Topic: Experimental Testing of Pelletized Biomass in Multi-Air-Stage Gasification
Name of student: Ms. Nidya Wisudawati Hayadi **Student ID:** 56300700502
Name of Supervisor: Dr. Boonrod Sajjakulnukit, Dr. Ir. Hj. Sri Haryati

ABSTRACT

This study conducted experiments on three different air supply stages of downdraft gasification: single air supply stage, double air supply stage and triple air supply stage. This configuration is considered to be the primary method for improving the quality of the producer gas and reducing the quantity of tar. Eucalyptus wood pellets were used as the raw material. By varying the equivalence ratio (ER), the producer gas composition showed its best result between ER 0.29 and 0.36 with CO, H_2 and CH_4 concentrations of 12.64, 9.35 and 0.92% v respectively. At this ER, the cold gas efficiency was 44.5% and the heating value of the producer gas was 3.1 MJ/m^3. On the other hand, the tar mass was significantly reduced by controlling the ER. It achieved 0.31 gr/m^3 at the highest ER of 0.39. It also showed that the more air supply stage, the better of tar reduction. The major problem of this multi-air-stage eucalyptus wood pellet gasification was the high of ash content that lead to slag formation when the ash melting at high gasification temperature. This high yield of slag had disadvantages for both the quality and the quantity of the producer gas.

Keywords : Multi-air-stage, Gasification, Downdraft, Tar, Eucalyptus wood pellet.

CONTENTS

CONTENTS (Cont')

LIST OF TABLES

LIST OF FIGURES