AIR TO FUEL RATIO CONTROL IN STEAM GENERATOR SYSTEM USING FUZZY LOGIC

By: Bustan Makkatutu
Student Identity No.: 2209204804
Supervisor: Dr. Muhammad Rivai, ST., MT.
Co-Supervisor: Ir. Djoko Purwanto, M.Eng., Ph.D

ABSTRACT

Steam Generators are an essential part in the steamflood process heavy oil field which serves to produce steam to be injected into the reservoir through injection wells with the purpose of lowering the viscosity of heavy oil. The heat energy is used to convert water into steam coming from the gas combustion process that takes place in the steam generator burner. The combustion process is the oxidation reaction of short duration between the fuel and oxygen flame with high-temperature heat release. In this thesis presented an approach to simulation control the ratio between air and fuel, or Air to Fuel Ratio Control, so that the combustion process in the steam generator is optimal. The ratio of air and fuel that will reduce the level of the optimal content of excess air or excess water thus increasing the efficiency of the steam generator. To improve the performance of fuzzy logic controllers applied AFR control is a control method based on knowledge, logic and rules. Fuzzy logic controller is compared with PI controller (Proportional - Integral) to determine the performance of the control of air and fuel ratio. Simulation results indicate that the fuzzy logic controller is able to control the air and fuel gas ratio and maintain the level of oxygen at optimum level of 2% by value of settling time is 8.58 seconds, peak time is 2.86 seconds, rise time is 2.14 seconds, maximum overshoot is 21.28%.