CASE STUDY

Wacker Chemie in Germany boosts control system efficiency

Advanced Digital Services powered by ServicePort find improvements

01 Bernd Schuhmann (r.) of ABB discusses with Peter Blümlhuber of Wacker Chemie AG the latest findings of ServicePort™

Identifying the potential for improving control loops, control performance and sensors was the objective of the comprehensive control system performance analysis conducted by ABB at Wacker Chemie AG in the Upper Bavarian town of Burghausen, Germany. The company uses ServicePort findings for optimizing its processes to improve quality, throughput and costs.

ServicePort generates key performance indicators

In Burghausen, Wacker Chemie AG operates a ketene cracking plant in which liquid acetic acid is evaporated and fed into cracking furnaces in a gaseous state. Special catalysts are then used for separating the gas into ketene and water. Ketene is used as the raw material for producing isopropenyl acetate and acetylacetone. Even though the plant has been working smoothly for many years, the operations management decided to appoint ABB to review its cost effectiveness. “We decided on this course of action because we wanted to boost our system’s efficiency without having to invest in new equipment,” explained Siegfried Pflaum, operations manager for the ketene plant.

ABB’s Advanced Services team was commissioned to analyze in detail the complete automation system and control loops used in the ketene plant. ABB ServicePort software was installed for this purpose. ServicePort enables advanced services to be delivered on site or remotely, and provides access to ABB’s most up-to-date system and process analysis functions. ServicePort monitors signals continuously and generates valuable Key Performance Indicators (KPIs) that allow any looming faults to be detected at an early stage. ServicePort Explorer, the intuitive user interface, presents data analytics so that the operator can take appropriate countermeasures.

The ketene plant uses ABB’s Freelance process control system with DigiVis taking care of the operation and observation functions. The required automation tasks are performed by five redundant type AC 800F

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controllers or rack-based process stations. The part of the plant inspected comprised a total of 139 control loops, including 109 loops that were studied in more detail. ServicePort was connected to the process control system via an OPC-DA interface. A signal sampling rate of two seconds ensured that sufficient data was collected to evaluate the performance of the plant's control equipment.

Bringing out the best

"It is easy to understand that with such a large number of different control loops, it is feasible that they are influencing one another," explains Bernd Schuhmann from ABB's Service sales department. Moreover, suboptimal control parameters may cause the process to fluctuate, which in turn has negative consequences for throughput and yield. Optimizing control loops eliminates weak points and bottlenecks, thereby extending the durability of components. Minor changes to the process can help operators run their plants more closely to their specification limits. This boosts output and energy efficiency without reducing product quality.

Following the first performance analysis, ABB's experts were able to propose possible courses of action. Changes that were easy to implement included increasing the awareness of plant operators for loops that work less efficiently than normal, and inspecting individual final control elements. In addition, some controllers needed to be changed into cascaded loop control structures to achieve better control performance.

Before implementing more expensive enhancements, the costs and potential improvements should always be weighed. To do so, it is a good idea to calculate the energy efficiency and conduct quality checks by adding customer KPIs to the ServicePort database.

When working with plants like Wacker's that have developed over years, it is not uncommon to reveal issues that remained undetected for years. Once people get used to these issues, they consider them natural and start to ignore them. When ServicePort first detected signal spikes without an obvious root cause, a closer inspection of the underlying Freelance project was performed. The findings included signals that are no longer valid but are still being used inadvertently. The analysis also revealed missing setpoint tracking values, or prioritizations of individual processing steps (tasking), both jeopardizing proper execution under certain conditions. In addition, redundant parts from the control system, such as obsolete program modules, were identified. These elements not only burden the control system unnecessarily, but may also cause adverse effects to the process.

These findings led to suggestions on how to improve the Freelance system performance, and new ways of using the process control system. A second analysis report was compiled for Wacker's ketene plant. Based on this report, further measures for improvement were identified .

As good as new

The example of Wacker Chemie AG demonstrates how the efficiency and profitability of older processing plants can be improved by systematically analyzing the plant's control loops. Control loops are usually only adjusted during the planning and engineering stages, and their performance is not called into question once a plant is in operation. Changes to the production process do not automatically result in control loops being updated, and the effects of aging and wear-and-tear remain unacknowledged. By automatically and continuously monitoring all performance parameters, ServicePort notifies operators early of looming faults. This helps to keep the plant running at the highest level and with consistent stability even after more than 30 years.

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