

**PENGARUH SUSUNAN LAMINA KAYU KARET TUA TERHADAP  
SIFAT KEKUATAN BALOK SILANG-I LAMINASI  
(The Effect of Arrangement of Old Rubber-Wood Laminae on Strength  
Properties of the Resulting Laminated I-Joist Beam)**

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ABSTRACT

The assembling of I-joist laminated beam was carried out using old-rubber wood (*Hevea brasiliensis* M.A.) taken from rubber plantation regarded no longer productive for latex-exudate removal (about 25-30 years old). Initially, old rubber-wood logs (diameter about 10-25 cm) were sawn into laminae. It revealed that the laminae yield (36-39%) was lower than that commonly obtained from the sawing of large-diameter logs. The resulting laminae were reconstituted into I-joist laminated beam using phenolrecorcinol-formaldehyde adhesive at room temperature. Results of reconsitution (assembling) showed that strength properties of laminated I-joist beam with horizontal-gluing profiles between laminae in the web portion (FSPL = 132.97 kg/cm<sup>2</sup>, MOR = 184.13 kg/cm<sup>2</sup>, MOE = 54425.196 kg/cm<sup>2</sup>, and Sh = 2.9397 kg/cm<sup>2</sup>) were lower than those of small-sized defect-free solid (intact) kayu manis wood, but higher than those of I-joist with vertical-gluing profiles between laminae in the web as well as than those of the horizontally laminated beam made-up of old rubber-wood laminaes as well. Besides, the angle between wood ray and gluing lines (planes) correlated negatively with the strengths of I-joist beam. This suggests the positive prospect of manufacturing laminated I-joist beam from old rubber-wood with vertical gluing patterns (in the web portion) between the laminae for construction, due to the saving- enhancement on raw-material usage.

keywords: Old rubber-woods, rubber plantation's wastes, small diameter, low durability, laminated I-joist beam, strength properties

ABSTRAK

Perakitan balok silang-I laminasi dilakukan menggunakan kayu karet tua (*Hevea brasiliensis*) asal pohon karet yang sudah tidak produktif lagi menghasilkan getah lateks (umur sekitar 25-30 tahun). Mula-mula, dolok kayu karet (diameter sekitar 10-25 cm) terlebih dulu dibentuk menjadi lamian (bilah-bilah) melalui penggergajian. Rendemen bilah tersebut (36-39%) masih lebih rendah dari pada rendemen yang umum dari kayu berdiameter besar. Bilah yang dihasilkan dirakit menjadi balok silang-I menggunakan perekat fenol-resorsinol-formaldehida pada suhu kamar. Hasil perakitan menunjukkan kekuatan balok silang-I laminasi dengan profil rekatan horisontal antar lamina dibagian tubuh

(keteguhan lengkung pada batas proporsi Pengaruh susunan lamina kayu karet tua terhadap sifat kekuatan balok silang – I laminasi<sup>2</sup>= 132.97 kg/cm<sup>2</sup>, MOR = 184.13 kg/cm<sup>2</sup>, MOE = 54425.196 kg/cm<sup>2</sup>, dan keteguhan geser horisontal = 2.9397 kg/cm<sup>2</sup>) lebih rendah dari pada sifat balok kayu karet utuh berdimensi kecil bebas cacat, tetapi lebih tinggi dari pada balok silang-I laminasi dengan profil rekatan vertikal dan produk balok laminasi (glulam) juga dari kayu karet tua dengan profil rekatan horisontal antar lamina. Di samping itu terdapat korelasi nyata negatif antara sudut jari-jari kayu – bidang rekatan dengan sifat mekanis/ kekuatan balok Silang-I laminasi. Ini mengindikasikan prospek positif pembuatan balok Silang-I laminasi dari kayu karet tua dengan profil rekatan vertikal tersebut untuk tujuan konstruksi, karena dapat lebih menghemat pemakaian bahan baku.

Kata kunci: Kayu karet tua, limbah perkebunan karet, diameter kecil, keawetan rendah, balok silang-I laminasi, sifat kekuatan