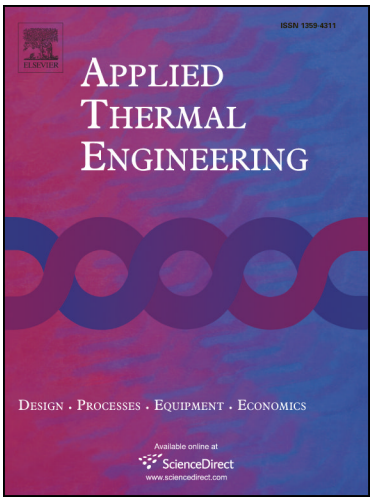

Damper opening optimization and performance of a co-firing boiler in a 300 MWe plant

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Damper opening optimization and performance of a co-firing boiler in a 300 MWe plant

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Abstract: Effects of secondary air and separated overfire air on boiler performance were experimentally investigated in a 300 MWe utility boiler co-firing coal with blast furnace gas and coke oven gas. Moreover, an objective function aiming at simultaneously calculating NO_x emissions and boiler efficiency from thirty-seven operating parameters was represented by a back propagation neural network model which was optimized by genetic algorithm, and the nineteen levels damper openings of secondary air and separated overfire air were optimized by adopting genetic algorithm so as to simultaneously achieve low NO_x emissions and high boiler efficiency. Damper openings of secondary air located at blast furnace gas nozzles zone (GAA/GA/GBB) and coal combustion zone (AS/BS/CS and AA/AB/BC/CC) were adjusted from 10 to 100% in specially designed burner, and the better damper openings were experimentally obtained. The damper openings of separated overfire air were also changed from 10 to 100%, but it hard to evaluate the better damper openings due to the boiler efficiency and NO_x emissions simultaneously decrease with the increase of separated overfire air. Finally, the optimal operation of secondary air and separated overfire air were achieved by using optimization model, which could