

Dynamic Young's modulus and glass transition temperature of selected tropical wood species

ABSTRACT

Dynamic Young's modulus (E_d) of selected tropical wood species, namely *Dyera polyphylla*, *Endospermum diadenum*, *Cratoxylum arborecens*, *Alstonia pneumatophora*, *Macaranga gigantea* and *Commersonia bartramia*, used for the study was measured using the free-free flexural vibration method. Young's modulus from three point bending (E_{3pb}) and compression parallel to grain (E_{cp}) was also studied. The results show that the relationship between E_d and E_{3pb} for all wood species is very significant with the mean value of E_d consistently larger than or sometime equal to E_{3pb} . Surprisingly, the relationship between E_d and E_{cp} is not significant except for *Alstonia pneumatophora*. The dynamic mechanical thermal properties were also investigated using the dynamic mechanical thermal analyser (DMTA). The results showed that the storage modulus of the wood species at 690°C is in the range of 1.4864-09 GPa with a glass transition temperature ranging from 50 to 70°C.

Keyword: Compressive Young's modulus; Dynamic Young's modulus; Glass transition temperature; Loss tangent; Storage modulus; Three point bending Young's modulus