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Fracture Analysis of Notched Sandwich Composites Applying Whitney-Nuismer Mathematical Model

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The main objective of this research is to investigate the fracture analysis of jute sandwich composites with 32 Vol% fiber weight content fabricated by modifying the hand lay-up technique with resin pre-impregnation into the jute fiber in the vacuum. This was carried out through open hole tension test with different ratios of the specimen width, W to hole diameter ($D=10.2$ mm) with three different values (1.7, 2.3, 3) using the characteristic distance (d_0) principle based on the microstructure of these composites applying Whitney-Nuismer mathematical model. Therefore in this work, the physical meaning of d_0 was validated for different W/D ratios through the microstructure of the composites based on the calculated d_0 . This was carried out through calculating and comparing the fiber pull out lengths from hole side up to d_0 and from d_0 to the end side of the specimen. The results showed that the average fiber pull out length was shorter after the crack reaches d_0 than that over the characteristic distance d_0 which validated and confirmed that after the crack reaches d_0 the brittle fracture has been occurred.