

Influence of chloride content, cover, and concrete mix parameters on post depassivation service life of chloride contaminated R.C. structures

Shamsad Ahmad and B. Bhattacharjee

Proceedings of International Conference on Maintenance and Durability of Concrete Structures, 4-6 March, 1997, J.N.T. University, Hyderabad, India, pp. 68-72

Abstract:

In the present study a response model has been developed for residual service life prediction of R. C. structures against chloride-induced rebar corrosion. The proposed model has been empirically fitted in terms of the four basic factors namely; chloride content, cement content, w/c ratio and cover thickness over rebar, which affect the post-depassivation service life (i.e., residual life) of chloride-contaminated R. C. structures. The chloride content has been found to be a major factor affecting the corrosion rate. However, the cement content and w/c ratio also have minor effects on the corrosion rate. Cover thickness plays a significant role in cracking of cover concrete due to rust expansion around the rebar besides providing a thin layer of protection against moisture and oxygen penetration. A standard experiment design was adopted and accordingly the levels of each factor and number of trials were fixed. The residual service life of each trial specimen was determined using theoretical and experimental approaches and finally the response surface model for service life prediction was fitted using least squares technique.