

EVALUATION OF IN-PLACE STRENGTH OF CONCRETE BY THE BREAK-OFF METHOD

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Reference: CBU-1990-14

ABSTRACT

The overall objective of this research was to investigate the reliability of the Break Off (B.O.) method as a tool in determining the in-place strength of concrete, and to investigate the sensitivity of this method to different types of concrete. Effects of several significant parameters were investigated to accomplish this objective. The parameters considered were: (1) concrete strength; (2) aggregate shape; (3) age of concrete; (4) slab thickness; and, (5) method of obtaining cylindrical B.O. test specimens (either by inserting plastic sleeves or by drill cores). A total of 524 B.O. tests and 90 standard cylinder tests were carried out.

Evaluation of the results has indicated that the B.O. test readings show a similar trend of strength development versus age as that for the standard cured compressive strength of concrete. The average coefficient of variation for the B.O. test was eight percent. The B.O. test results for crushed aggregates concrete were on the average 10% higher than that for rounded aggregates concrete. Slab thicknesses of 5 and 7 in. did not have any significant effect on the variability or the average value of the B.O. reading. The drilled cores B.O. test results were on the average nine percent higher than the inserted sleeves B.O. test results.

In order to develop empirical relationships correlating the cylinder compressive strength to the in-place concrete strength, as a function of the B.O. reading, regression analysis was performed. The regression equations obtained showed a high degree of correlation between the B.O. readings and the compressive strength of concrete. It was concluded from the results of this research project that the B.O. test is an accurate, fast, and easy way of determining the in-place compressive strength of concrete.