C-05: Chemical attack on concrete and its prevention

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Concrete can be severely affected in the presence of different chemical environments. The common cause of such deterioration is sulphate attack. The extent of deterioration of concrete in sulphate environment and effective ways of minimizing such effects were studied.

By maintaining a constant cement content, concrete cubes were cast with different water/cement ratios. All concrete cubes were water cured for 28 days. Epoxy, bitumen and sodium silicate coated cubes and some cubes from different water/cement ratios were kept in chemical solutions with different sulphate concentrations for maximum of 4 months. A few cubes were kept without exposing to the sulphate environments. At different time intervals the degree of deterioration was estimated.

Sand blasting and rebound hammer could be used to estimate the degree of deterioration of sulphate attack in concrete. It was found that the application of epoxy coatings are superior to bitumen and sodium silicate coatings in preventing sulphate attacks. The use of low strength concrete with epoxy coatings is effective and economical, than the use of high strength concrete, for elements vulnerable to sulphate exposure.