Short Communication

Investigation of HRB335 steel Corrosion in Concrete in Chloride-Containing Sulfate Solution Using Electrochemical Method

Jianrong Pang, Guosong Shi*, Gang Li, Yanmeng Qi

College of Civil Engineering, Cangzhou Jiaotong College, Hebei Cangzhou 061199, China

*E-mail: shi_teacher00@126.com

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High mechanical strength, long durability, and other outstanding characteristics make concretes widely used in the construction of bridges, buildings, sewage pipeline, and many more infrastructure items. However, in the long run, micro-cracking and chloride ion diffusion caused by the corrosion of steel reinforcement exert a hazardous effect on the properties of concretes, which has aroused special attention of the scholars. In this work, the failure mechanism of concrete induced by chlorine-containing sulfate corrosion is studied via array electrode technology, electrochemical experiments, and corrosion morphology analysis. The results show that the failure caused by the corrosive medium diffusion in the cracks inside the concrete can be divided into two stages. First, the corrosive medium reaches the concrete - reinforcement surface and forms a corrosion galvanic cell with a large cathode and a small anode, which promotes the corrosion product accumulation. Second, the Cl^- ions destroy the corrosion product layer and make the rust spread to the inside of concrete, while leading to severe pitting corrosion of the metal matrix.

Keywords: Concrete; Cl^- -containing sulfate; Array electrode; Electrochemical method

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