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Short Communication

Investigation of mechanical properties of dual-fiber reinforcement in polymer composite

Mohan Kumar Anand Raj [a], *Suresh Muthusamy* [b], *Hitesh Panchal* [c], *Ahmed Mohamed Mahmoud Ibrahim* [d], *Mohammad S. Alsoufi* [e], *Ammar H. Elsheikh* [f,*]

[a] *Department of Mechanical Engineering, Kongu Engineering College (Autonomous), Perundurai, Erode, Tamil Nadu, India*

[b] *Department of Electronics and Communication Engineering, Kongu Engineering College (Autonomous), Perundurai, Erode, Tamil Nadu, India*

[c] *Department of Mechanical Engineering, Government Engineering College, Patan, Gujarat, India*

[d] *Department of Production Engineering and Mechanical Design, Faculty of Engineering, Minia University, Minya, 61519, Egypt*

[e] *Mechanical Engineering Department, College of Engineering and Islamic Architecture, Umm Al-Qura University, Makkah, 24382, Saudi Arabia*

[f] *Production Engineering and Mechanical Design Department, Faculty of Engineering, Tanta University, Tanta, 31733, Egypt*

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ABSTRACT

Nowadays, the demand for fiber-based composites increases continuously compared to conventional materials because of their excellent mechanical properties. Synthetic fibers have specific advantages over natural fibers. It includes strength to weight ratio, durability, wrinkle resistance, and the ability to absorb moisture is less. However, the synthetic material having a few demerits also. To overcome the drawbacks of the synthetic fiber-based composite, an attempt is made to fabricate the hybrid composite specimen to obtain the combined benefits of the synthetic and natural fiber-based composites. The potential applications of the hybrid composites are aerospace, marine, and industrial structural applications. The composite specimen has been fabricated by using different natural and synthetic fibers, namely, Abaca (A), Hemp (H), Kevlar (K), and Glass (G). The three different hybrid composite specimens have been fabricated, each consisting of 5 layers are as follows, 1) the first and last layers of the specimen are Kevlar, and the remaining layers are Abaca fibers, 2) the first and last layers are Glass, and remaining layers are Hemp fibers, 3) first and the last layer is Glass, and remaining layers are Abaca fibers. The experimental results of the Glass/Hemp based composite have been compared with the simulation results. A good agreement has been found between the experimental and the simulation results. The Kevlar/Abaca composite displays a maximum load-carrying capacity in tensile, flexural, and impact is 5600 N, 86 kgf, and 3.625 J, respectively, followed by the Glass/Hemp and Glass/Abaca composites. It is due to the load being transferred in the following order during tests, which is as follows: matrix, natural fibers, and synthetic fibers. The

* Corresponding author.
E-mail address: ammar_elsheikh@f-eng.tanta.edu.eg (A.H. Elsheikh).

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