

TACKLING THE PRIMARY CAUSE OF CONCRETE DETERIORATION

The environment provided by good quality concrete in which steel reinforcement exists, is said to be passive, i.e. a highly dense and protective oxide film forms on the steel's surface and acts as a physical barrier to aggressive agents. If, however, atmospheric 'nasty's are able to reach the steel, corrosion of the reinforcement can occur.

Corrosion of steel reinforcement in concrete is the single biggest cause of deterioration of our infrastructure. The two primary reasons; carbonation, which leads to the loss of concrete alkalinity and chloride attack, primarily from de-icing agents or seawater, break down the protective oxide film of the steel reinforcement. The presence of moisture and oxygen causes expansive corrosion (which can be up to eight times greater than the original steel) and is sufficient to cause concrete cracking, delamination and eventually spalling.

Fortunately, a number of remedial options are detailed in a new 8-page document, entitled **Electrochemical Rehabilitation of Steel Reinforced Structures - Advice Note No. 4**, which has just been published by the **Concrete Repair Association (CRA)**. The publication describes the problem in detail, as well as the various electrochemically based methods of remediation and where these are applicable. It also gives advice on designing against deterioration, provides information on new developments and gives an extensive list of references and further reading suggestions.

Even though standards, papers and advice notes laying down the minimum requirements for durable steel reinforced concrete exist, it is always likely that poor detailing, inadequate consideration of local weathering, micro-climatic conditions and poor workmanship will lead to corrosion of the reinforcement, states the document. It is essential, therefore, that a thorough assessment of the condition of a structure is performed at regular intervals and the most suitable remediation procedure is applied when required.

The document also points out that electrochemical processes require specialist skills and stresses that they should only be carried out by a qualified contractor, experienced in the design and application of the techniques, such as members of the CRA.

The electrochemical remediation techniques detailed in the CRA Advice Note No. 4 form only part of the range of steel reinforced concrete rehabilitation methods, but are recognised as the most successful in controlling or arresting steel corrosion. Copies of CRA Advice Note N0 4 can be obtained, free of charge, by logging on to: www.cra.org.uk/info and entering Enquiry No: 1027.

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