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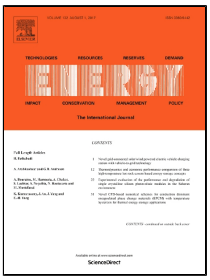

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Abstract

A forced-convection rubber smoking room aimed to reduce time and save energy on natural rubber sheet drying. Exhaust hot air is recirculated to reduce heat losses and improve thermal efficiency of drying system. Moisture content (% dry basis); thermal efficiency; specific fuelwood, electricity and energy consumption are evaluated for half and full load conditions. Economic benefits were also investigated. The rubber smoking room can dry up to 1500 sheets in 48 hours by fuelwood combustion with 0.88 kg/s inlet mass flow rate reduction from conventional drying time of 72 hours. Specific fuelwood and electricity consumption were 0.56 kg and 0.075 kWh per kg of dried rubber sheet, respectively. Air flow in the rubber smoking room was uniform with maximum variation of 6.75°C and the dried products are of high quality. The saving of fuelwood consumption is 55.5% as compare to conventional rubber smoking room. Thermal efficiency of the rubber smoking room is 14.3% under full load condition. The net present value, internal rate of return, and payback period of the smoking room were estimated to be 28,773 USD, 24.6% and 4.0 years. Therefore, new design represents not only a good financial return but also better rubber sheet quality.

Keywords: Ribbed smoked sheet, Rubber sheet drying, Thermal efficiency, and Economics

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