ABSTRACT

FACTORS AFFECTING SELECTED METHODS OF TESTING CONCRETE FOR COMPRESSIVE STRENGTH

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Destructive testing of moulded specimens is the most frequently used method of assessing the in-place compressive strength of concrete in structures. Recent experiences at premier German institutes have vividly demonstrated the current need for substantial improvements in reliability, even in some metropolitan countries. Many influences have been determined to affect such testing, including the character and composition of test specimens, testing equipment performance, and testing procedures. Caribbean data of relevance are virtually non-existent, and existing literature is typically uninformative concerning such details, and is therefore of limited value; in any event, particular aggregates and cements and their proportions can exercise substantial influence. Accordingly, the first part of the work has experimentally examined the effect of a number of test parameters, and has concluded that many more details of experimental procedure than it is presently usual to record are necessary for the proper interpretation of results from such testing.

Notwithstanding the foregoing, developments in nondestructive testing have made possible rapid data acquisition from existing structures, and monitoring of properties-changes over time. These approaches require referencing to parallel compressive-test data, and are themselves affected by numerous factors, so that the referencing relationship is itself subject both to the factors which affect the non-destructive testing and those which affect compressive tests.

The second part of the work examines the use of rebound and ultrasonic-pulse-velocity methods, and the effects of both variations in aggregate proportions and of a substantial change in aggregate properties, on the compressive-strength/nondestructive testing relationships. It also concludes that details of experimental method are of considerable significance to the validity of test data, and that the failure to control such parameters is reflected in wide dispersions of test data, which severely compromise the usefulness of the two methods for concrete strength-prediction.