Effects of stray AC on delamination of epoxy coatings with defects in 3.5% NaCl solution

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The stray current induced coating delamination at defect areas is complicated and with its mechanism uncovered. In this study, the delamination mechanism of epoxy coating at defect areas under stray alternating current (AC) interference was investigated using electrochemical methods and software simulation. The simulation results indicated that stray AC at defect areas was not evenly distributed. The current density at the defect edge was higher than that at the defect center. The electrochemical results showed different electrochemical behaviors on samples with a various size of defects as AC density increased. The impedance of samples with small defects decreased, on the contrary, the impedance of samples with large defects increased. The delamination area on samples with small defects was larger than that with large defects under the same level of AC interference. Furthermore, the AC interference resulted in a more severe corrosion damage at the small coating defects. Small defects deserve particular attention in the safety assessment at the presence of stray AC.

Keywords: Stray alternating current, coating defects, coating delamination, simulation

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