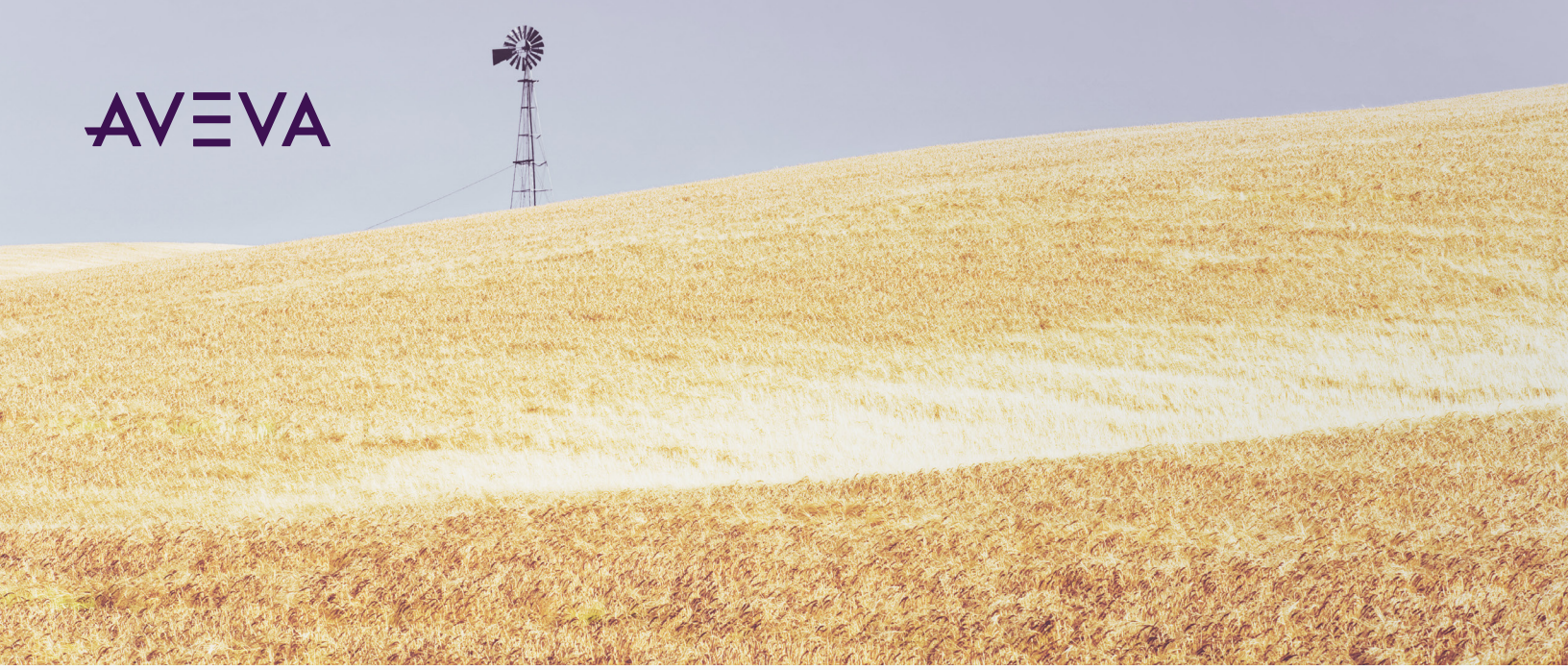

CUSTOMER CASE STUDY

Kellogg's transforms food production lines with AVEVA™ PI System™

Kellogg's - www.kelloggs.com
Industry - Consumer products

Goals

- Reduce product variability
- Bring overall equipment effectiveness in line with the CPG best-in-class rating

Challenges

- Increasingly stringent regulations and safety standards
- Without digital connectivity, teams were required to collect data manually, which lead to compliance and nonconformity issues

Results

- Reduced CCP by 64%, product failures by 73%, and minor line stops by 67%
- Achieved CPG best-in-class rating for OEE of 80%
- Increased mean time between failures rate by 180%

