GO-SENGON: Sengon Wood for Wind Turbine Blades

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As the world is facing energy crisis and degradation of environmental quality, the authors proposed to make Sengon wood as a research object for wind turbine blades material, which converts wind energy into electrical energy to develop environmentally friendly, less expensive and renewable energy sources. Sengon wood is the fastest growing timber plant, naturally found and abundant in Indonesia. The research was divided into three steps: (1) Comparing basic characteristics of Sengon wood to Balsa and Pine woods, based on British Standard (BS) 373-1957 method, (2) Manufacturing and testing of modified Sengon wood included hot pressed at 100°C of 25% and 50% compression levels and thinning or holing to get higher rigidity with the same weight as Balsa wood, and (3) Making a wind turbine prototype and trial. Data analysis was conducted to get maximum strength to weight ratio, stiffness, durability, cost, and energy efficiency. The results showed that 25% compression level provides a durability value increase of 250 N or 69% of the original wood, while a 140% increase were obtained with 50% compression level. Axis Structural Suppression provides a stiffness value of 11.1 kg/mm or 122% increase of the original wood, satisfying the needs of 9.2 kg/mm. Sengon wood is 9 times cheaper, 21.3% stiffer, 18.2% more durable, and potentially giving 81 times more energy generated with the same cost than Balsa and is also stronger than Pine wood. It gives more feasible option for procurement of wind turbines in Indonesia and other developing countries. Keywords: Sengon wood, wind turbine blades material, compression levels, stiffness.

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