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Effect of Pulse Current Amplitude on Corrosion Protection of Mild Steel in the Atmospheric Environment

Abstract

Atmospheric metal corrosion affects the appearance and life span of iron-based metals. There are several methods for dealing with atmospheric corrosion, but none are perfectly ideal. Pulse Current Prevention (PCP) is a new method for atmospheric corrosion protection. Mild steel samples were studied using PCP for 14 days in a semi-sealed container. The pulse current is 50 Hz, 50% duty cycle, with different amplitudes of 2, 5, and 7 V. Amplitude effectiveness in the PCP technique is determined by morphological observation and image analysis technique. According to the findings, the use of pulsed current can prevent atmospheric corrosion on the steel sample. The amplitude of pulsed current has a major impact on atmospheric corrosion protection. The amplitude of 2 V is inadequate to create the necessary negative charges for steel surface protection. In the meantime, a 7 V amplitude produces overprotection, which exacerbates atmospheric corrosion deterioration. The meaningful finding is that 5 V is found to be a fairly good amplitude parameter for atmospheric corrosion prevention. Nonetheless, it needs to be investigated further to give optimal protection.

Keywords

Amplitudes; Atmospheric corrosion; Corrosion protection; Pulse current