

Reliability Study of Reinforced Concrete Structures Under Carbonation Attack

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Abstract: *The enhanced performance due to the addition of steel within concrete elements has thrust reinforced concrete structures to be one of the most commonly used construction materials in the world. Reinforced concrete structures are exposed to a variety of deterioration mechanisms during their operational existence, each of which contributes to reducing their service life, durability, and load bearing capacity. The longevity of these reinforced concrete structures is strongly connected to degradation processes, whose origin is environmental and/or functional. Among these processes is the initiation and evolution of corrosion on the steel reinforcement. Steel reinforcement has direct effects on the durability, safety, and useful service life of a reinforced concrete structure. The reliability of an engineering design is measured by the probability that a design meets certain demands under certain conditions, or its resistance will be able to sustain given loads. The main focus of this study is to develop a reliability-based service life prediction model using the uncertainties characteristically recognized in the parameters included in established corrosion detection processes. Reliability algorithms, such as Advanced First Order Reliability Method (AFORM), were used to analyze the effects of key factors within both uniform and localized corrosion conditions on time-dependent reliability. The results clearly illustrate the decrease in reinforced concrete element reliability after exposure to corrosion due to the reduction in flexural capacity of the steel reinforcement*

Keywords: Christian Mission, Anglican Church, Civilizing Mission, Romanticism, Eastern and Orient

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