

How Smart Is Your Plant?

Advanced Process Monitoring Software Makes Plants Smarter and Safer

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Manufacturing companies over a range of industries have identified significant value to be gained with real-time process monitoring systems operating in conjunction with their control systems. Accessing under-utilized process information for validation, optimization and control, fault analysis, and detection can improve plant profitability and safety without expending significant additional resources (time, money and people).

The control systems and data historians of today's plants generate enormous quantities of data, from process instrumentation, that needs to be interpreted at multiple levels within an organization. However, engineers and operators typically experience information overload and just don't have the time and resources available to use all of this information effectively, if at all. At the lowest level this raw sensor data is used to directly operate and control the given process in a plant. At the higher levels, this information is used to monitor operations so that they can be optimized at the overall highest or enterprise level. Ultimately, the reasons for collecting and analyzing this information are to improve the plant's profitability and safety.

Ideally, a continuous performance monitoring system can help this situation by automatically identifying areas (instrumentation, control loops, equipment, etc.) that are either underperforming or performing properly in real-time — essentially sifting through the information overload to find the business opportunities. The key benefits of a performance monitoring system are more efficient plant operations, improved reliability and safety, and increased profitability. The most immediate benefit comes from predictive and preventative actions based on performance monitoring results. Longer-term benefits are obtained through more optimal process and equipment operation.

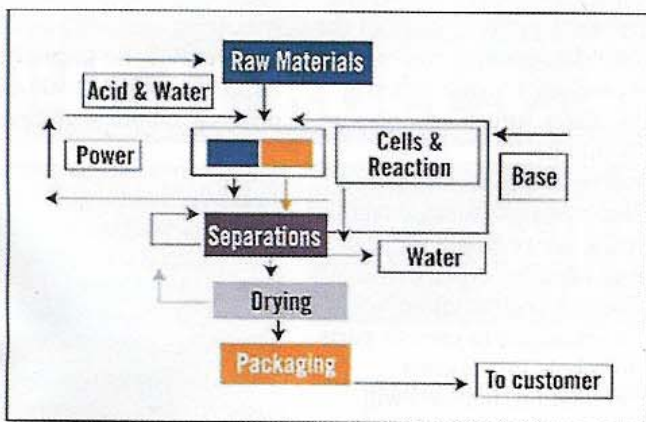


FIG. 1: Schematic of industrial chemical process

Complete real-time process monitoring validation

FALCONEER Technologies has developed smart plant software, FALCONEER™ IV, that continuously performs real-time process performance monitoring and validation. The software essentially makes the challenges of setting up and using a real-time monitoring tool for validation or optimization, or fault detection or dynamic performance equations, into simply the task of documenting process knowledge as models and equations. This simplifies the work immensely, since engineers are well versed in models, calculations and equations for designing and operating the plants! It allows much of the engineering knowledge used to design and operate a given process to be leveraged to create higher-level information necessary to make enterprise wide decisions for optimization, profitability and safety. The software combines process state identification, sensor and process condition validation, continuous statistical process control monitoring, and predictive fault analysis within a single package.

A case study

The following case study demonstrates how FALCONEER IV, can cut through information overload to help plants improve operations and safety.

FMC manufactures a wide range of industrial and specialty chemicals. The FMC process being monitored is a continuous electrolytic process, shown schematically in Fig. 1. FMC was looking for several types of improvements by making better use of the information collected by its Honeywell TDC 3000 control system. They were interested in continuously validating their safety instrumentation and reducing the costs associated with this requirement, optimizing certain underperforming unit operations, improving process on-stream time and reliability, reducing operating expenses associated with manpower and raw material usage and finally, capturing existing process knowledge in an organized and usable manner. They anticipate annualized product cost savings of 2% to 6% from these efforts.

The FALCONEER IV application developed for FMC continuously monitors, in real-time, 100 process sensors and 40 unmeasured process conditions (such as leaks, solution compositions, assumed flows, etc.), and three dynamic process performance parameters. In essence, with this chemical process, there are about 30,000 things (including multiple faults) that could go wrong at any given time and FALCONEER IV automatically generates the necessary diagnostics to monitor the entire process, instrumentation and equipment. Whereas multiple faults are less common, when they do occur the consequences are significant. It is these situations that, when undetected or incorrectly acted upon, can directly lead to costly downtime, accidents, releases, or worse. FALCONEER IV thus makes this plant inherently safer as it continuously monitors for such situations.

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