

Burimparth Pakornsiri 2009: Reduction of Fuel Oil Consumption and Waste Management through Bio-sludge Gasification in Recycle Paper Industry. Master of Science (Environmental Technology and Management), Major Field: Environmental Technology and Management, Department of Environmental Science. Thesis Advisor: Assistant Professor Tunlawit Satapanajaru, Ph.D. 104 pages.

This research was the production of producer gases from gasification of bio-sludge and rejected solid waste in recycle paper industry. Open-top downdraft gasification system at Center of Excellent of Biomass, Suranaree University of Technology, was used in this study. Gas flow rates at 100, 120, 140 and 180 m³/hr were studied. The results indicated that suitable flow rate was 140 m³/hr. Carbon monoxide, hydrogen and methane from gasifying were 10.06%, 11.77% and 1.63%, respectively. Fuel consumption rate was 87.9 kg/hr. Average high heating value was 3.54 MJ/Nm³. Percentage of ash volume after process was reduced less than 50%. Gasification is one of the effectively alternative waste managements for industry by changing waste to energy and reducing waste volume.

Technical and economical evaluation in using bio-sludges and rejected plastics as a fuel for steam production show that using 42.2 tons of bio-sludge with rejected plastic can produce 92 tons of steam per month. Five thousand three hundred and fifty point seven two tons of fuel oil can be saved (64,956.60 baht) per month. Investment cost is 3,000,000 baht and payback period is 46.18 months. Net present value is 2.93 million baht and internal rate of return is 25 %.

Student's signature

Thesis Advisor's signature

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