

## **A Study on the Comparatison of Mechanical and Thermal Properties According to Laminated Orientation of CFRP through Bending Test**

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**Abstract :** In rapid industrial development has increased the demand for high-strength and lightweight materials. Thus, various CFRP (Carbon Fiber Reinforced Plastics) with composite materials are being used. The design variables of CFRP are its lamination direction, order, and thickness. Thus, the hardness and strength of CFRP depend much on their design variables. In this paper, the lamination direction of CFRP was used to produce a symmetrical ply [0°/0°, -15°/+15°, -30°/+30°, -45°/+45°, -60°/+60°, -75°/+75°, and 90°/90°] and an asymmetrical ply [0°/15°, 0°/30°, 0°/45°, 0°/60° 0°/75°, and 0°/90°]. The bending flexure stress of the CFRP specimen was evaluated through a bending test. Its thermal property was measured using an infrared camera. The symmetrical specimen and the asymmetrical specimen were analyzed. The results showed that the asymmetrical specimen increased the bending loads according to the increase in the orientation angle; and from 0°, the symmetrical specimen showed a tendency opposite the asymmetrical tendency because the tensile force of fiber differs at the vertical direction of its load. Also, the infrared camera showed that the thermal property had a trend similar to that of the mechanical properties.

**Keywords :** Carbon Fiber Reinforced Plastic (CFRP), bending test, infrared camera, composite

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