

ABSTRAK

PERANCANGAN PRODUK BERBAHAN *UPCYCLED* KOMPOSIT ROTAN MENGGUNAKAN *HOUSE OF QUALITY*

Calamus Melanoloma Mart menjadi *waste* pada CV Satori Rattan Indonesia, *upcycled Natural Fiber Composite* (uNFC) dibuat dan karakteristik material divalidasi menggunakan pendekatan *House of Quality* (HoQ). Material komposit dibuat dalam dua ketebalan yaitu 6 mm dengan ekstraksi serat dan 15 mm tanpa ekstraksi serat. Kedua spesimen diuji untuk mengetahui kekuatan tarik dan daya serap air. Hasil uji menunjukkan bahwa spesimen 15 mm memiliki *tensile strength* sebesar 31,91 MPa dan modulus elastisitas 734 MPa yang menunjukkan spesimen ini lebih kuat daripada spesimen 6 mm, sedangkan spesimen 6 mm memiliki daya tahan terbaik terhadap kelembapan dengan kenaikan massa 4% dan penurunan kekuatan 17,5% yang menunjukkan spesimen ini lebih baik dibandingkan material 15 mm, memenuhi spesifikasi teknis dalam HoQ material. HoQ produk digunakan untuk mengonversi preferensi pengguna menjadi atribut desain, dan simulasi FEM menunjukkan produk akhir memiliki tegangan maksimum $\pm 3,7$ MPa dan faktor keamanan 4 dan 5, layak untuk aplikasi furnitur. *Prototype* produk dibuat dan menunjukkan kesesuaian antara performa material dan kebutuhan pengguna, sehingga material komposit rotan hasil *upcycling* dinyatakan fungsional dan berkelanjutan.

Kata kunci: *House of Quality*, rotan, komposit alami, *Finite Element Method*

ABSTRACT

PRODUCT DESIGN USING UPCYCLED RATTAN COMPOSITE MATERIAL WITH HOUSE OF QUALITY APPROACH

Calamus Melanoloma Mart becomes waste at CV Satori Rattan Indonesia, and an upcycled Natural Fiber Composite (uNFC) was developed with its material characteristics validated using the House of Quality (HoQ) approach. The composite material was produced in two thicknesses: 6 mm with fiber extraction and 15 mm without fiber extraction. Both specimens were tested to determine tensile strength and water absorption. The results showed that the 15 mm specimen had a tensile strength of 31.91 MPa and a modulus of elasticity of 734 MPa, indicating higher strength than the 6 mm specimen. Meanwhile, the 6 mm specimen demonstrated superior moisture resistance with a 4% mass increase and a 17.5% strength reduction, making it better suited for humid conditions and fulfilling the technical specifications outlined in the HoQ material. HoQ for product design was then used to translate user preferences into design attributes, and FEM simulation showed that the final product experienced a maximum stress of ± 3.7 MPa and safety factors of 4 and 5, making it suitable for furniture applications. A product prototype was fabricated and demonstrated alignment between material performance and user needs, indicating that the upcycled rattan composite material is functional and sustainable.

Keywords: House of Quality, rattan, natural fiber composite, Finite Element Method