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Analysis of dry sliding wear performance of tribaloy T-800/Tungsten carbide coating deposited via laser cladding assisted with preheating

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Abstract
Shafts, gears, axles and crankshafts, which are exposed to severe sliding wear environment, are made from wear resistant EN8 medium carbon steel. The wear resistance of EN8 can be enhanced by depositing it with laser cladding assisted with preheat (LCAP) fabricated T-800/WC composite coating. A systematic study via accurate, reproducible ball on disk tests which explores how extreme sliding force and velocity influence wear resistance and mechanism of the coating and the uncoated EN8 is carried out. It was revealed that EN8 substrate has up to six (6) times more special specific wear rate (SSWR) relative to T-800/WC coating. An increase in sliding force increased the SSWR whilst an increase in sliding velocity reduced the SSWR for the LCAP coating. Alumina (Al2O3) counter wear body exhibited the highest SSWR compared to silicon carbide (SiC) and silicon nitride (Si3N4) counter wear body on both T-800/WC and EN8. Oxidative and abrasive wear mechanisms were evident on the coating. A wear mechanism for the T-800/WC was deduced which showed abrasive wear, oxide layer formation, breaking of the formed oxide layer and back to abrasive wear during dry sliding wear.