MECHANICAL BEHAVIOR OF CONVENTIONALLY DRILLED SiO2 DISPERSED CARBON, GLASS, AND KEVLAR FIBER REINFORCED EPOXY COMPOSITES

A dissertation interim evaluation submitted in partial fulfillment of the requirement for the degree.

Of

MASTER OF TECHNOLOGY

(Machine Design)

Submitted by

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This is to certify that the "Thesis" entitled **"MECHANICAL BEHAVIOR OF CONVENTIONALLY DRILLED SiO_2 DISPERSED CARBON, GLASS, AND KEVLAR FIBER REINFORCED EPOXY COMPOSITES"**

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Examiner 1	Examiner 2	Examiner 3
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ABSTRACT

Research and development of synthetic fiber-reinforced composites have been on the rise over the past few decades owing to the advancement in technology and the effects of synthetic fibers on the environment. Researchers are searching for alternatives while keeping in mind the advancement of mechanical properties. Due to their exceptional mechanical properties, synthetic fibers as reinforcement in composites are inevitable in today's composite industry. The objective of this thesis is to investigate the performance of continuous carbon, glass, and kevlar unidirectional (0°/90°) reinforced composites manufactured using the hand layup method. These fibers are combined with epoxy resin, which acts as a binding agent to form composites. A filler material silica (SiO_2) is also used with different weight percentages to further enhance the material's properties. A hole is drilled in the specimen, and its tensile behavior is compared to the material without drilling, which often results in damage around the drilled hole. The tensile and flexural tests are conducted to identify the composite specimen with the better mechanical characteristics. A predictive approach based on artificial neural networks (ANN) modeling analysis has been developed to predict the ultimate tensile strength of the (SiO_2) dispersed carbon, glass, and kevlar fiber-reinforced epoxy composite. The results of the predictive model are in close agreement with the training and testing data.

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