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Fiber-optic sensor to estimate surface roughness of corroded metals

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Keywords

fiber optic sensor, scattering principle, surface roughness, corrosion

Abstract

A fiber optic sensor system is developed to probe the surface texture of corroded metals. The present work is based on the principle of scattering of light by objects. A light beam from an LED source is focused onto the corroded surface. Specular and diffuse reflection of the surface is measured vertically at normal incidence of a fiber. The observed response agrees well with mechanical stylus measurements, with $R^2 > 0.89$. The fiber optic sensor system can be used to estimate the roughness of metals due to any type of corrosion without erosion. The obtained results show a consistent relationship between measured and surface roughness levels.

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