

**Electrochemical behaviour of steel in plain and blended cement concretes in sulphate and/or chloride environments**

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**Abstract:** The electrochemical behaviour of reinforcing steel in plain and blended cement concrete specimens placed in sulphate, chloride and sulphate-chloride environments was investigated. The effect of cement composition and the exposure condition on the corrosion behaviour of reinforcing steel was evaluated by measuring corrosion potentials at periodic intervals and conducting potentiodynamic scans after two and half years of exposure. The corrosion potential data indicated passive corrosion in plain and blended cement concrete specimens placed in the pure sulphate environment. The time to initiation of reinforcement corrosion, however, was higher in blended cements than plain cements in all chloride and chloride-sulphate environments. The concomitant presence of sulphate and chloride salts did not significantly influence the time to corrosion initiation. The corrosion rate, however, was significantly influenced by the quantum of sulphate ions associated with the chloride salts. The superior performance of silica fume blended cement, in terms of longer time to corrosion initiation and lower corrosion rate, indicates its potential in enhancing the useful service life of reinforced concrete structures placed in the chloride-sulphate environments.