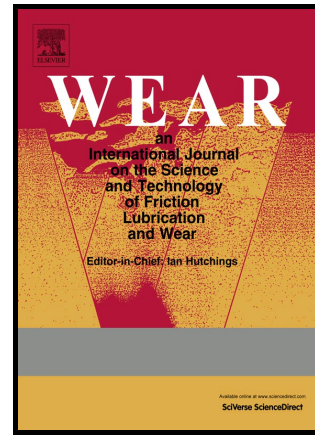


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Effect of alternate corrosion and wear on the overall degradation of a dual phase and a mild steel

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Effect of alternate corrosion and wear on the overall degradation of a dual phase and a mild steelPratik Murkute¹, J. Ramkumar², S. Choudhary³ and K. Mondal^{3*}¹*Materials Science Programme, Indian Institute of Technology Kanpur, Uttar Pradesh, India,*²*Department of Mechanical Engineering, Indian Institute of Technology Kanpur, Uttar Pradesh, India, 208016*³*Department of Materials Science and Engineering, Indian Institute of Technology Kanpur, Uttar Pradesh, India, 208016***Abstract**

The present work investigates the alternate corrosion and wear effect on the overall degradation of a dual phase and a mild steel. In case of corrosion-wear, immersion corroded samples of both the steels in freely aerated 3.5 wt. % NaCl solution are subjected to reciprocating sliding wear at three different loads. In case of wear-corrosion, wear takes place first in the steel samples, which are then subjected to immersion corrosion. The wear volume and mean coefficient of friction have decreased for the corrosion-wear case as compared to only wear, and this attributes to the lubricating action of rust formed due to initial corrosion. In case of wear-corrosion, corrosion rates of both the samples have increased as compared to only corrosion situation, which attributes to the rough and strained surface created due to initial wear. Though both the trends are independent of types of steels, the overall wear of the dual phase steel is lower than that of the mild steel, whereas, corrosion rate of the dual phase steel is higher than the mild steel in both the corrosion-wear and wear-corrosion cases.

Keywords: Sliding Wear; Steel, Corrosion-wear; immersion corrosion; Surface analysis.

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