

3rd International Conference on Forensic Research and Technology

October 06-08, 2014 Hilton San Antonio Airport, USA

Enhance corrosion and wear resistance of oil piping by high velocity oxygen fuel-sprayed coating of NiCoCrAlYTa and Inconel 625 on carbon steel

Mitra Akhtari Zavareh
University of Malaya, Malaysia

In petroleum industry a carbon steel is the most common material that is used in piping in both the upstream and downstream is domain due its high performance and relatively low cost compared with higher alloyed materials. The corrosion resistance of carbon steel in CO₂ containing, oxygen free aqueous solutions is depended to the surface layer that created on the carbon steel. This layer commonly consists of siderite (FeCO₃) and cementite (Fe₃C); however these deposits are neither compact nor dense. For this reason thermal spray coating can be applied to create a compact and dense deposited layer for improving the surface characterization over resistance of wear and corrosion rate. So in this research the deposition of Inconel 625 and NiCoCrAlYTa onto surface of mechanical parts was done by High Velocity Oxygen Fuel-sprayed technique. The present study describes and compares the electrochemical behavior of carbon steel, NiCoCrAlYTa and Inconel 625 in 3% NaCl by Open-circuit potential measurements (OCP) during 30 days. Also the tribological and mechanical properties of them were investigated by tribometer (pin-on-disc). The results show a significant anti-corrosion and anti-wear improvement provided by these chemical compositions coating. The samples that coated with NiCoCrAlYTa have the lowest corrosion rate. However in wear performance, both of coated samples have a nearest behavior in different loads. Scanning electron microscopy (SEM) showed the distinctive microstructure of the High Velocity Oxygen Fuel-sprayed before and after wear testing.

akhtari.mitra@yahoo.com