

RES2016-25 - Acceptable Chloride Ion Limits for Concrete

Synopsis

The objective of this project is to develop guidelines that aide TDOT professionals in writing supplemental specifications for reinforced and pre-stressed concrete. Upon the completion of this project, information will be available on the acceptable chloride limit for both reinforced and prestressing concrete structures in the state of Tennessee, which takes into considerations of the nature of local materials (e.g., aggregates), structures (e.g., reinforced or pre-stressed), and environment. Information will also be available regarding the chloride content in aggregates and other constituent materials, and how they affect the acceptable chloride limit as well as the corrosion behavior of both prestressing and reinforcing steel. Guidelines can be developed as to what aggregates may present potential risks to corrosion of reinforcing steel and prestressing strands, and how much chloride from constituent materials is acceptable for both reinforced and pre-stressed concretes. Also, evidences will be available on how type III cement and other supplementary cementitious materials affect the binding capacity, pH value, as well as the acceptable chloride ion limit. Guidelines can be developed concerning what cementitious materials are favored for reinforced and pre-stressed concrete applications. In addition, the results of this study will demonstrate how the bound chloride can be released as well as the buffering capacity of various TDOT concrete mixtures. Guidelines can be developed regarding what concrete has a higher inhibiting effect and thus a longer service life when exposed to chloride. The outcome of this study will also include the comparison of different testing methods for determination of chloride content in concrete, which enables TDOT professionals to choose a more reliable testing method for future chloride analysis.