

**DYNAMIC MECHANICAL ANALYSIS OF ARENGA PINNATA FIBRE  
REINFORCED EPOXY COMPOSITES**



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## 2. Acknowledgements

*In the name of Allah S.W.T, the Most Gracious and the Most Merciful*

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### **3. Enhanced Research Title and Objectives**

(if any)

Original Title as Proposed:

DYNAMIC MECHANICAL ANALYSIS OF *ARENGA PINNATA* FIBRE REINFORCED EPOXY COMPOSITES

Improved/Enhanced Title:

DYNAMIC MECHANICAL ANALYSIS OF MOISTURE ABSORBED *ARENGA PINNATA* FIBRE REINFORCED EPOXY COMPOSITES

Original Objectives as Proposed:

1. To investigate possible mechanical behavior in both ageing and as produced conditions with of APEC under time/temperature dependent functions as predicted by dynamic mechanical analysis
2. To study the surface morphology in both ageing and as produced conditions of APEC from the results of tensile test by using scanning electron microscopic (SEM)

Improved/Enhanced Objectives:

1. Determine the moisture content of composite material when subjected to exposed humid air and submerged in water.
2. Investigate the dynamic mechanical properties of exposed humid air and submerged condition.

## 4. Report

### 4.1 Proposed Executive Summary

The relatively higher costs of synthetic fibres (glass, carbon, kevlar fibre) used in fibre reinforced composite materials make it desirable to investigate natural fibres as a source of possible reinforcement in low-cost applications *Arenga pinnata* or sugar palm is one of the abundance and readily available material that commonly found growing wild in primary and secondary forests in Southeast Asia including in Malaysia.

As a new emerging material, this material is significant because there is a need to generate the idea, to evaluate and to try to explore the new natural resources with low production cost considering on to abundance and readily available material in Malaysian tropical forest. A number of studies have been carried out to explore the potential of *Arenga pinnata* fiber as reinforcement in polymers composites that gave positive results [4-9] but still insufficient to warrant their fully utilization. The dynamic mechanical properties have a major influence on the response of the material and the structural integrity of the component. The change of temperature, fibre fraction and ageing of this composite could alter the dynamic mechanical properties that still unknown. If confidence in this material is to be given in such manner, much effort is needed and it is vital that full understanding, not only of the strength but also including the durability and sustainability, be achieved.

In this proposed research, ageing and as produced conditions of *Arenga pinnata* fibre reinforced epoxy composites (APEC), fabricated from hand-layout technique with three fibre weight fractions of 10%, 30% and 45% for each conditions are subjected to tensile test and dynamic mechanical analysis. The surface morphology of specimens is examined in order to understanding its damage mechanism.