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ABSTRACT

Merkusii pine (*Pinus merkusii* Jungh. et de Vriese) is a Conifer tree that relative infrequently in Indonesian tropical forest and recently the tree has been cultivated in many places in Indonesia. In an effort to increase the added value of the trees grown in Imogiri, Bantul, Yogyakarta, a study on the physical, mechanical and fiber length of the wood was carried out.

The study was conducted by using a Completely Randomized Desingn of two factors that is axial (bottom, middle, and top of the tree) and radial (near by the pith, middle, and near by the bark) positions. Wood sample for the study was prepared according to British Standard BS 373.

The average rate of green wood and equilibrium moisture contents (EMC) are 87.34% and 14.01%. Specific gravity (SG) in green wood, air dry and oven dry are 0.45, 0.49, and 0.52 respectively. The average radial, tangential and longitudinal shrinkage of wood from green to air dry condition are 2.25%, 4.45%, and 0.40% while shrinkage from green to oven dry condition are 3.83%, 6.65%, and 0.46% respectively. The average radial, tangential and longitudinal swellings of wood from oven dry to wet condition are 4.27%, 6.83%, and 0.46%. The static bending strength in proportion limit, MoE and MoR are 36.14 MPa, 8286.82 MPa, and 69.58 MPa. Wood hardness in the radial and tangential surface are 36.15 MPa, and 37.21 MPa, and also fiber length are 2.85mm. Interaction between axial and radial positions have a significant effect on equilibrium moisture content (EMC), radial shrinkage from green to air dry conditions, tangential from green to oven dry condition, and wood hardness in the tangential surface. The axial position have very significant effect on static bending strength in proportion limit, Specific gravity (SG) in green wood, SG in air dry, and SG in oven dry, radial swells of wood from oven dry to wet condition and radial shrinkage from green to oven dry condition are only effected significantly by the axial position.

Keywords : merkusii pine, physical properties, mechanical properties, axial position, radial position, fiber length.

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Variasi Aksial dan Radial Beberapa Sifat Fisika, Mekanika dan Panjang Serat Kayu Tusam (*Pinus merkusii* Jungh. et de Vriese) yang Tumbuh di Imogiri, Kabupaten Bantul, Yogyakarta

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INTISARI

Tusam (*Pinus merkusii* Jungh. et de Vriese) adalah salah satu jenis konifer yang relatif jarang keberadaannya di hutan tropis di Indonesia dan sekarang telah banyak dibudidayakan di beberapa daerah di Indonesia. Dalam upaya meningkatkan nilai tambah dari pohon tusam yang tumbuh di Imogiri, Kabupaten Bantul, Yogyakarta, dilakukan penelitian tentang sifat fisika, sifat mekanika dan panjang serat kayunya.

Penelitian ini dirancang menggunakan rancangan acak lengkap dengan tiga ulangan dan dua faktor yaitu letak aksial batang (pangkal, tengah, dan ujung batang bebas cabang) serta letak radial batang (dekat hati, tengah, dan dekat kulit). Pembuatan contoh uji berdasarkan British Standard method BS 373.

Nilai rerata untuk kadar air segar dan kering udara kayu sebesar 87.34% dan 14.01%. Berat jenis segar, kering udara dan kering tanur kayu sebesar 0.45, 0.49, dan 0.52. Penyusutan radial, tangensial dan longitudinal dari kondisi segar ke kering udara berturut-turut sebesar 2.25%, 4.45%, dan 0.40% serta dari kondisi segar ke kering tanur berturut-turut sebesar 3.83%, 6.65%, dan 0.46%. Pengembangan radial, tangensial dan longitudinal dari kondisi kering tanur ke basah berturut-turut sebesar 4.27%, 6.83%, 0.46%. Keteguhan lengkung statik sampai BP, MoE dan MoR berturut-turut sebesar 36.14 MPa, 8286.82 MPa, 69.58 Mpa. Kekerasan kayu penampang radial dan tangensial sebesar 36.15 MPa, dan 37.21 Mpa serta panjang serat kayu sebesar 2.85mm. Interaksi antara kedudukan aksial dan radial berpengaruh nyata pada kadar air kayu kering angin, penyusutan dimensi radial dari kondisi segar ke kondisi kering angin, penyusutan dimensi tangensial dari kondisi segar ke kondisi kering tanur, dan kekerasan kayu penampang arah tangensial. Kedudukan aksial berpengaruh sangat nyata pada keteguhan lengkung statik pada batas proporsi, berat jenis berdasarkan volume kayu segar, berat jenis berdasarkan volume kayu kering angin, berat jenis berdasarkan volume kayu kering tanur, pengembangan dimensi radial dari kondisi basah ke kondisi kering angin dan berpengaruh nyata pada penyusutan dimensi radial dari kondisi segar ke kondisi kering tanur. Kedudukan radial berpengaruh nyata terhadap kadar air kayu kering angin dan panjang serat kayu.

Kata kunci : Tusam, sifat fisika kayu, sifat mekanika kayu, panjang serat kayu, letak aksial, letak radial, longitudinal, tangensial, radial, BP, MoE, MoR

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