

Thesis title:

Assessment of durability indicators use in evaluating concrete durability with different supplementary cementitious materials under a given exposure condition

Abstract:

Durability and service life prediction have increasingly gained importance in current construction industry for the existing concrete structures and service life-based designs. Traditional durability design approaches have been based on prescribed limiting values for selected mix design parameters and deals with durability of concrete entirely on the basis of prescriptive specification, although it refers to performance-based design methods as an alternative. Concrete's durability is defined by its ability to resist weathering action and chemical attack, while maintaining the desired engineering properties. Characterization of cover concrete is often the most viable means for assessing the durability. Measuring the durability of concrete to determine its longevity is difficult to predetermine. However, there are many testing methods available which provide a number of properties to assessing the concrete durability such as initial surface absorption test, rapid chloride penetration test, electrical resistivity, water penetration test, water absorption test, permeability test, etc. The performance of concrete has to be defined indirectly with respect to its durability by these test methods considering various parameters. There are limitations in some of test methods for evaluating durability since various drawbacks make the tests unrealistic and unreliable and also there is no quantitative approach for evaluating durability of concrete directly. The test of permeability is considered to be the most fitting for assessing durability of concrete. Different researchers have identified various behaviours of existing durability test methods in different type of supplementary cementitious materials (SCM) use in the construction industry. Therefore, this study was focused to evaluate the durability indicators and to propose requirements with respect to each test method to achieve a specified level of durability under a given exposure condition.