

Introducing a control solution for weld seam normalizing

EFD Induction has unveiled a new control system for normalizing pipe weld seams to API standards. Per H. Ødesneltvedt, one of the R&D engineers involved in the project, explains some of the system's features and benefits.

Every pipe professional knows that weld seams on oil and gas pipe must be heat treated. But the new generation of pipe alloys and pipe manufacturing methods—together with a trend towards thicker pipe walls—is making processes such as normalizing more and more technically challenging. Tolerances, for example, are extremely narrow when normalizing the newer types of pipe.

The challenges faced by pipe manufacturers have prompted EFD Induction to develop an innovative control system for weld seam normalizing. According to Per H. Ødesneltvedt of EFD Induction's R&D center in Norway, the new system provides three functions crucial for successful, safe and cost-effective seam normalizing. "The first function," says Ødesneltvedt, "is of course ultra-accurate power control—as well as optimized power inputs—to achieve the desired temperatures and heat patterns. These are essential when dealing with the narrow tolerances involved. The system uses pyrometers to provide continuous temperature readings to the control software. But the system also supervises a power injection function for quick power ramp-up. It's a feature that boosts productivity by minimizing scrap."

The system's second main function is automatic coil positioning and control. Data from various sensors are continuously relayed to the control system, which in turn ensures that the coils automatically track the weld seam. "With orbital tracking of the seam," comments Ødesneltvedt, "the system can move the coils to plus or minus 15°." The system also handles unwanted movements of the pipe: "It's important to remember that not only can the weld seam deviate, but the pipe itself changes position due to forming and heat-induced forces. That's why our system has a centre-line offset compensation function, to make sure the coils are always in the right position." Correct coil positioning is aided by a pilot line applied to the pipe by a spray station located directly after the weld point.

Technology as a business tool

The third main function of the system covers various safety, quality and communication features. "Again," says Ødesneltvedt, "these features are geared towards maximizing the output of correctly normalized pipe. For example, the control system lets an operator easily select pre-set process parameters. This not only saves time, it minimizes the potential for human error." The system also collects critical quality control data for each batch of pipe normalized, providing details of power inputs, temperatures, line speeds, etc. Quality control is further enhanced by defect detection and quick coil release features. "Such features,

"explains Ødesneltvedt, "are actually important business tools. Defect detection, for instance, senses temperature gaps in the pipe, and marks the relevant sections for further examination. Inferior product is prevented from leaving the factory—and reputations remain untainted." The quick coil release uses an optical sensor to check the top of the pipe for excess weld bead or other protrusions that might damage the induction coils. When an abnormality is detected, a powerful servo motor swiftly moves the coils to a safe position.

The control system contributes to operator safety by collecting all control functions in a safely located central control desk. Each desk, complete with easy-to-use touch-screens, provides process control and overview for up to four separate work stations. Local control panels can likewise deal with up to four normalizing work stations. Integrated into the system is a programmable safety relay for emergency stops, light curtains and service entrance safety devices. The system can be integrated into existing production mill safety systems. Modular in design, the control system can be expanded over time to meet changing circumstances. "Absolutely," says Ødesneltvedt, "Just one example of this flexibility is the optional telemetric function. This is a module that supports Internet-based remote diagnostics." Ødesneltvedt, however, is keen to stress that the control system is only one element in the total seam normalizing solutions available from EFD Induction. "The system is a big advance for pipe manufacturers. But its full benefits can only be exploited when used in tandem with our unique coil designs and modelling capabilities."



The new control system helps meet the challenges posed when normalizing weld seams on the new generation of API-standard pipe.