Thesis Title	Optimum Strategy for Vibro-Fluidized Bed Paddy Drying
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Candidate	Mr. Suwat Trutassanawin
Supervisors	Prof. Dr. Somchart Soponronnarit
	Mr. Somboon Wetchacama
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Abstract

The objectives of this research were to develop a mathematical model that be able to determine economical optimum insulation thickness and optimum operating parameters for vibro-fluidized bed paddy drying. Comparison between the experimental result and that of the model showed that the model could predict the result fairly good. Insulation with 25 mm thickness could reduce heat loss and save specific primary energy consumption (SPEC) about 90 % and 7 - 27 %, respectively. The economical optimum insulation thickness for each section was less than 50 mm and the payback period was less than 312 hours. For fluidized bed paddy drying with capacity of 5 tons/h, initial moisture content of paddy of 30 % d.b. and drying air velocity of 2.3 m/s, the optimum operating parameters were: drying air temperature 149 °C, fraction of air recycled 0.93 and bed height 11.9 cm. SPEC and final moisture content were 5.74 MJ/kg-water evaporated and 24.9 % d.b., respectively. For vibro-fluidized bed paddy drying with the same capacity and initial moisture content and drying air velocity of 1.5 m/s, the optimum operating parameters were: drying air temperature 143 °C, fraction of air recycled 0.83, bed height 9.9 cm, frequency 5 Hz and vibration intensity 2.5. SPEC and final moisture content were 5.36 MJ/kg-water evaporated and 26.0 % d.b., respectively. SPEC of vibro-fluidized bed drying was less than 7 % as compare to SPEC used in fluidized bed drying

Total electrical power and average diesel oil consumption of vibro-fluidized bed drying were 5.9 kW and 21.1 l/h, respectively. Total electrical power consumption was 30.1 % as compare to total electrical power consumption used in fluidized bed drying without vibration.

Keywords: Vibration / Drying / Fluidization / Grain