

DeltaV™ System Improves Boiler Operation, Efficiency for Norfolk Southern

RESULTS

- Eliminated manual control intervention
- Improved safety
- Reduced oxygen levels in stacks
- Reduced engineering cost
- Reduced maintenance costs
- Improved process control and performance
- Increased process information
- Increased data for enterprise management

APPLICATION

Boiler control

CUSTOMER

Norfolk Southern Corp., Roanoke, Virginia, USA

CHALLENGE

Limitations of the old controller at Norfolk Southern Roanoke, VA locomotive shop's four 1950s vintage, stoker-fed, coal-fired boilers made changes and efficient operation difficult. For example, when two units operated at the same time, only one could be managed automatically. The other had to be controlled manually with loads fluctuating between the two. Many of the control loops had to be manually controlled at all times.

Another problem was fan control. The induced draft fan ran erratically and the control system occasionally shut it off without stopping the forced draft and overfire fans. The furnace would become pressurized, forcing the furnace doors open and creating the potential for dumping burning coal onto the floor. To ensure safety, operators had to control the fan manually to stabilize boiler pressure and prevent smoke emissions.

SOLUTION

A new boiler control package installed with the DeltaV™ digital automation system solved operating problems for the locomotive shop. Within a few hours of startup, combustion efficiency dramatically increased. The new system virtually eliminated manual intervention of



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the control, improved safety, and reduced oxygen levels in the stacks.

These improvements were achieved using the economically scalable DeltaV system with a preconfigured boiler control, rather than costly distributed controls and custom-engineered strategies. The new package replaced a DCS that had been used for the last 15 years. The steam from the four boilers, each rated at 70K pph at 160 psig, is used to power three air compressors, heat water for parts washers, and heats the facility.

Scalable control solution

The DeltaV system can accommodate even the biggest control configurations, yet it can scale down to bring control to many types of operations once considered too small for a fully automated control system.

The new system automatically controls about 250 I/O at the Roanoke shop, controlling the four boilers, economizers, precipitators, ID fans, water decarbonization units, deaerators, condensate storage, and the feed water pumping system. There's plenty of capacity left to expand control to the water treatment system and the air compressor at a future date.

Applying the strategies

The pre-configured strategy and software simplifies system engineering, installation, configuration, use, and maintenance, while providing tight control of the medium-sized boilers. Cost was a fraction of that generally required for a custom-engineered strategy.

The new control package now operates the boilers automatically, even when more than one boiler is on line. The system also monitors all the inputs from field sensors continuously. Operators quickly accepted the system with its PC-based, Windows familiarity. The 25 displays help generate eye-catching, easy-to-read graphics.

Trend reports let the superintendent analyze any given time period to determine if any change is needed. Totalizers in the system track fuel use and steam production, providing information for financial performance reports.

The system's open architecture allows the company to integrate intelligent field devices, assist management solutions and business applications to provide the information, control, and management capabilities needed to increase performance levels and control costs even further.

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