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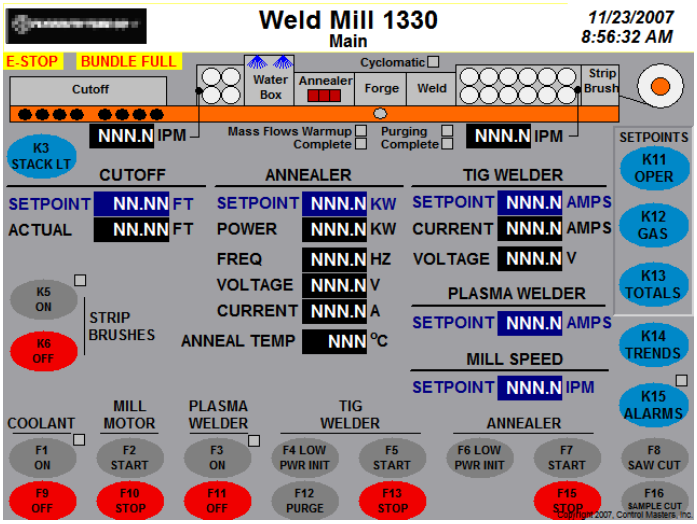
Control Masters Application Case Study

Weld Mill Controls Upgrade



Technologies

Allen-Bradley 1769 CompactLogix Controller
Allen Bradley 1769–HSC High Speed Counter
Allen-Bradley PanelView Plus 1000 HMI
Rockwell RSView ME

Services

Control Narrative
PLC Integration
HMI Integration
System Simulation
Factory Acceptance Test

Project Description

The objective was to upgrade the control system of a tubing manufacturing weld mill. Old pushbutton and pilot light indicators on operator stations were to be replaced with a graphical user interface on a new color HMI. Hand-adjusted flow rates were to be replaced by PLC-driven actuators responding to operator input at an HMI. Relay logic was to be replaced and functionality enhanced by programmed sequences. The existing mill drive motor-generator set was to be retained. Control Masters, Inc. (CMI) provided a new control panel containing an Allen-Bradley 1769-L32E CompactLogix Controller designed to interface with the existing motor control panels. CMI provided a detailed control narrative of the proposed weld mill operation to the client for approval before designing completely new RSLogix5000 PLC and RSViewME HMI application programs. Factory acceptance tests simulating all weld mill functions were performed at the CMI facility for the client.

The weld mill line includes a mill motor, hydraulic roll forge, motor-driven strip brushes, ten weld gas mass flow controllers, a TIG welder, a plasma welder, a hydraulic roll forge, an annealer, a water quench and a cutoff saw. Gas flow rate, welder current and annealer power setpoints are output to the respective regulating equipment from PLC analog output modules. The speeds of entering metal sheet and exiting tubing are measured by entry and exit encoder wheels connected to a high-speed counter module (1769-HSC). Entry and exit speeds are compared to detect feed problems in the mill. The exiting length of tubing is measured by the exit encoder and high-speed counter module and the cutoff is triggered according to the length setpoint entered at the HMI. The Weld Mill PLC issues cut requests to the cutoff saw controller supplied by the saw manufacturer. During production, pairs of three-foot samples can be requested at any time by the operator entering parameters on the HMI, as can random cuts. Production data displayed on the HMI includes the total footage of good tubes cut and the total footage of all cuts including scrap, the number of full lengths cut, the total number sample cuts and the total number of random length cuts. The HMI allows the operator to start and stop the equipment, enter setpoints for tube lengths, gas flow rates, welder current and annealer power, and to schedule sample cuts, monitor equipment status, view trend charts for all process variables, and view alarms on alarm summary and history screens.

The client performed the installation and startup of the new control system themselves and needed only minimal phone support from CMI to get the weld mill running to a higher level of productivity.

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