

Determination of the influence of the exposure conditions in models of durability of reinforced concrete

Summary

The main objective is to assess the adequacy of the chloride diffusion coefficients, used in service life assessment, determined by the laboratory tests. Several types of binders and aggregates were inserted in different maritime environments reproduced in the laboratory. The thesis will involve an extensive experimental component, in order to rank the quality of the different concrete produced. This work intends to contribute to a greater confidence and a better criterion in the direct application of the parameters obtained in the accelerated tests of chloride penetration to the service life assessment models specified in the European and national standardization.

At the end, it should be possible to establish a qualitative classification of the performance in terms of the durability of the various types of concrete, as a function of the diffusion coefficient obtained in the accelerated migration chloride test. It should also be possible to analyse the relationship between the parameters obtained in these tests and the main transport properties of the concrete evaluated from current tests on the microstructure of the concrete (absorption, permeability, porosity).

Finally, an experimental campaign is also planned to determinate the diffusion coefficients of the concrete in real structures, by carrying out accelerated durability tests on specimens drawn from different structures that exist in the territory. The aim is to assess the hierarchy established for concrete from the laboratory tests and to present a critical analysis of the error associated with the forecast models suggested in European and national standardization.

Keywords

Chloride diffusion, concrete durability, steel corrosion, concrete microstructure, service life.



a)



b)

a) Core samples for characterization of concrete structures in marine environment

b) Tidal zone tank simulator



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