

Corrosion Monitoring of Weathering Steel in a Simulated Coastal-Industrial Environment

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Abstract : The atmospheres in many cities along the coastal lines in the world have been rapidly changed to coastal-industrial atmosphere. Hence, it is vital to investigate the corrosion behavior of steel exposed to this kind of environment. In this present study, Electrochemical Impedance Spectrography (EIS) and film thickness measurements were applied to monitor the corrosion behavior of weathering steel covered with a thin layer of the electrolyte in a wet-dry cyclic condition, simulating a coastal-industrial environment at 25 oC and 60 % RH. The results indicate that in all cycles, the corrosion rate increases during the drying process due to an increase in anion concentration and an acceleration of oxygen diffusion enhanced by the effect of the thinning out of the electrolyte. During the wet-dry cyclic corrosion test, the long-term corrosion behavior of this steel depends on the periods of exposure. Corrosion process is first accelerated and then decelerated. The decelerating corrosion process is contributed to the formation of the protective rust, favored by the wet-dry cycle and the acid regeneration process during the rusting process.

Keywords : atmospheric corrosion, EIS, low alloy, rust

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