INVESTIGATION OF WATER FLOW AND THERMAL CHARACTERISTICS IN A FIRE TUBE BOILER BY USING FLUENT

MOHD ISA BIN MOHD NASARUDDIN

FACULTY OF CHEMICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
SHAH ALAM

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DECLARATION

"I hereby declare that this report is the result of my own work except for quotations and summaries which have been duty acknowledged"

Mohd Isa bin Mohd Nasaruddin   23th October 2009

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ABSTRACT

Fire tube boiler is a one type of boiler. It is developed as the second of the three major historical types of boilers which are low-pressure tank, fire tube boiler and high-pressure water tube boiler. Sometimes fired tube boiler is called as a smoke tube boiler or shell boiler. A fired tube boiler is use for production of steam.

The efficiency of steam production is directly related to the temperature, residence time of water flow and the water turbulence inside the fire tube boiler. With the aid of computational fluid dynamics (CFD), this study presents the effort performed in modelling work on the water turbulence using design of fire tube boiler without baffles and fire tube boiler with baffles. The prediction of water flow inside the boiler based on k-ε turbulence model is used since it is widely applied in industries and education sectors. Anyway, the purpose of this study is to investigate the water flow and the thermal characteristics in a fire tube boiler by using FLUENT.

FLUENT is the software that used as a solver and post-processing in CFD. The comparison of the water flow and the thermal characteristics between fire tube boiler without baffles and fire tube boiler will also be discussed.

Keyword: Fire tube boiler, Modeling and Simulation, Water Flow, Thermal
Characteristics

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