



CUSTOMER CASE STUDY

How SCG Chemicals' Digital Reliability Platform harnesses AI-infused APM to prevent unplanned downtime from shutting down its value chain

Company Name - SCG Chemicals
Industry - Chemicals

Goals

- Build a single platform to provide integrated, real time visibility of operations
- Leverage smart analytics and cloud to drive decision support and streamline operations
- Visualize operational information and KPIs to coordinate Asset Performance Management

Challenges

- SCG Chemicals wished to drive greater real-time visibility of plant performance across its team
- Need to visualize data and track KPIs, as well as desire to leverage performance improvements from analytics-based decision support
- SCG management developed a “zero unplanned downtime” vision and wanted to build a digital operating system that would enable them to make this reality

Solutions

- Engineering and Design
- Asset Information Management
- Operations Control
- Asset Performance

Results

- Unplanned downtime cut from 98% to near 100%
- ROI of 9X achieved within six months
- Digital Reliability Platform provides end-to-end visibility of plant operations
- Trusted, real-time data blended with analytics enables team to predict equipment health, monitor performance and drive optimizations more readily
- Better understanding and tracking of performance through visualization of data and KPIs
- Operational digital twin supports SCG's aim to drive zero unplanned downtime



Overview

SCG Chemicals is one of the largest petrochemical companies in Thailand and a key industry player in Asia. The company's integrated operations include upstream production of olefins and downstream production of polyethylene, polypropylene, and polyvinyl chloride.

With its tightly integrated business, the company was at risk that individual equipment failure could shut down the entire production chain with direct implications for top and bottom line financial performance. To address this risk, SCG Chemicals pursued a digital transformation initiative to harness data to build an advanced asset performance management (APM) solution to monitor critical assets and predict failure towards a goal of zero plant shutdowns.

The company partnered with AVEVA to develop a Digital Reliability Platform (DRP), a complete asset performance management solution to predict equipment health, monitor performance, and enable advanced maintenance to eliminate unplanned downtime. Using a mix of on-premise and cloud-based applications, the solution integrates online and offline equipment data to visualize plant performance, enhance workforce efficiency, and apply artificial intelligence (AI) for predictive maintenance and resolution.

During a five-month pilot project, enabled by the AVEVA Flex subscription program, SCG Chemicals validated the Digital Reliability Platform and commissioned its Digital Reliability Center, the company's central hub for data collection, analysis, visualization, and maintenance operations. With the success of the DRP, SCG Chemicals is easily scaling up the platform to its 15 plants as well as its joint ventures.

“The Digital Reliability Platform is an unprecedented step forward to ensure reliability for our business. AVEVA was the only company able to provide an end-to-end solution spanning engineering, operations, and maintenance. With the DRP, we have successfully brought together big data, AI, machine learning, and predictive analytics into a practical solution that will empower our workers and improve our performance. This is a great achievement and innovation for SCG Chemicals.”

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Mr. Mongkol Hengrojanasophon,
Vice President - Olefins Business and Operations, SCG Chemicals

Platform requirements for asset reliability

SCG Chemicals envisioned a Digital Reliability Platform to apply digital innovation to management and maintenance processes. In addition, the approach matched the company's broader digital transformation imperative to become a data-driven organization to advance its position as a leader in the petrochemical industry. In evaluating technology partners for its APM strategy, SCG Chemicals focused on three factors:

- **End-to-end solution** – ability to deliver a complete APM solution to integrate and analyze data, visualize performance, and manage maintenance activity.
- **Workforce enhancement** – tools for teams to access data quickly and guide actions to perform maintenance tasks using enhanced information via tablet, video wall, and mobile operator rounds.
- **Strategic partnership** – a technology provider with the deployment expertise, deep knowledge of process manufacturing, with a subscription program that gives full flexibility to access a solution ecosystem.

Importantly, in its efforts to reduce unplanned downtime, SCG is also driving business transformation to improve the knowledge and behavior of its workforce.

