

**UJI COBA MESIN PENGERING KAYU KOMBINASI TENAGA SURYA DAN PANAS
DARI TUNGKU TIPE I (SC+TI)**

**{Trial Test on the Wood- Drying Machine Powered by the Combined Solar Energy and Type I Heating-
Stove (SC+TI)}**

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ABSTRACT

Technical and financial feasibility of a combined solar energy and heating stove (SC+TI) wood drying machine has been recently assessed. The machine batch had a capacity of 19 m³ and was located in a wood craft industry in Ngaringan Village, Grobogan Sub Regency, Central Java. The assessment was carried out during the use of the machine for drying teak wood (*Tectona grandis* L.f.). During the day, the heat source was from solar energy. At night depending on the need, the heat was provided by heating stove with biomass or wood waste as the fuel. The study purpose was to analyze technical and financial feasibility of drying machine. The drying trial test showed that average temperature achieved inside the drying machine ranged from 40° C to 50° C. On the other hand, the required condition for optimally drying teakwood was around 45° C – 70° C. Thus, additional heat was necessary and gained from heating stove. The time required to dry wood with initial moisture content of 50% to final moisture content of 10% averaged 13 days. The drying yield obtained was around 80% or around 304 m³. The need of wood waste for heating stove was 8 m³/drying period. The investment on wood-drying unit construction cost Rp74,635,000. The production cost per year with the product amount of 304 m³ was Rp 3,251,548,750 and manufacturing cost Rp10,695,884/m³. The financial feasibility analysis showed that with price of dried jati Rp11.000.000/m³, BEP (Break Event Point) at 86,3 m³, NPV (Net Present Value) Rp +374.245.458 dan IRR (Internal Rate of Return) 80%. This result indicates that the operation of drying-machine unit is technically and economically feasible.

Keywords : Drying machine, solar energy, type-I heating-stove, wood waste, teak, technical and financial feasibility²

ABSTRAK

Telah dilakukan uji coba teknis dan finansial terhadap mesin pengeringan kayu kombinasi tenaga surya dan panas dari tungku tipe SC+TI untuk kapasitas ± 19 m³ di salah satu industri/pengrajin kayu di Ngaringan, Grobogan, Jawa Tengah. Uji coba dilakukan terhadap kayu jati (*Tectona grandis* L.f.). Kebutuhan panas pengeringan di siang hari diperoleh dari tenaga surya dan di malam hari atau tergantung kebutuhan diperoleh dari tungku pembakaran dengan bahan bakar biomas/limbah kayu dari pengggajian sendiri. Tujuan uji coba adalah untuk mengetahui kelayakan teknis dan finansial dari pemanfaatan mesin pengering tersebut. Hasil uji coba menunjukkan suhu rata-rata harian dari panas surya yang diterima ruang pengering berkisar antara 40° C – 50° C, sementara suhu untuk pengeringan kayu jati berkisar antara 45° C – 70° C. Kekurangan panas diperoleh dari tungku bakar. Untuk mengeringkan sortimen kayu dengan kadar air 50% sampai mencapai kadar air 10% memerlukan waktu rata-rata 13 hari dan menghasilkan rendemen kayu kering sekitar 80%. Konsumsi limbah kayu untuk bahan bakar tungku pada setiap periode pengeringan 8 m³. Investasi pendirian unit pengeringan

memerlukan biaya sebesar Rp74.635.000. Biaya produksi setahun (jumlah produksi 304 m³) adalah Rp3.251.548.750, sehingga harga pokok produk Rp 10.695.884/m³. Analisis kelayakan finansial pemanfaatan mesin pengering menunjukkan dengan harga jual kayu jati kering Rp 11.000.000/m³ Titik impas (BEP) tercapai ipada produksi sebesar 86,3 m³, Nilai sekarang neto (NPV) Rp + 374.245.458 dan Internal Rateof Return (IRR) 80%. Hasil ini menunjukkan bahwa mesin pengering tersebut layak untuk dioperasikan.

Kata kunci: Mesin pengering, tenaga surya, tungku tipe I, limbah kayu, jati, kelayakan teknis dan finansial