



ADVANCED CONTROLS, SIMULATION AND EMISSIONS

CLEAN ENERGY TECHNOLOGIES

REGENERATIVE AIR HEATER MODEL

CETC-Ottawa has developed a wide range of computational models capable of predicting the performance of various unit operations involved in fossil-fuel combustion. One of the latest accomplishments at CETC-Ottawa is the development of a regenerative air heater (RAH) model that provides fast and accurate information regarding the performance of a RAH and can be used in a variety of applications such as system design, optimization and retrofit.

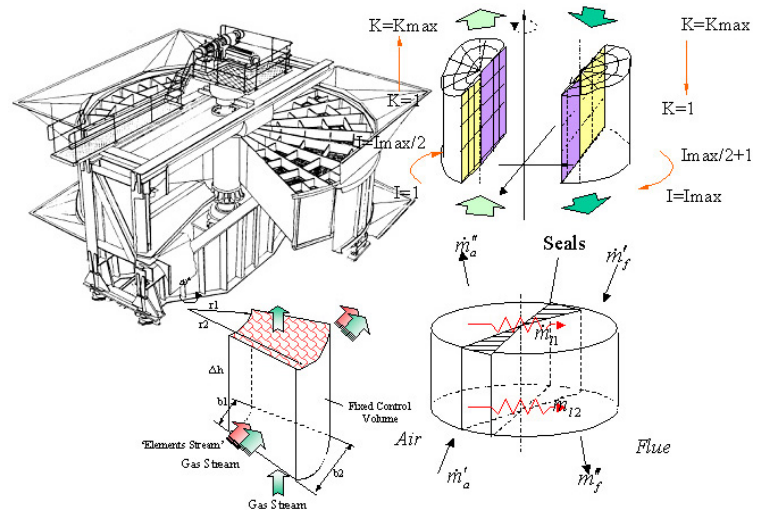
Model Capabilities

The RAH model provides precise 2-dimensional profiles of the:

- Flue gas and air temperatures
- Flue gas and air velocities
- Heating element temperature

The model is also extremely robust and can handle a multitude of settings involving different:

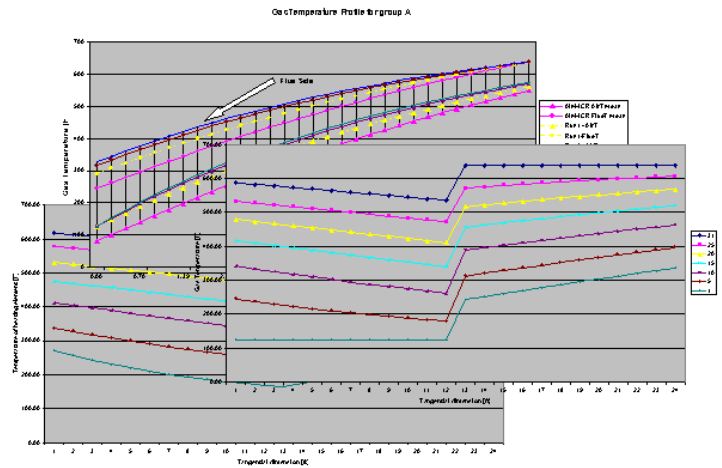
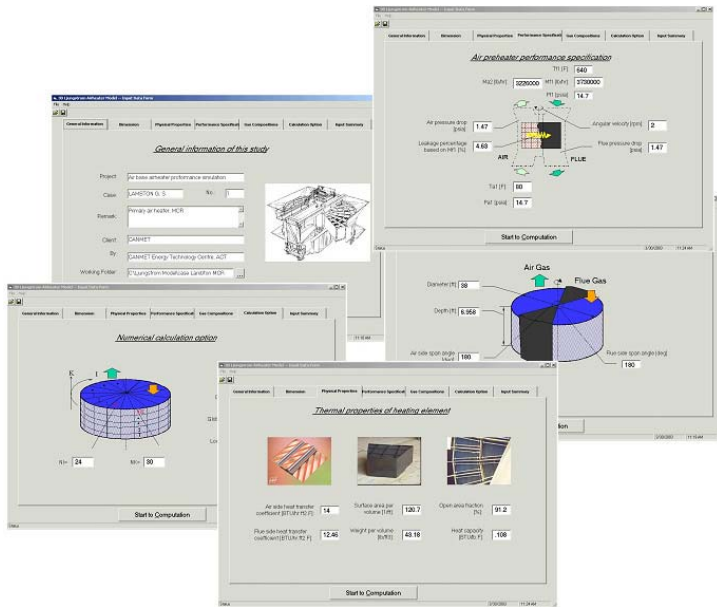
- Rotor dimensions
- Thermal properties of heating elements
- Performance specifications
- Gas compositions



Schematic of Regenerative Air Heater and Model Development

Methodology

The RAH model divides the system into small sections. Within each section, mass and energy balances are simultaneously solved for both the flue gas and the heating elements. When performing the calculations, the model takes into account the complete physical, geometrical and thermal characteristics of the RAH.



Visually Enhanced Interface

Accomplishments

The RAH model has been thoroughly tested against industrial scale reference data coming from both a 40 MW_e and a 500 MW_e utility boiler and has proven to be highly accurate and robust. The model has also been successfully applied in a feasibility study to retrofit an air based 500 MW_e utility boiler for oxy-fuel operation.

- Performance specifications
- System performance evaluation retrofit
- Thermal efficiency optimization

Possible Applications

The RAH model is a powerful tool that can be used in a variety of applications such as:

- New RAH design
- Existing boiler retrofit

Your Invitation to Work with Us

We are interested in collaborating with you. Please contact the Business Office to discuss your particular needs.

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