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ABSTRACT

The curing of concrete requires high water demand. In this study reinforcement corrosion protection of self-curing concrete (SC) mixtures incorporating two water-soluble polymers; polyethylene glycol (PEG) and polyacrylamide (PAM) have been evaluated. Durability indices; electrical resistivity, chloride ion penetrability and water permeability, were evaluated and compared to that of control concrete mixture with no self-curing agents under different curing regimes. Reinforcement corrosion monitoring was conducted by exposing reinforced concrete prisms at the age of 28 days to wet-dry cycles for a total period of 96 weeks. In the wetting cycle, the prisms were partially immersed in 5% sodium chloride solution at ambient temperature. The corrosion activity was evaluated by measuring the corrosion potential and corrosion current density. Self-curing concrete mixtures showed better reinforcement protection and durability indices than those of air-cured control mixture. Short water curing period of 3 days significantly improved the reinforcement protection and durability indices of the self-curing concrete mixtures to a level comparable to that of the control mixture that was moist-cured for 28 days. Self-curing concrete represents a step towards a new construction material due to its lower demand for curing water and hence can reserve the limited water resources in many parts of the world.

Keywords: Self-curing concrete; Water-soluble polymers; Electrical resistivity; Chloride ion penetrability; Microstructure; Reinforcement Corrosion