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Mechanical Analysis and Characterization of Friction Stir Processed Aluminium Alloy

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Abstract : Friction stir processing (FSP) is a solid-state surface processing technique. A single-pass FSP was performed on Aluminum alloy at combinations of different tool rotational speeds with cylindrical threaded pin profiled tool. The effect of these parameters on tribological properties was studied. The wear resistance is found to be increased from base metal to a single pass FSP sample. The results revealed that with an increase in tool rotational speed, the wear rate increases. The high heat generation causes matrix softening, which results in an increased wear rate; on the other hand, high heat generation leads to coarse grains, which also affected tribological properties. Furthermore, Microstructure results showed that FSPed alloy has a more refined grain structure as compare to the base material, which may be resulted in enhancement of hardness and resistance to wear in FSP.

Keywords : friction stir processing, aluminium alloy, microhardness, microstructure
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