IIIn18-001

Wear resistance of hardfacing Fe-Cr-C deposited by flux-core-double-wire GTAW in pin-on-disc wear test

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Gas-Shielded Tungsten Arc Welding (GTAW), was modified to a Flux-Cored-Double-Wire GTAW (FCDW-GTAW) and it showed potential to be a technology for the manufacture of customized hardfacing, because wires of different compositions were used simultaneously to obtain different microstructures. Hardfacings were manufactured employing a new technique, flux-cored double-wire gas tungsten arc welding. Pin-on-disk wear test described by astm G99 were performed to assess the wear coefficients of six hardfacing materials in the Fe–Cr–C system, having added Ti, Nb, and/or Mo. The result of the combination of these wires was a hypoeutectic microstructure with niobium and titanium carbides, with an average hardness of 650 HV0.3 and hypereutectic microstructures formed by different niobium contents, with a microhardness range from 820 to 1020 HV0.3. The wear tests were performed without lubrication and at room temperature, using a 6.0 mm in diameter polished alumina sphere as a counterbody. The total distance covered was 1000 m with a speed of 0.1 m/s, track radius of 6.0 mm and applied load of 10 N. Friction, wear coefficient and wear mechanisms were compared and results showed that the wear resistance can be distinguished by the mean free path measured in the metallic matrix and by the hardness of the second phase.