NWA Northwest Analytical The Leader in SPC

CRISTAL كريستال

YOKOGAWA

National Titanium Dioxide Company Facility in Yanbu Al-Sinaiyah, Saudi Arabia Implements NWA Quality Suite to Support World-Class Manufacturing

Overview

The National Titanium Dioxide Company Ltd (Cristal) has been manufacturing titanium dioxide (TiO_2) using imported rutile ore at its ultra-modern Yanbu Al-Sinaiyah plant in Saudi Arabia since 1991. National markets its products under the well-known Cristal brand.

Cristal has developed an international reach with headquarters in Jeddah and offices in both the UK and Singapore. The company is owned by three partners, the National Industrialization Company (Saudi Arabia), the Gulf Investment Corporation (Kuwait), and a private investor.

In 2002, Cristal increased its original TiO_2 production capacity from 70,000 metric tons a year to 100,000 metric tons in line with a projected annual rise in world demand of around 3% to 2005. This expansion makes Cristal the largest privately owned chemical company in Saudi Arabia. It also reinforces their position as a major supplier of TiO_2.

Titanium dioxide pigment (TiO_2) is a white powder which offers high opacity, brilliant whiteness and exceptional UV resistance. Such unique qualities have turned it into an essential ingredient in the manufacture of paints, inks, plastics and rubber. It is also used in other products such as soap and toiletries, adhesives, concrete curing compounds, candles and crayons.

Cristal TiO_2 is inert, non-toxic and available in a variety of grades to deliver the color, tone, strength and protection required by an increasingly diverse global market for premium-quality white pigments.

TiO_2 is a high-demand product. The paint industry is its largest user, consuming more than 50% of world TiO_2 production, while plastics consume 19% and paper 17%. Not surprisingly, the largest TiO_2 consumer is the United States (33%), followed by Europe (24%) and Japan (8%). Over the next decade, substantial growth in consumption is expected in developing economies in more densely populated countries such as India and China.

The Challenge

TiO_2 customers such as paint and coatings manufacturers require dependable high quality sources to maintain the quality of their own production. Typically they require vendors to demonstrate process stability and capability.

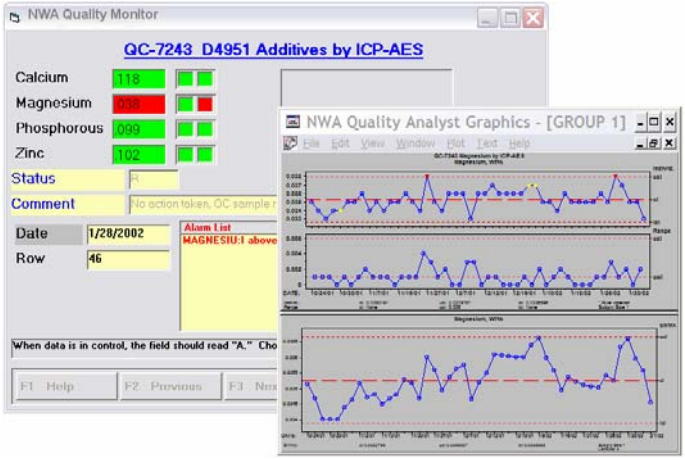
The company goal was to establish itself as a world class manufacturer and improve efficiency, yield and quality. Statistical process control (SPC) is the accepted way to achieve these goals. In addition to using SPC for routine process monitoring, Cristal wanted the capability to run

an active Continuous Process Improvement (CPI) program. However, the Yokogawa DCS 3000 system and Exaquantum historian used to monitor and control the process did not provide the required SPC and manufacturing analytics reporting and visualization.

Cristal needed to rapidly and cost effectively incorporate real time SPC capability into the control system and analyze the historic data for the CPI program. In addition, it was very desirable for the resulting analytical and reporting system to be supportable by the plant engineering staff.

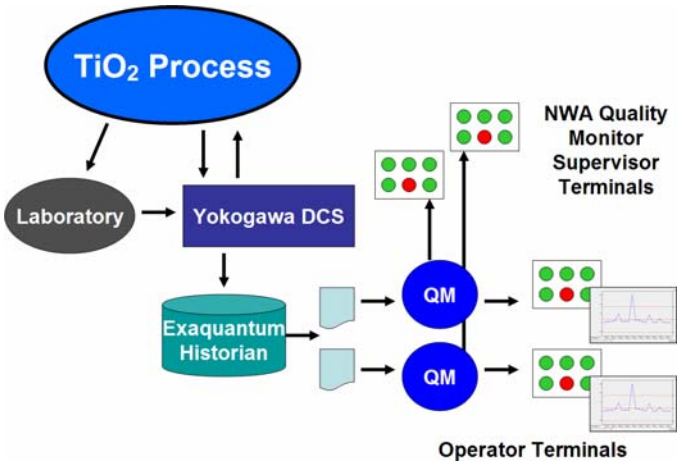
The Solution

The project involved extracting laboratory and control system data from the Exaquantum historian and automating the transfer of the process data into NWA Quality Monitor plant floor workstations. The data is transferred every fifteen minutes, processed and used to update QM operator screens and NWA Quality Monitor Supervisor process status supervisory displays. Operators use the Quality Monitor stations to detect events and to guide process adjustments while supervisory and managerial staff uses the Supervisor screens to alert to process difficulties.



Example NWA Quality Monitor Screen

The solution was developed through the cooperation of Yokogawa, Intercol, the regional NWA distributor, and NWA technical staff. The Cristal process engineering staff was able to configure and implement the system with the help of the vendors.



NWA/Yokogawa-based SPC and process visualization

The Benefits

The integration of the NWA Quality Suite with the Exaquantum historian data is helping Cristal achieve its goal of becoming a world class TiO_2 supplier. In addition to process monitoring, the data is fed to NWA Quality Analyst for continuous process improvement to help meet the goal of world class manufacturing. This also enables them to improve process performance by using process capability analysis to develop process control parameters and set points.

Using the NWA Quality Suite as the basis of the process analysis and visualization enabled a quick, low cost, more flexible solution. The plant process engineers can modify and update the system as needed and reduce the dependence on outside support.