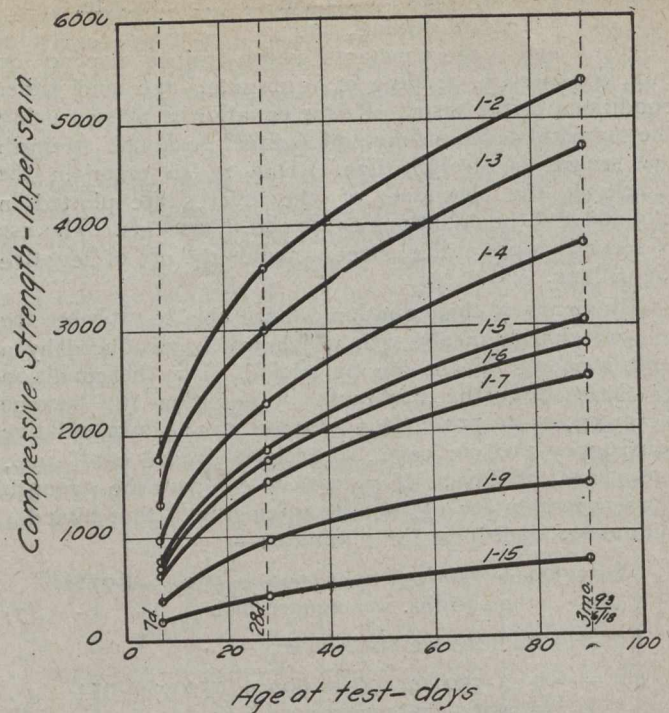


Fig. 35—Effect of Age on the Strength of Concrete
 Series 93—Aggregates graded 0-1 1/4 in. Each point is the average of 24 tests from 6 times of mixing. Compare Figs. 19 and 38.

ing the mixing time for a 1:4 mix of ordinary aggregates from $\frac{3}{4}$ to $1\frac{1}{2}$ or from 1 to 2 minutes causes an increase in the strength of about 10 per cent.

From the values in Table 12 it will be seen that mixing a concrete of 125 per cent. consistency for 10 minutes gives about the same strength as mixing 110 per cent. for 1 minute; the use of 2 to three pints of water more than necessary in a 1-bag batch of concrete is sufficient to counteract the beneficial effects of increasing the mixing time from $\frac{3}{4}$ to $1\frac{1}{2}$ minutes or from 1 to 2 minutes. No reasonable increase in the period of mixing concrete will compensate for the use of an excess of water in the batch.

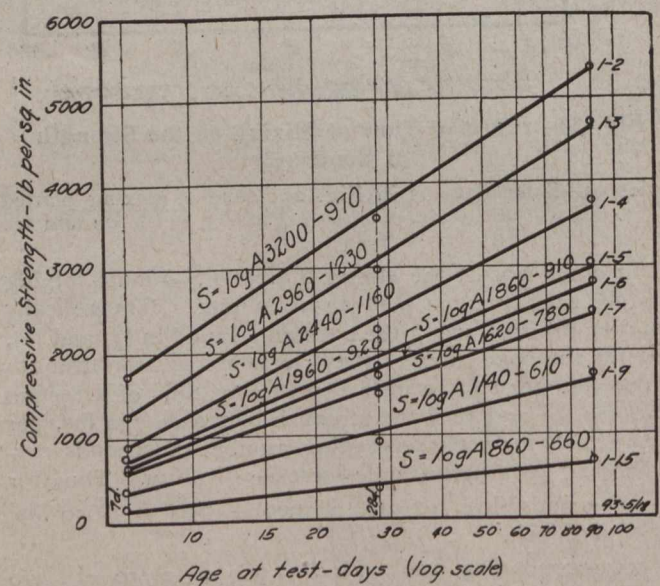


Fig. 36—Effect of Age on the Strength of Concrete
 Series 93—Same data as in Fig. 35, except age is platted to logarithmic scale. Compare Figs. 20, 37, 39 and 46.