



ON-LINE

SYSTEM FOR CALCULATION & IMPROVEMENT OF EFFICIENCY DEGREE FOR COAL-FIRED THERMO ELECTRIC POWER PLANTS

The On-Line System for the Calculation & Improvement of Efficiency Degree of Coal-Fired Thermo Electric Power Plants is based on the Input/Loss method developed by Exergetic Systems –USA.

The Input/Loss Method

The Input/Loss method is based on real time monitoring and provision of necessary information of plant thermodynamics, via integrated system models. The information data provided is then used by the engineering software which in turn executes the input/loss method and addresses the results and the corrective issues.

A major limitation of other systems for coal-fired performance monitoring is the lack of understanding of fuel chemistry, its heating value and coal flow, as they are not based on real time monitoring. Without real time monitoring, boiler efficiency and system heat rate information is not possible. Exergetic Systems' Input/Loss Method addresses this issue. Further, the Method contains a novel approach in identifying where in the system improved heat rate can be found (through Fuel Consumption Indices).

Benefits

- Increase of the Unit's Efficiency (> 0.8 Units)
- Reduction of Fuel Consumption (> 8%)
- Reduction of Unit's Self Consumption (> 8%)
- Reduction of Unit's Wear – Maintenance
- Rational Management of Fuel Qualities
- Reduction of the need to Use Foreign Sources
- Detection of the Plant Components that require Maintenance or Improvement
- Data Generation for Techno-economical Analysis on Maintenance-Improvement Operations
- Immediate Evaluation of the Results of Maintenance-Improvement Operations
- It is the Ultimate and Irreplaceable Tool of the Personnel in the daily struggle for Efficient Operation of the Unit



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Economic Aspects

The system has proven to improve, by at least 1%, the Unit's efficiency! For example, applied on a 300 MW unit, it saves the plant €800,000 per year as it lowers the fuel consumption, the self-energy consumption and a lot more due to the lower fuel consumption that results in Unit Wear decrease.

The Input/Loss Method determines in real time:

- Fuel Chemistry (complete with water & fuel ash)
- As-Fired Heating Value
- Fuel Flow
- Boiler Efficiency
- Turbine Cycle Heat Rate
- Unit Heat Rate
- Routine Steam Generator Data
- Emission Rates
- Tube Failure Flow Rates and Location
- Determination of Many and Most Essential Losses

It is the only system **World-Wide** that can calculate with **Extreme Accuracy** the *Calorific Value* and the *Fuel Flow*. It is the most powerful tool a plant can utilize to reduce costs while at the same time protects the environment by helping to reduce polluting emissions.

The system has the ability to present via user friendly HMI/SCADA interface the necessary monitored data and calculated results.

It gives to the user all the required data for the ultimate Unit performance, and also addresses the corrective actions required at those points where the loss of efficiency may depend on.

Based on real time numerical results and corrective values the Operator is able to interfere accordingly, and consequently increase the Unit efficiency. Also the same system backs up historical information, as well as technical and run time cost results which may be used from the Plant management directly.

The system has also the ability to forecast future leaks, and using an appropriate model the components life may be evaluated. Consequently it does also provide information for maintenance purposes. Therefore Plant Operator has also the ability to program Unit maintenance time.



Communication

Via the developed integrated software, is possible to:

- Maintain a central database of results and Unit data which in turn may be updated automatically on 1-hour, 8-hour, 24-hour or other shorter interval (selected by the Operator) basis.
- Transmit all the above through Internet connection to any other remote centre. Consequently with this option remote analysis of the results is possible to any other user.

General System Description

The system's major components are:

1. The Measuring Units
2. The Signal Converter - Transducer Units
3. The Data Acquisition Unit
4. The Database – Server Computer where the database of measurements and results is stored and maintained. This database is called Process Historian database specialized for process industrial applications.
Server computer runs on Windows XP operating system. At the same computer runs the OPC Server software responsible for the communication between the data base and the data acquisition units.
5. The Calculation – Engine Server Computer with Windows XP Operating system where the input loss method is executed.
The above computer unit's typical configuration is:
 - 3,2 GHz Dual Processor
 - 2GBytes RAM
 - 2x250GBytes HDD (RAID)
6. High Speed Fiber Optic Local Area Network - Ethernet

The above components are quoted for one Steam Unit.



Schedule of Project Execution

The schedule of the execution of the project, after Contract Award, as offered includes the following steps (Referred here below in prerequisite form):

- 1) Field survey – Necessary Data collection
- 2) Engineering and project studies-drawings issue
- 3) Project studies approval (by the client)
- 4) Major Equipment and Bulk Material Procurement
- 5) Installation and Commissioning
- 6) Training of Client's personnel

Time schedule is to be finally confirmed with the Client.

Price Quotation

The system makes use of the already installed instrumentation of the Unit for measurements. In the rare case where additional signals have to be acquired they can be installed from ASPO Technologies.

Depending on the type of the Coal-Fired Steam Unit, the Location of the Unit, the amount of the Interface Signaling to be used and the Conditions under which the works will be carried out, the net price cost for one Unit varies.

Please contact ASPO Technologies for more information