Thesis Title	Development of Software for Predicting Temperature and NO_x Emission of Steam Boiler
Thesis Credits	12
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Abstract

Development of mathematical model for predicting temperature and NO_x emission of large steam boilers was studied in this thesis. Heat balance in a furnace of steam boiler was employed to obtain temperature at the active combustion zone outlet and at the furnace outlet. And then we could compute nitrogen oxides concentration in flue gas downstream from the furnace. As for conveniently usage, mathematical model was developed to be computer software. Computational investigations can be carried out for any kind of fuel burning in open type watertube boiler. Prediction of NO_x concentration was in good agreement with the combustion experiments in 65 and 75 MW boilers of which temperature at the active combustion zone outlet were less than 1800 K and the combustion led to appearance of fuel and quick NO_x. For 500 and 800 MW boiler, the model predictions were not in good agreement with experimental data due to the error of Thermal NO_x prediction. The NO_x emission was influenced by nitrogen content in fuel, excess air ratio and volume fraction of cold gases recirculation. The increase in nitrogen content in fuel and excess air ratio and the decrease in volume fraction of cold gas recirculation gave higher NO_x emission. The software is capable of choosing high efficiency operating condition and NO_x emission control of boiler which is existing or in design stage.

Keywords : NO_x or Nitrogen Oxides / Steam Boiler / Fuel Combustion / Radiation