Corrosion of Steel in Concrete, Part I – Mechanisms

Throughout the world reinforced concrete is the most widely used construction material for buildings and civil engineering structures. Most reinforced concrete structures have performed satisfactorily over many decades, but there still is an unacceptable large number of structures that deteriorate prematurely. Reinforcement corrosion is identified to be the foremost cause of deterioration. Steel in concrete is normally protected by a passive layer due the high alkalinity of the concrete pore solution; corrosion is initiated by neutralization through atmospheric carbon dioxide and by ingress of depassivation ions, especially chloride ions. The background and consequences of deterioration of reinforced concrete structures caused by steel corrosion are summarized. Selected corrosion mechanisms postulated in the literature are briefly discussed and related to observations. The key factors controlling initiation and propagation of corrosion of steel in concrete are outlined.

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