

Corrosion and Tribocorrosion Behaviour of Potential Coatings Applied in High-Strength Low-Alloy Steel for Offshore Applications

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Abstract : The materials used in offshore structural applications are continuously subjected to aggressive environmental conditions that accelerate their degradation, thus shortening their useful life. Wear, corrosion and the effect of marine microorganisms are the main processes taking place in marine environments, and whenever they occur simultaneously the durability of materials is strongly reduced. In the present work, the tribocorrosion behaviour of a High-Strength Low-Alloy (HSLA) steel and three coatings commonly used for protecting offshore components has been studied by means of unidirectional tribological tests in synthetic seawater. The coatings were found to enhance the tribological response of the uncoated steel and provide the system with improved corrosion resistance, in terms of smaller material losses and reduction of friction coefficients. The tests were repeated after ageing the materials in a salt-fog cabinet, and the aging process was found to slightly affect the performance of two of the coatings, in terms of higher material losses, meanwhile the third coating was not affected.

Keywords : coatings, corrosion, high-strength low-alloy steel, seawater, tribocorrosion

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