

# Scratch Behavior of Glass Fiber Reinforced Polyester Matrix Composite After Solid Particle Erosion

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In current study, the tested material is a glass fiber reinforced polyester matrix composite with one stacking sequence namely [0/90]<sub>s</sub>. First of all, the solid particle erosion behavior of composite samples was investigated under various impingement angles (15°, 30°, 45°, 60°, 75°, and 90°, respectively). Eroded composite samples were examined by non-contact optical profilometer and 3D surface roughness maps were obtained. From optical profilometer results, it was clearly shown that values of erosion crater hole volumes were well suited with erosion rate values versus impingement angles. Maximum and minimum erosion crater hole volumes observed at 60° and 15° impingement angles due to semi-ductile characteristic of the target material, respectively. After erosion tests, the scratch behavior of composite samples was examined. The results showed that the coefficient of friction was decreased by the increase in impingement angles of 45° and 60°. The maximum scratch hardness value was determined at 60° impingement angle. Scratch damage morphologies were determined by using optical microscope and scanning electron microscope. It was observed that low (15° and 30°) and high (75° and 90°) impingement angles result in remarkably severe surface deformation on the samples. POLYM. COMPOS., 00:000–000, 2014.

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