

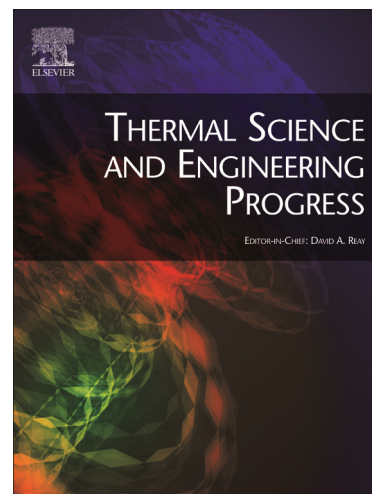
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Burner air-fuel ratio monitoring in large pulverised-fuel boilers using advanced sensors: case study of a 660 MW_e coal-fired power plant.

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Abstract

In this paper, a novel methodology is proposed for the online monitoring of the air-fuel ratio in large pulverised-fuel boilers at the burner level. Using standard measurements, this parameter can only be estimated, as the fuel distribution between burners is generally missing. The detailed air flow distribution to the burners can also be unknown depending on the available measurements. **An accurate control of local and global air-fuel ratios is however crucial in terms of boiler efficiency and various pollutant emission reductions, leading to lower overall operational cost, improved performance and increased fuel and load flexibility.** It is here proposed to combine two advanced techniques to quantify air and fuel flow rates per burner: microwave probes for fuel particles and smart soft sensors for air. When combined, those measurements allow for the calculation of the local air-fuel ratios. The proposed methodology was successfully applied to the boiler of a 660 MWe coal-fired power plant. While the burner equivalence ratios predicted by the standard equipments were in the range 0.9 – 1.05, it was shown that the actual range was significantly broader (0.65 – 1.25). Looking at

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