



Performance assessment on degrading concrete structures including considerations on the time variant alteration

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Abstract

The infrastructure of ASFINAG is mainly built from reinforced and prestressed concrete, which despite all regular maintenance measures, is subject to ageing and degradation. The major degradation process is chloride attack, followed by carbonation, which both lead to corrosion of the reinforcing steel. In this paper chlorides in the concrete are analysed with a new method, which represents a major improvement over previous assessment. The paper also introduces a new concept for the durability assessment by using objective indicators, like chloride content, electrical resistivity, and corrosion potential. For objectivity and a reliable determination of the condition state, an overall performance index derived from the condition indices using an analytic hierarchy process (AHP) is adopted. The model is applied to excellent and dense data from a monitoring system and investigations taken from reinforced concrete components beside the motorway.

Keywords: Existing structures; chloride content; Laser Ablation Inductively Coupled Plasma Mass Spectrometry; LA-ICP-MS; corrosion; performance assessment; condition index; performance index; analytic hierarchy process; short time prediction