

KARAKTERISTIK FISIS DAN MEKANIS GLULAM JATI, MANGIUM, DAN TREMBESI (*Physical and Mechanical Characteristics of Glulam Made From Laminates of Teak, Mangium and Trembesi*)

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Diterima 21 Maret 2013, Disetujui 9 April 2015

ABSTRACT

This paper studies the physical and mechanical characteristics of the glued-laminated (glulam) beams made from small diameter of three fast growing species i.e. teak (Tectona grandis L.f), mangium (Acacia mangium Willd.) and trembesi/monkeypod (Samanea saman Merr.) using water based polymer isocyanate (WBPI) as a binder. Six plies of wood combination species were laminated into final dimension of 6 cm x 12 cm x 300 cm. Each laminate was graded using Machine Stress Grading (Panter, plank sorter) to determine its Modulus of Elasticity (MOE). Cross-section of two type of glulam beam was 6 cm x 12 cm, arranged of various widths and based on values of laminate MOE. Results show that the average and range value of the glulam density were 0.658 g/cm³ and 0.557-0.821 g/cm³, with the moisture content of 14.6% (13-16.8%). The average of the glulam modulus of elasticity and modulus of rupture were 75.51(37.016-12.0446) kg/cm² and 494 (145-750) kg/cm² respectively. The glulam made from teak has better MOE and MOR performances compared to those of mangium and trembesi. In general, the results showed that almost all of glulam beams tested meet requirement of JAS (Japanese Agricultural Standard) 2007 for structural glulam in moisture content, MOE, MOR, and shear strength. The glulam qualities can be classified into E65-E95-F225-F270, except for several species combination beams. Based on the strength classified and the ratio of S/W, the glulam can be used as a construction material except glulam teak-trembesi (preserved or unpreserved) and the unpreserved trembesi-trembesi. The three types of glulam can be utilized for the lightweight construction.

Keywords: Glulam, teak, mangium, trembesi, wood structural

ABSTRAK

Penelitian ini bertujuan untuk mengetahui karakteristik fisis dan mekanis serta pengaruh komposisi jenis dan perlakuan pengawetan pada glulam baik sejenis maupun campuran sebagai bahan baku kayu pertukangan dan kayu konstruksi. Glulam dibuat dari kayu jati, mangium dan trembesi baik sejenis maupun campuran, terdiri dari enam lapis dengan ukuran 6 cm x 12 cm x 300 cm. Setiap lamina dinilai menggunakan *Mechine Stress Grading* (Panter, plank sorter) untuk menentukan nilai Modulus Elastisitas (MOE)-nya. Dua tipe penampang balok lamina berukuran 6 x 12 cm disusun berdasarkan variasi lebar dan nilai MOE masing-masing lamina. Hasil penelitian menunjukkan bahwa kerapatan glulam berkisar antara 0,557-0,821 g/cm³ dengan rata-rata 0,658 g/cm³. Nilai rata-rata kadar air glulam berkisar antara 13-16,8% dengan rata-rata 14,6%. Nilai rata-rata modulus elastisitas glulam yang diuji berkisar antara 37,016-12,0446 kg/cm² dengan rata-rata 75,251 kg/cm² sedangkan keteguhan lentur patahnya (MOR) berkisar antara 145-750 kg/cm² dengan rata-rata 494 kg/cm². Glulam yang dibuat dari kayu jati merupakan yang terbaik dibandingkan dengan glulam kayu mangium dan trembesi. Berdasarkan nilai kerapatan, kadar air, MOE, MOR tekan sejajar serat dan keteguhan geser rekat glulam yang dibuat memenuhi standar mutu glulam struktural (Standar Jepang, JAS-2007) dan dapat digunakan untuk kayu

konstruksi dan tergolong mutu E65-F225 sampai E95-F270. Berdasarkan kelas kuat dan rasio S/W, glulam yang diteliti dapat dimanfaatkan sebagai bahan konstruksi kecuali glulam jati-trembesi (diawet maupun tidak diawet) dan trembesi-trembesi tidak diawet. Ketiga jenis glulam tersebut dapat dimanfaatkan untuk konstruksi yang tidak mensyaratkan kekuatan seperti kusen pintu, kusen jendela dan rangka partisi.

Kata kunci : Glulam, jati, mangium, trembesi, kayu struktural