

ABSTRAK

Deaerator merupakan salah satu komponen utama dari sistem air pengisi boiler. Kondisi level air deaerator dipertahankan pada batasan level normal untuk dapat memenuhi kebutuhan boiler. Dalam proses mempertahankan batasan level normal diperlukan sistem pengendalian level air deaerator, sehingga proses pengisi air menuju boiler dapat dikendalikan sesuai dengan kebutuhan sistem.

Oleh karena itu, perlu diterapkan pengendalian otomatis untuk pengendalian level air deaerator, serta perlu dilakukan penelitian mengenai kestabilan dari sistem deaerator. Penerapan pengendalian otomatis pada sistem pengendalian level air deaerator menggunakan metode fuzzy logic dan cascade control. Metode fuzzy merupakan salah satu metode pengendalian sistem yang berhasil digunakan dalam pengendalian tingkat cairan (liquid level) pada suatu sistem tangki. Pengendalian berbasis fuzzy logic direpresentasikan dengan menggunakan simulink MatLab.

Berdasarkan hasil performansi parameter respon sistem yang didapat dengan menggunakan fuzzy logic dan cascade control menunjukkan respon dapat mencapai nilai set point yang ditetapkan dan dapat menjaga kestabilan. Dengan nilai parameter sebagai berikut settling time (t_s) sebesar 302.337 detik, rise time (t_r) sebesar 145.907 detik, error steady state (ess) sebesar 0.4 % dan maximum overshoot sebesar 1.329% .

Kata kunci: deaerator, level, fuzzy control, rise time, settling time, error steady state, maximum overshoot

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ABSTRACT

Deaerator is one of the main components of the boiler feed water system. The condition of the deaerator water level is maintained at normal level limits to be able to meet the needs of the boiler. In the process of maintaining normal level limits, a deaerator water level control system is needed, that the process of filling water to the boiler can be controlled according to system requirements.

Therefore, it is necessary to apply automatic control to control the deaerator water level, and it is necessary to conduct research on the stability of the deaerator system. Application of automatic control to the deaerator water level control system using fuzzy logic and cascade control methods. The fuzzy method is a system control method that is successfully used in controlling the liquid level in a tank system. Fuzzy logic based control is represented using MatLab's simulink.

Based on the performance results of the system response parameters obtained using fuzzy logic and cascade control, it shows that the response can reach the set point value and can maintain stability. With the following parameter values, the settling time (t_s) is 302,337 seconds, the rise time (t_r) is 145,907 seconds, the steady state error (ess) is 0.4% and the maximum overshoot is 1,329%.

Keywords: deaerator, level, fuzzy control, rise time, settling time, steady state error, maximum overshoot

