



POWER GENERATION



CONTROLLING THE COAL FLOW

An improved combustion monitoring system created lower carbon emissions, a safer workplace, and substantially reduced the operator's expenses

Background

The combustion system in a coal-fired power plant is not much different than in a car. A controlled mix of fuel and air are sent to the combustion chamber where they are burned to release energy. In the continuing move towards cleaner burning and more flexible fuels, power plants are conducting the equivalent of converting from carburetors to fuel injection.

When the client's energy plants were being converted to Continuous Combustion Monitoring, the equipment supplier suggested combining their new technology with the older pulverized coal plant. Since there was no way to accurately measure the amount of coal flowing to the burners, Avid's engineers were asked to develop a metering and control system by marrying the new monitoring signals with the old control strategy.

Approach

In response, they developed an Air/Fuel ratio meter to measure and control both the density and speed of the coal flow to each burner. The metering was then connected to a damper within the delivery tube in exactly the same way as the mass airflow meter controls the throttle body valve in a car's engine.

One of the challenges was measuring the coal loading in a two-phase air transport stream. Previous meters were only effective with constant airflow, but bends in the intake tubes disrupted the air speed and made the old technologies useless. Using a sensor that can measure airflow, the first automated closed loop control of fuel and air to the boiler in a pulverized coal system was a success.

Results

The ability to monitor air speed creates additional advantages. Below a certain velocity, the pulverized coal will fall out of the air stream and accumulate within the pipe – perfect conditions for a dangerous coal fire. The system will maintain at least the minimum transport velocity to prevent coal settling.

The client realized many benefits with this innovation. In a little more than a year, the first installation saved the operator \$2.4 million in fuel alone. These savings allowed the plant to further automate this process and invest the savings in upgrades at other plant locations. With cleaner burning, it also produced less slag, fewer overall emissions, and specifically, lower carbon emissions. And lastly, like running a car with 'Flex Fuel' capability, the plants can now burn a variety of coal qualities to respond to market pressures while maintaining plant efficiency and lower emissions.

Applications

Primary Air Flow

Technologies

Air Fuel Ratio

Burner Management

Honeywell Experion

Mass Flow Sensing

Micro-wave Technology

Ovation

Suspended Coal Flow Monitoring

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