

Durability of Precast Prestressed Concrete Pile in Exposure Severe Environment

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This research project focuses on the corrosion resistance of prestressed concrete pile using cement type III and typical prestressing wire exposing to the severe environment. Exposing conditions represented various situations; submerge, wet-dry cycles and electric accelerated using identical concentrations at approximately triple that of seawater. In addition, for realistic situation, full-scale precast prestressed concrete piles are constructed by hammering the piles into the soil to a depth of five meters by diesel hammer. The corrosion prevention technique using Sacrificial Anode Cathodic Protection (SACP) also was installed before casting the piles in order to evaluate the corrosion effect of anode and prestressing wire. Durability properties of concrete were tested; permeability, concrete resistivity and half-cell potential. Moreover, analysis of polarization diagrams showed that 100. mV shift meet the requirements of the cathodic protection criteria for the prestressed concrete piles. Finally, the four full-scale precast prestressed concrete piles of six meters long were driven in the corrosive soil area. These piles were considered to evaluate the corrosion effect in actual condition. The piles were/were not installed using sacrificial anodes along the pile length. The corrosion damage assessments have been established. This worth information provide a key parameter in the repair/maintenance process to minimize loss to the structure. The results of the study are carried out to help in the decision making process for repair strategy.