

Concrete Mix Proportions with Ultra-High Electrical Resistivity

Mohammad Shekarchizadeh¹

Mohammad Tahersima¹

Amir Hajibabae¹

Hamed Layssi¹

T 11

ABSTRACT

Durability is the ability of concrete to withstand any deterioration process during its service life. Different concretes require different degrees of durability depending on the exposure environment and properties desired. The long-time behavior of concrete structures has shown that their main cause of distress is reinforcement corrosion. This type of damage is responsible for the huge financial cost spent each year on the repair of deteriorated structures.

The electrical resistivity of concrete is one of the main parameters controlling the initiation and propagation of reinforcement corrosion specially in railway ties or in structures in which concrete is used for protection from stray currents. Electrical resistivity is well correlated with durability parameters such as diffusion coefficient, capillary absorption and porosity.

The main aim of this study is achieving to ultra high electrical resistivity in concrete; in this paper, bulk electrical resistivity of concrete is measured using a new instrument in which bulk electrical resistivity is calculated in different frequency ranges. The effect of silica fume and metakaolin as pozzolanic admixtures has been investigated. Also the effect of aggregate content types is studied in this research.

KEYWORDS

Electrical Resistivity, Metakaolin, Silica fume

¹ University of Tehran, School of Civil Engineering, Tehran, Iran 34469, Phone +98 21 88973631, Fax +98 21 88959740, amirtech.doc@gmail.com