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Experimental Investigation on the Effect of Masked Multiple Passes Abrasive Waterjet Machining Surface Texturing on Coefficient of Friction

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Abstract
The surface texturing method is popular because of its ability to improve surface properties, specifically surface functioning, and friction control. It is a common technique used on material surfaces to improve friction performance. Laser surface texturing is the popular choice; however, this method suffers drawbacks such as cracking, heat-affected zone, and generation of hazardous fumes. The Abrasive Water Jet Machining (AWJM) was chosen is that, because the eroded material is carried by the waterjet, the process is clean and does not produce dust, chips, or chemical contaminants. This experiment examines the influence of AWJM and investigates how crater density and a multiple-pass machining path affect the stainless-steel friction characteristics when sliding in dry conditions. The texture was applied on the surface of stainless steel by masked multi-passes AWJM technique. According to the findings, there is less friction in craters with greater densities because there are more craters in the contact zone, which improves the trapping of debris particles and reduces friction, when the crater density rises from 4% to 18%, there is a greater chance of worn debris becoming trapped, which reduces friction. The coefficient of friction and crater roughness of the stainless-steel surface are all proportionally affected by the multiple-passes approach. The coefficient of friction increases with higher machining passes. There is more erosion and greater roughness when there are more jet passes. It is concluded that the masked multiple passes AWJM Surface Texturing technique has a significant impact on the Coefficient of Friction (COF).

Author Keywords
Abrasive Waterjet Machining; Crater; Friction; Number of passes; Surface roughness; Surface texturing; Template masking; Texturing densities

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