NOTCHED IMPACT STRENGTH OF FIBRE - REINFORCED POLYMER (FRP) COMPOSITES

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"I declared that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree."

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ABSTRACT

This project is attempted to apply mechanics concepts for notched fiber reinforced polymer (FRP) composites material where it has subjected to low impact loading. The materials used were Woven E-Glass fiber / epoxy composites.

The specimen configuration for this project was 50 x 200 mm and notched lengths were 15, 22.5 and 30 mm. The mechanics concept that was applied is to find the fracture toughness and notched strength of woven E-glass fiber/epoxy composites after subjected to low impact loading. In order to apply that mechanics concept, a few experimental test being implemented such as Low Blow Impact Test and Tensile Test to get the data. For the Low Blow Impact test, the impact energy used was 2, 4, 6 and 8 Joules.

The notched strength and fracture resistance of woven E-glass/epoxy was studied. The specimen with lower impact energy (2 Joules) has the biggest value of fracture toughness than the higher impact energy. The specimen with fewer notches length (the less notch length is 15 mm) has the biggest value of fracture toughness compare to longer notch length. The conclusion is the specimen with the lower impact energy and the less notch length has tougher than the specimen with high impact energy and longer notch length. For the notched strength, the specimen with the lower impact energy and the less notch length has the bigger notched strength than the specimen with high impact energy and longer notch length.

From observation, only surface crack at specimen has been occurred due to the Low Blow Impact Test. The surface cracks of epoxy for 2 joules impact loading is too small and it being increase for other higher impact loading. In this specimen the dominant damage mechanism is fiber breakage followed by delamination of the plies.

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