***THE EFFECT OF CURING TEMPERATURE VARIATIONS ON FORGED CARBON FIBER-REINFORCED COMPOSITES USING HAND LAY-UP AND VACUUM BAG METHODS ON BENDING TESTING***

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## *ABSTRACT*

*With the rapid growth of industrial and technological sectors, the demand for higher-performance materials is also increasing. This is driving materials research with the aim of developing materials that meet the diverse requirements of modern industry and possess the optimal composition. One such possibility is composite materials. The aim of this study is to investigate the relationship between the curing temperature and the flexural strength of forged carbon fiber composites. The samples were produced using hand lay-up and vacuum bagging processes with epoxy resin as the matrix and forged carbon fibers as reinforcement. The curing process was carried out for one hour at three temperatures (60 °C, 80 °C, and 100 °C) to determine the changes in mechanical properties. Bending tests were performed according to the three-point bending method as per ASTM D790. The results show that increasing the curing temperature leads to a decrease in flexural strength in both manufacturing processes. In hand layup, the highest average stress value was 175.70 MPa at 60 °C and 118.27 MPa at 100 °C. In vacuum bagging, the highest average stress value was 185.30 MPa at 60 °C and the lowest was 160.33 MPa at 100 °C. The decrease in flexural strength is due to excessively rapid resin curing, which leads to brittleness and impairs the adhesion between the fiber and matrix. Furthermore, vacuum bagging produces a higher composite quality than hand layup because it reduces air inclusions and allows for a more uniform resin distribution.*

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***Keywords :*** *Composite,Carbon Forged, ASTM D790-03*