

ROUGHNESS CHARACTERIZATION OF CARBON FIBER REINFORCED EPOXY COMPOSITES AFTER SOLID PARTICLE EROSION WITH VOLCANIC ASH AT ELEVATED TEMPERATURES

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ABSTRACT

The solid particle erosion behavior of unidirectional carbon fibre reinforced epoxy composites under elevated temperatures has been characterized. The erosive wear of these composites have been evaluated at three different impingement angles (30° - 60° - 90°) and at three different test temperatures (+20°, +40°C and +60°C). The abrasive particles used for the erosion measurements were volcanic ash (VA) particles with a size of 120 mesh (90-125µm) and impact velocity of 70 m/s. The morphology of eroded surfaces was examined by using flatbed scanner. Flatbed scanner investigations of eroded surfaces were used to discuss possible erosion mechanisms such as micro-cutting and micro-ploughing. Moreover, surface roughness measurements were taken by non-contact laser profilometer. Two and three dimensional surface roughness evaluations were also discussed in order to figure out the effects of impingement angle and temperature. By this study, it was aimed to contribute to the solid particle erosion behavior of carbon fiber reinforced composite eroded with volcanic ash particles at elevated temperatures.

Key Words: Roughness, Carbon fiber reinforced composite, Volcanic ash, Solid particle erosion, Morphology