Paint Plant Automation Using SCADA

Since 1925, Dunn-Edwards Corporation has been the leading manufacturer and supplier of architectural and industrial coatings in the Southwest, providing a complete line of paints and painting supplies to professionals and quality-conscious consumers.

Dunn-Edwards paints are manufactured exclusively in the Southwest and formulated specifically for the climate of the Southwest. From the hot, arid deserts of Arizona and Nevada, to the cool, moist seacoast of California, Dunn-Edwards paints are uniquely formulated to withstand the elements, and protect and beautify a wide variety of architectural surfaces.

Dunn-Edwards currently operates plants in Tempe, AZ and Los Angeles, CA. The Tempe plant is not automated and the Los Angeles plant only has a small section of its operations automated. Dunn-Edwards has commissioned the consolidation of both operations into one large, state of the art manufacturing facility residing in Phoenix, AZ, which will be fully automated to gain all the advantages inherent with automation.

Paint is generally custom-made to fit the needs of various end users. For example, certain industrial users might be especially interested in a fast-drying paint, while another might desire a paint that supplies good coverage over a long lifetime. Paint intended for the consumer can also be custom-made. Paint manufacturers provide such a wide range of colors that it is impossible to effectively keep large quantities of each on hand. To meet a request for "stonish beige," "whisper white," or "aloha sunrise," the manufacturer will select a base that is appropriate for the deepness of

color required.

The base is developed at Dunn-Edwards using a slurry system and the PcVue SCADA software automates this process. The software is integrated with three PLCs based on ISaGRAF, which are fully compliant with both IEC 61499 and IEC 61131 industrial control standards.

The automated slurry system, currently residing at the Los Angeles facility, frees workers from having to add ingredients by hand into paint mixing tanks. This high-tech paint making method ensures consistent paint quality because it is almost entirely computer automated polling about 1,200 physical I/O points and monitoring approx. 5,000 variables in total. There is one PcVue server communicating with three PcVue client stations running on Ethernet and Profibus devices.

Every step in the manufacturing process is controlled by dual computer networks in order to achieve redundancy. PcVue constantly monitors and enables the operator to adjust the exact amount of raw materials needed to make each paint batch perfect. In a few months, these operations will be moved to the new Phoenix facility and expanded upon. Centris Technologies, known for its industrial control and automation expertise, is mandated to develop and integrate all the real-time process control and SCADA development on the plant floor.

The Phoenix plant has been designed to accommodate future growth of the company for years to come. To handle this volume of production, the system architecture for this new plant will be completely state of the art, consisting of two PcVue servers set up in a redundant configuration and connected to 10 Centris Technologies Advanced Process Controllers (APCs), each running ISaGRAF over TCP/IP. The servers will be connected to 12 PcVue human machine interface (HMI) stations residing in key operator locations, some running WebVue through the facility.

WebVue is PcVue’s solution for remote monitoring and maintenance through the use an ordinary browser and allows Dunn-Edwards staff to display and control their paint manufacturing process remotely across an Internet or intranet network. Through management of user rights and authentication processes, operators will be able to access in polling mode the real-time values of PcVue's variables and lists of alarms, events, historical data, etc.

All of Dunn-Edwards production systems will be linked easily to PcVue through standard connections to access both historical and real-time production data. Staff will be able to trend, plot, analyze and report on any details workers need to see in order to make better decisions about their batch processes.

Dunn-Edwards utilizes an extensive array of quality control measures. The ingredients and the manufacturing process undergo stringent tests, and the finished product is checked to insure that it is of high quality. Typical inspections for a finished paint include: density, fineness of grind, dispersion, and viscosity. Paint is also applied to a surface and studied for bleed resistance, rate of drying, and texture. There are thousands of data points PcVue collects and manages through

the quality control process.

The PcVue SCADA will perform data acquisition and collection of approx. 75,000 data points and will be interfacing to an enterprise resource planning system (ERP) from SAP — sharing some 55,000 of those I/O points. SAP has embedded a Pico module for I/O connectivity which is communicating to PcVue's SCADA through OPC. Manufacturing paint is a material intensive process. SAP will be handling the accounting, lab, reporting, POS, sales, purchasing, inventory and production and PcVue will manage all the process control and automation on the plant floor. Operators will manage anywhere between 10–20 batches per shift within PcVue.

Dunn-Edwards is poised for growth with the opening of this new facility in early 2011. By investing in automation, Dunn-Edwards expects to have a deep insight into their batch processes, facilitated information-sharing among their production and supervisory staff so that they will be able to better monitor production in their appropriate contexts, scalability for future expansion and integration with their ERP and HMI systems.

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