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Experimental Validation of a Micro-Sized Polarization Resistance Corrosion Sensor for Structural Health Management Applications

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This paper presents the theory and experimental validation of Analatom's Structural Health Management (SHM) system for monitoring corrosion. Corrosion measurements are acquired using a micro-sized Linear Polarization Resistance (uLPR) sensor. The uLPR sensor is based on conventional macro-sized Linear Polarization Resistance (LPR) sensors with the additional benefit of a reduced form factor making it a viable and economical candidate for remote corrosion monitoring of high value structures, such as buildings, bridges, or aircraft.

A series of experiments were conducted to validate the uLPR sensor for AA 7075-T3. Test coupons were placed alongside Analatom's uLPR sensors in a series of accelerated tests. LPR measurements were sampled at a rate of once per minute and converted to a corrosion rate using Analatom's SHM system. At the end of the experiment, pit-depth due to corrosion was computed for each sensor from the recorded LPR measurements and compared to the average pit-depth measured on the control coupons. The results demonstrate the effectiveness of the sensor as an efficient means to measure pit-depth for AA 7075-T3.

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Ключевые слова:

Содержание

Abstract
Introduction
Linear polarization resistance theory
 μ LPR corrosion sensor
Experiment
Results
Summary