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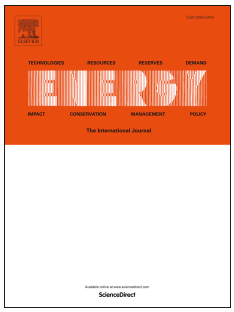

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Dynamic simulation of a municipal solid waste incinerator

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Abstract

For first time in literature, a dynamic process simulation model of a municipal solid waste incinerator is generated. The developed model of the 60 MW_{th} incinerator describes in detail the flue gas path with its vertical and horizontal passes including grate, primary and secondary combustion zones as well as auxiliary burners, in addition to the water/steam side with its economisers, superheaters and natural circulation evaporators. All control structures required for plant operation are implemented, e.g. feedwater tank, boiler drum, steam turbine bypass system, condensers, air supply systems and attemperators. Through careful development, the only boundary conditions of the incinerator model are the inlet temperature and the mass flow rate of cooling water into condenser as well as the composition of the municipal solid waste. The model is verified towards design data, showing good agreement. The relative errors of water/steam and flue gas parameters are all within 5%. The incinerator behaviour during shut-down and hot start-up procedures is then evaluated with the validated model.

Key words

Municipal solid waste incinerator; Dynamic process simulation; Nominal load operation; Shut-down; Hot start-up procedure

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