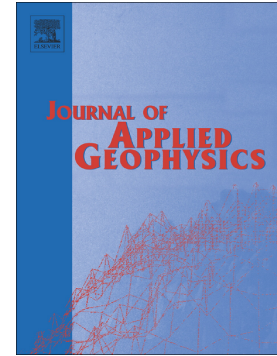


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Nevbahar Sabbağ, Osman Uyanik



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Determination of the Reinforced Concrete Strength by Electrical Resistivity depending on the Curing Conditions

Nevbahar SABBAĞ¹ and Osman UYANIK^{1*}

ABSTRACT

In this study, change of the electrical resistivity values was investigated on reinforced and unreinforced concrete samples that were designed in different strength of the dry and water saturated conditions. For this purpose, studies were conducted with 150x150x150 mm cubic samples of 9 different concrete designs. A piece of 10, 14 or 20 mm diameter reinforcement was placed in the middle of concrete samples and 18 samples were prepared for all types of them and 9 samples for the unreinforced samples. Some of the prepared these samples were subjected to the water cure and the other part of the samples were kept in the air cure. The potential difference measurements were made by electrical resistivity method on different surfaces of the sample at specific time periods of during the 90 days and apparent resistivity values of the samples were determined. Furthermore, the concrete strength was determined from average of 3 samples by uniaxial compressive strength test of each sample on 7th, 28th and 90th days. Changes of the apparent resistivity and concrete strength values that obtained from these conducted studies were investigated to depending on time. At the same time, the relationship between uniaxial compressive strength and the apparent resistivity was revealed in case of the samples' being in water or air cure. Accordingly, it was stated that the different curing conditions have an effect on the apparent resistivity of concrete and concrete strength. Therefore, while the apparent resistivity of the concrete design having different strengths increased depending on increasing concrete compressive strength of samples in the water cure; it reduced in the air cure. This research is important in terms of both time and being economical by providing a non-destructive approach to the determination in-situ of the concrete strength of the water or gas saturated old and new concrete structures.

Keywords: Reinforced concrete, reinforcement, resistivity, uniaxial compressive strength, Concrete, water cure, air cure

¹Suleyman Demirel University, Faculty of Engineering, Department of Geophysical Engineering, West Campus, 32260 Çünür, Isparta, Turkey.

*corresponding author

E-mail: osmanuyanik@sdu.edu.tr

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