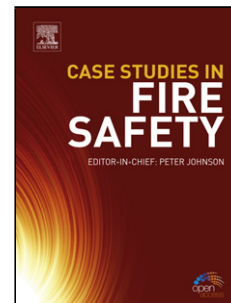


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CORROSION, WEAR AND TRIBOCORROSION PERFORMANCE OF A THERMALLY SPRAYED ALUMINUM COATING MODIFIED BY PLASMA ELECTROLYTIC OXIDATION TECHNIQUE FOR OFFSHORE SUBMERGED COMPONENTS PROTECTION

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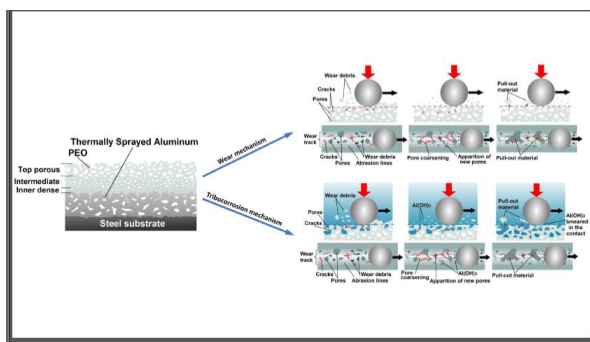
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Graphical abstract



Highlights

- A TSA coating applied on steel has been modified by PEO technique
- The developed coating was evaluated by corrosion, abrasion and tribocorrosion tests
- The corrosion behavior of the TSA is improved by PEO treatment
- The wear and tribocorrosion resistance of the TSA is highly improved by PEO process

ABSTRACT

Thermally Sprayed Aluminum (TSA) coatings have been widely employed to protect steel components from corrosion in marine environment. However, TSA is highly damaged in transport operations, due to the low wear resistance of aluminum, leading to a rapid coating deterioration during final service. In this work, the TSA properties have been improved by Plasma Electrolytic Oxidation (PEO) technique. The response of the newly generated TSA/PEO duplex system was investigated by means of sliding wear tests, electrochemical corrosion tests, and tribocorrosion tests in synthetic seawater. The study was completed with several characterization techniques, including SEM and confocal microscopy, and X-ray diffractometry.

KEYWORDS

Offshore; Corrosion; Tribocorrosion; Coatings; Thermally Sprayed Aluminum; Plasma Electrolytic Oxidation

1 INTRODUCTION

Marine environment is a very aggressive working atmosphere, that comprises several phenomena that can accelerate the degradation of structural materials reducing their useful life. The exposition to ultraviolet radiation, chloride rich salty environment, frequent wet-dry cycles, high humidity, low

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