AI-infused Predictive Analytics and Virtual Plant

The Digital Reliability Platform utilizes digital innovations to increase maintenance efficiency. The solution provides SCG with an enhanced ability to maintain equipment in various plants within its business, both in Thailand and abroad. The central components of the Digital Reliability Platform include:

- **Predictive analytics** – AVEVA Predictive Analytics monitors equipment behavior continuously in real-time and alerts operators when current operation deviates from the historical operation. The solution applies data science principles to manage “Big Data” sets to detect machine abnormalities. In addition, a rule-based engine (Policy Management) monitors equipment health by incorporating online and offline data from different sources, and helps determine Remaining Useful Life of the equipment.

- **Data center** – The DRP gathers offline and online data into a centralized data management platform through AVEVA Enterprise Data Management which serves as an operational data repository and a base for policy management rules configuration. The data center collects real-time data, time series data, contextualizes, and feeds it into predictive analytics.
- **Smart workforce and advanced maintenance** – AVEVA Enterprise Asset Management delivers advanced maintenance using offline data entry including work requests, work order closure via mobility, and work order scheduling, connected through SAP Solution Overview. Use of digital technology increases work efficiency for both maintenance and production staff, and employs artificial intelligence to record, store and analyze data to reduce human error.
- **3D Virtual Plant** – The DRP features a virtual three-dimensional plant, which has complete machine information represented within the model, allowing management to plan work efficiently and respond to emergency events if they arise. The Virtual Plant solution provides an immersive and touch-based visualization solution that allows inter discipline collaboration and fast to access plant information through AVEVA Asset Information Management, AVEVA 3D Asset Visualization, and range of hierarchical dashboards for equipment status, alarms, and health status.

Plant reliability increased from 98% to near 100% and significant cost saving delivered

SCG has identified some key areas where its AVEVA solutions are delivering business value as follows:

- **Asset reliability and performance optimization** – plant reliability has increased from 98% to near 100% through catch identification to avoid asset failure costs. The ROI from this saving was 9X, making it a best-in-class solution.
- **Standardized work execution and safety risk management** – maintenance costs have decreased delivering savings of 40% through greater operational and workforce efficiency, as well as improved work scheduling.

In addition, the AVEVA solutions have contributed to delivering value in these areas:

- **Asset strategy optimization and remediation** – reduced/optimized planned maintenance through use of data from IIoT sensors and real-time analytics, reducing costs by up to 30%.
- **Access to information and visualization** – the time to retrieve actionable information has reduced to less than 10 seconds, through the single source of truth, single data platform and automated reporting.
- **Real-time information on software usage** – the central license management portal facilitated the software scaling to SCG's evolving needs, either by allocating credits across teams and sites or adding new credits to the existing AVEVA Flex contract.

A new era for asset reliability

The Digital Reliability Center provides an unprecedented combination of digital, IT, and domain expertise in operation technology. Through the Digital Reliability Platform:

- The solution gathers offline and online data into a centralized data warehouse.
- Online data will be gathered from existing real-time databases.
- Critical assets that are not connected are tagged and data is collected manually through AVEVA Mobile Operator.
- All data from field is then passed through the rules engine where it is turned into insightful actions. The rules engine detects deviations from normal operations and updates the health status of equipment.

The facility serves as a hub to collect and analyze data from production and machine operation using of big data platforms and analytics software. In parallel, AI and machine learning technology analyze equipment status and provide prescriptive recommendations and actions. The faster teams can access information and correlate it with real-time data, the faster they are able to resolve and identify errors that occur. The result is an increase in efficiency in operating the plant as well as early detection of abnormalities to prevent equipment damage or failure.

With a range of dashboards from the business unit level down to individual equipment, the Digital Reliability Center changes how SCG teams interact with their data by providing a single interface to all asset information.

The Digital Reliability Center is the latest advance by SCG Chemicals to drive industry innovation and leadership. The use of various digital innovations to increase work efficiency and safety, enhanced with a subscription program that optimizes software investments, establishes a new competitive standard within the industry.