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KED

Power Plant Simulator & Designer for Operators

1. Support of decisions

Management Teams of power plants receive a multitude of proposals from various organizations and suppliers. The main proportion of this information concerns unit efficiency and optimisation increases. Operational priority decisions are often executed using the intuition based experience of the Unit Operator, which comes from operational experience of the power plant and previous training.

Utilization of unit mathematic models (plant simulation software) enables the Unit Operator to simulate operational scenarios and apply techniques and solutions with the correct reasoning applied. This benefits the Unit Operator as well as the Power Plant and helps to increase plant availability and reduce operating costs.

2. Influence of design and operative factors

The software package makes it possible to analyse the influence of all design and operative inputs and parameters to determine and maximise the economy of the Power Plant equipment.

With the help of this Power Plant Simulator & Designer model, it is possible to show how the changes of fuel composition and consumption, impact the boiler operation and allows the Unit Operator to choose the optimal combustion parameters for the given fuel. It is possible with a sufficient accuracy to determine:

- If the boiler is capable of guaranteeing nominal parameters -steam flow & temperature.

- Which fuel is most suited to the boiler design.

- Allows corrected combustion parameters to be simulated and analysed for new fuel types.

- Optimal combustion ratios determined when 2 completely different types of fuel are burnt (e.g. crude oil and coal)

3. Saving tests

The software model significantly reduces (and in some cases) eliminates the need for laborious combustion tests, which are inevitable for evaluation of boiler operation and performance when evaluating new fuel types or combinations.

This software combustion model can be used to determine the optimal combustion parameters required by simulation, which can also be used as the basis to produce optimised operational procedures for the unit at all loads.

4. Simulator

During Operator training, the model can be used to show the basic principles of unit operation. It gives a precise and clear picture of processes involved throughout the system at various load or combustion conditions. This software package is an important tool for the development of competent Unit Operators, who can gain the experience and competence in a realistically simulated environment. This has the added advantage of protecting the installed plant equipment from damage, whilst the Unit Operators are increasing their competency levels. In this way, it is possible to increase significantly the competency level of plant personnel.

5. Diagnostic

When to the software model is given real time data from running plant, the model can be used as a diagnostic tool for specific boiler conditions. These can further increase the optimisation of the unit be determining and minimising the following:

- Boiler tube surface fouling.

- Optimisation of soot blowing intervals.

- Determining metal temperatures in heated zones, which influence thermal creep fatigue.

- Air ingress into combustion air systems -air heaters, etc.

- Control of excess air, which improve combustion efficiency and reduce flue gas losses.