Construction

General Surface Preparation and Diagnosis Procedure

1. Initial Survey and Diagnosis

Notes for Guidance

N.G.1.1 A visual examination of the whole damaged structure should be undertaken noting all symptoms, soundness of existing waterproofing systems, evidence of structural movement and structural integrity. It is important that the structures current condition is assessed as a whole, (ie. visible, non visable and potential defects), as well as reviewing its past, current and future exposure to damaging influences. This will determine the order in which the works are programmed, separate contracts are let or specific products are selected.

This examination should be combined with the results of testing, using principally non destructive techniques onto cleaned concrete. This testing should ideally determine the following

- Concrete soundness
- Depth of concrete cover and reinforcement location
- Carbonation zone
- Chloride content
- Concrete permeability

A number of other test procedures, e.g. petrographic examination, electropotential mapping etc. may also be useful in compiling a complete picture of the structure, the damage and the causes. Obviously the extent and costs of testing must be related to the degree and value of the structure and the works.

The initial survey, i.e. the results of any testing combined with the visual examination requires interpretation by skilled and experienced personnel to ensure that any unusual aspects of the concrete or its environment do not go unnoticed. In all cases we recommend that this be undertaken under the supervision of an experienced and independent structural engineer.

Construction

2. Cleaning and Preparation

Specification

2.1 All exposed concrete shall be cleaned and prepared to achieve a laitance and contaminant free, open textured concrete surface to the approval of the Supervising Officer.

Notes for Guidance

N.G.2.1 This must fully expose all defects including cracks, honeycombing, blow holes, cold joints, sealant rebates etc. and remove all contaminants including moss, lichen, algae, oil, grease, efflorescence, joint sealant residue, paint, graffiti, skims, renders, old bagging in or repair materials etc.

N.G.2.2 The Contractor shall satisfy himself prior to tender that his stated method of cleaning and preparation is practical, economical and acceptable to the client.

N.G.2.3 The Contractor shall include in his method statement his intended method of cleaning and preparation. However, such method statement will not limit in any way the Contractors obligations under the contract to meet the requirements of the foregoing subclauses and this specification generally to the entire satisfaction of the Supervising Officer.

N.G.2.4 The Contractor shall provide adequate protection to all adjacent elements of the structure, other trades and third parties.

N.G.2.5 All debris and residue of cleaning and preparatory operations shall be removed to the place designated under the contract.

3. Identification and Cause of Damage

Specification

3.1 Carry out on-site testing to supplement initial diagnostic testing as directed by the Supervising Officer, to identify the causes of damage.

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Notes for Guidance

N.G.3.1 Hammer testing of the surface will only identify existing and visibly damaged areas but can usefully be carried out prior to more detailed testing/survey.

N.G.3.2 An accurate cover meter survey should be carried out by experienced personnel, in the presence of the engineer, if possible. An accurate cover meter survey will be difficult to conduct on anything but fairfaced concrete surfaces.

N.G.3.3 Carbonation depth testing should be carried out on all elevations, levels and different elements of the structure to ensure correct assessment. This should be done in conjunction with random and localised carbonation depth testing on freshly broken concrete using phenolphthalein indicator solution.

N.G.3.4 It is prudent to test for chloride content in all different elements of the structure, taking care to investigate the source i.e. inclusion in the original mix or ingress from the environment, marine atmosphere or de-icing salts.

N.G.3.5 These results will help to ensure that not only visibly damaged areas are treated, but non visible damage and potential defects are also identified and treated, i.e. it is likely that in some areas not as yet showing visible damage, the carbonation front has reached steel bars with inadequate cover, reducing the alkalinity and allowing active corrosion to commence - however, if this is only at an early stage, then expansive stresses will not yet have built up to a level sufficient to cause visible cracking and subsequent spalling.

N.G.3.6 The nature of all cracks in the structure should be ascertained and the likely extent of future movement estimated by the structural engineer.