UNIVERSITI TEKNOLOGI MARA

FRACTURE CHARACTERISTICS OF BETONG BAMBOO CULM LOADED IN COMPRESSION, BENDING AND SHEAR

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ABSTRACT

Bamboos, being a common resource (plant) in the Asian region provide an interesting alternative raw material other than timber. The study was conducted to determine the fracture characteristic and microscopic failure of round bamboo and their relationship to the strength properties of bamboo loaded in compression, bending and shear. "Buloh Betong" (*Dendrocalamus asper*) aged 3 years old was used in this study. Specimens were taken from internode and node of bottom, middle and top portion. All the specimens were tested at 12% of MC. Generally, the fracture characteristics from three different tests shown variety of failure mode on each test. In compression parallel to grain there are three mode of failure generated along the culm height and between internode and node. Meanwhile in bending, four mode of failure was observed from bottom, middle and top portion. However in shear test, only one mode of failure was found from internode and node part of bottom to top portion. Each classified failure mode from respective test was affected by grain and fiber orientation within the bamboo culm which differ from bottom to the top and between internode and node. The variety of strength properties was found between classified failure modes on each test. Generally the failure mode occurred at top portion and at internode part posses significantly greater strength properties compared to same or different failure mode from bottom, middle and node part. A slight variation was observed in microscopic failure from all classified failure mode of each test where the crushing occurred mostly at parenchyma cells as compared to vascular bundles with minimum crushing effect.