

## **Interfacial debonding force and shear strength of sugar palm (*Arenga pinnata*) fiber reinforced composites by pull-out test**

### **ABSTRACT**

An experimental investigation was performed to understand the pulling out behaviour of sugar palm (*Arenga pinnata*) fibers from unsaturated polyester (UP) composites. The effect of embedded length on the fiber-matrix interface was studied. Fibers were treated with UP and phenol formaldehyde (PF). Untreated fibers were used as the control. Single fiber pull-out tests were carried out for 360 specimens to determine the debonding force and interfacial shear strength (IFSS). Significant increase in debonding force of untreated fiber and UP-impregnated fiber was observed from embedded length of 2 mm to 3 mm. However, no significant increase was observed for the embedded length of more than 3 mm. Debonding force showed remarkable improvement with ascending order of untreated fibers, PF-impregnated fibers, and UP-impregnated fibers. The optimum embedded lengths of untreated fibers and UP fibers were determined. Additional finding showed that the interfacial shear strength decreased as the embedded length increased. However, UP-impregnated fibers showed the highest IFSS value, followed by PF fibers and untreated fibers. Analysis using Scanning Electron Microscope (SEM) was also included to justify the result.

**Keyword:** Debonding force; Interfacial shear strength; Optimum embedded length; Single fiber pull-out test