Early period corrosion of reinforced concrete with sodium hypochlorite in seawater

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Abstract Steel is one of the essential materials in the construction of marine infrastructures. Sodium hypochlorite (NaClO) is often used to control the colonization or growth of microorganisms on steel, which may adversely affect the performance of a steel structure. In this presentation, we report on an investigation into the influence of NaClO on the corrosion of carbon steel. The results from polarization curve and electrochemical impedance spectroscopy (EIS) measurements indicated that the addition of NaClO in artificial seawater accelerated the corrosion of carbon steel. The initial corrosion rate of the steel in the seawater increased with increasing temperature and NaClO concentration. There were complicated changes in corrosion rate with time. At low concentrations of NaClO, the corrosion resistance of the steel first increased, then decreased, and finally slowly increased again. At high concentrations of NaClO, the corrosion resistance gradually decreased, and finally stabilized. Possible mechanisms for these phenomena are discussed in the presentation.

Keywords corrosion，sodium hypochlorite，carbon steel，seawater