The Study of Corrosion Behaviour of Intumescent Fire Retardant Coating with Structural Steel Substrate

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The aim of this work is to study corrosion behaviour of intumescent coating and the primer on steel substrate before and after a fire test. The coated steel substrates were subjected to fire in a furnace at 950°C for a variable duration ranging from 30, 45, 90 and 120 min. All coated steel substrates were also subjected to corrosion test by immersing them in 5% NaCl solution, for 15 min and three months duration using Electrochemical Impedance Spectroscopy (EIS). The specimen's impedance before fire test and before immersion was $4.37 \times 10^8 \Omega \cdot \text{cm}^2$. After 15 min exposure to NaCl, this value was reduced by 26, 53, 60 and 65% for specimens fired for 30, 45, 90 and 120 min, respectively. Further reduction in the impedance by 97.6, 97.8, 97.9 and 98.9% for samples fired for 30, 45, 90 and 120 min, respectively, were measured after three months in 5% NaCl immersion.

Keywords: Intumescent fire retardant coating; Corrosion; Electrochemical Impedance Spectroscopy (EIS); Fire test; Salt spray

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