

## **Delamination and manufacturing defects in natural fiber-reinforced hybrid composite: a review**

### **ABSTRACT**

In recent years, most boat fabrication companies use 100% synthetic fiber-reinforced composite materials, due to their high performance of mechanical properties. In the new trend of research on the fabrication of boat structure using natural fiber hybrid with kevlar/fiberglass-reinforced composite, the result of tensile, bending, and impact strength showed that glass fiber-reinforced polyester composite gave high strength with increasing glass fiber contents. At some point, realizing the cost of synthetic fiber is getting higher, researchers today have started to use natural fibers that are seen as a more cost-effective option. Natural fibers, however, have some disadvantages, such as high moisture absorption, due to repelling nature; low wettability; low thermal stability; and quality variation, which lead to the degradation of composite properties. In recent times, hybridization is recommended by most researchers as a solution to natural fiber's weaknesses and to reduce the use of synthetic fibers that are not environmentally friendly. In addition, hybrid composite has its own special advantages, i.e., balanced strength and stiffness, reduced weight and cost, improved fatigue resistance and fracture toughness, and improved impact resistance. The synthetic–nature fiber hybrid composites are used in a variety of applications as a modern material that has attracted most manufacturing industries' attention to shift to using the hybrid composite. Some of the previous studies stated that delamination and manufacturing had influenced the performance of the hybrid composites. In order to expand the use of natural fiber as a successful reinforcement in hybrid composite, the factor that affects the manufacturing defects needs to be investigated. In this review paper, a compilation of the reviews on the delamination and a few common manufacturing defect types illustrating the overview of the impact on the mechanical properties encountered by most of the composite manufacturing industries are presented.

**Keyword:** Delamination; Manufacturing defects; Mechanical properties; Hybrid composite; Natural fiber-reinforced