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MODEL CLAUSES FOR CIVIL ENGINEERING WORKS

SECTION 83

STRUCTURAL CONCRETE REPAIRS

NOTES TO SPECIFIER

These notes do not form part of the Specification.

Use of this Section and interface with other Sections

83.1

This Section specifies the testing requirements to determine the cause, extent and degree of deterioration in concrete structures and the methods of repairing such structures.

This Section should be read in conjunction with Section 23: Structural Repair Survey, and Section 80: Structural Concrete.

Diagnostic investigations

83.2

Before any repairs, other than emergency repairs, are carried out, it is essential that the root cause of the deterioration is identified. In commissioning diagnostic investigations it is important that the Specifier does not jump to conclusions regarding the cause of deterioration and thereby unduly limit the type of diagnostic testing which is commissioned. It is far better to keep an open mind and use the diagnostic investigation to eliminate unlikely causes of deterioration. By adopting this approach, causes of deterioration not readily apparent are less likely to be overlooked.

Limitations on application of this Section

83.3

This Section of the Specification covers specific testing of concrete structures and commonly used repair methods.

This Section does not cover the following aspects:

- (i) foundation Works,*
- (ii) under-water examination or Works.*

Also, techniques such as cathodic protection, externally bonded reinforcement, re-alkalisation of concrete and external post-tensioning are not covered by this Specification. It is recommended that specialist advice is sought for these types of repairs.

Choice of testing 83.4

Clauses 83.004 to 83.011 should be used in conjunction with Section 23: Structural Repair Survey.

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The Specifier, when choosing appropriate tests, shall take into account the suitability of the tests, the results required and the relative complexities and costs of the tests. With respect to non-destructive (including partially destructive tests), it is strongly recommended that the Specifier is familiar with BS 1881: Part 201. This outlines the applicability, advantages and disadvantages of these tests. Tables 1 and 2 of BS 1881: Part 201 are a useful introduction, before considering each test in detail. If the Contractor is to propose a testing regime, reference should be made to BS 1881: Part 201. The CBDG technical guide No 2, Guide to testing and monitoring the durability of concrete structures, provides a simple but comprehensive guide to selecting and procuring the most appropriate tests of concrete durability and for improving the quality of testing.

It may be appropriate to undertake the testing, investigation or survey in two phases, the first to identify the deterioration mechanisms that are active, and the second to identify the extent and degree of the deterioration, such that adequate repair details can be designed.

The following list gives an indication of other tests which are available, but are unlikely to be required in most instances. Further guidance on use of the tests and their advantages, disadvantages and limitations is available in BS 1881: Part 201. It is essential that specialist advice is sought before specifying the following tests.

- (i) An alternative test for carbonation is the laboratory x-ray or chemical analysis of samples collected from different depths to determine their calcium hydroxide and calcium carbonate contents.[see BRE IP 6/81 - now out of print]. The phenolphthalein is a simple and adequate test.*
- (ii) "Cornell Tests" (the observation of fluorescence after treatment with Uranyl Acetate) for alkali silica reaction - may be of limited value and may pose some health and safety risks.*
- (iii) Radiography (BS 1881: Part 205) for identifying variations in density - expensive and difficult to set up.*
- (iv) Radiometry for assessing in-situ density - expensive and difficult to set up.*
- (v) Neutron moisture measurement for an indication of surface zone moisture content - expensive and difficult to set up.*