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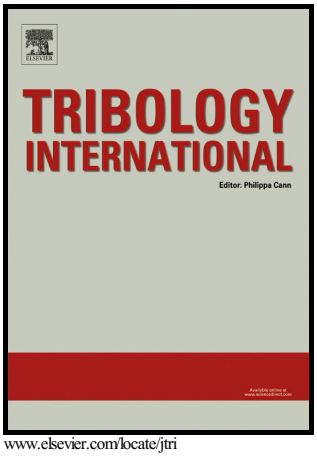

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Effect of 4-point bending and normal load on the tribocorrosion-fatigue (multi-degradation) of stainless steels

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Abstract

In many engineering environments tribocorrosion is combined with fatigue (multi-degradation). In the present work, the effect of static/cyclic bending and normal load on multi-degradation of austenitic and super duplex stainless steels has been studied. Investigating surface and subsurface characteristics by SEM/FIB, tribologically refined layers (TRL), crack matrices and pits were observed and their role on wear mechanisms was elucidated. Passive film thickness and composition was examined with XPS. Observations showed surface tensions increase the passive film thickness which can control pit and crack matrix formation thus wear loss mechanisms. Static and cyclic bending resulted in thicker oxide layer, enhanced pit formation and wear debris detachment while in the absence of 4-point bending larger subsurface cracks and TRL were observed.

Keywords: Tribocorrosion, fatigue, multidegradation, stainless steel.

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