Solution

- AVEVA PI System

Kellogg's is an American multinational manufacturer of cereal and convenience foods. Like other name-brand food and beverage producers, it is adjusting to a market with tighter regulations and safety standards and increased public scrutiny of its products. To that end, the company wanted to upgrade the infrastructure of its international plants to reduce recalls, meet more stringent regulations, and promote consumer trust. Three years ago, Kellogg's deployed AVEVA PI System at its manufacturing plant in Valls, Spain, which produces 12 Kellogg's cereal brands. Since then, AVEVA PI System has helped the Valls plant achieve a plantwide digital transformation, including data analytics. As a result, the plant has reduced costs, improved operational standards, and enabled a smoother compliance process.

Automating line weight monitoring with data

Until recently, the weight-control system on the Valls plant's packing lines was manual; workers collected data samples twice per shift. "All this equipment was without any connectivity," said Emilio Angles, the power controls and information systems manager at the Kellogg's plant in Valls. "It created problems with compliance and nonconformity."

To address these problems, the Valls plant's engineers connected their in-line control to AVEVA PI System through Modbus TCP/IP and an OPC DA interface. This connection enabled the digitized data to be channeled to AVEVA™ PI Server. There, the data was contextualized within the asset framework feature of AVEVA PI Server and basic calculations were configured with asset analytics for all necessary variables, including average weight, number of cartons rejected for weight irregularities, and other metrics tracked during compliance audits. As a result of AVEVA PI System, production lines now produce samples every 20 seconds in real time – the equivalent of 1,440 samples per shift. In addition, nonconformities due to human input error have been nearly eliminated.

> "Now we spend less time looking for data and more time analyzing it."
>
> -
> Emilio Angles
> Power Controls and Information Systems Manager, Kellogg's plant in Valls, Spain

Reducing food recalls and product holds

Food manufacturers must monitor specified critical control points (CCPs) to guarantee product quality and public safety. The Valls plant's CCPs are tied to its ovens, driers, and temperature sensors. The plant closely monitors the conditions of this equipment to reduce product holds and potential recall events. In 2015, the plant began to use AVEVA PI System to collect data from temperature sensors to alert different departments to changes in CCP conditions in real time. Utilizing the richer, real-time analytics made possible by AVEVA PI System helped the plant implement more proactive maintenance and reduce variability in product yields.

AVEVA PI System also helped the Valls plant keep conditions within its equipment above critical limits of temperature and significantly reduce product failures. The plant began using the asset framework feature of AVEVA PI Server to put data in the context of its real-time operations in 2015. Since then, the plant has reduced the number of CCP incidents by 64% and slashed the number of cereal cases scrapped due to failures by 73%. This contextualized data has helped plant operators create a virtuous cycle of analytics that they expect to further reduce the number of CCP events.

Improving OEE with a digital twin

The Valls plant wanted to meet the best-in-class standards of the consumer packaged goods (CPG) industry. Doing so would provide Kellogg's with an opportunity to burnish its reputation as a corporate citizen and deliver ROI through cost reductions and more effective plant maintenance. The benchmark for a CPG best-in-class rating for overall equipment effectiveness (OEE) is 80%, but in 2014, the Valls plant was rated at 68%.

To meet its goal for OEE, the plant's management needed to improve the equipment mean time between failures (MTBF) rate and reduce the number of minor stops on the line. In addition, better root cause analysis could help the plant isolate bottlenecks and reduce stops and line efficiencies.

To that end, the plant used the asset framework feature to create digital twins of all equipment on the packing line. The asset framework feature brought machine metrics onto dashboards, which allowed operators to control packing-line efficiency in real time and spot maintenance alerts before problems arose. By 2018, Valls had achieved the 80% percent OEE benchmark and extended its average MTBF by 180% (from 10 minutes to 28 minutes). The plant also cut the number of minor stops per hour by 67%.

These AVEVA PI System use cases and benefits are just the beginning for the Valls plant. According to Angles, AVEVA PI System will enable the plant to launch advanced analytics and machine learning initiatives for predictive maintenance and product control.

For more information about AVEVA PI System please **click here.**