Case Study

FOGHORN

DAIHEN Automates Production of Industrial Transformers, Improves Materials Quality Monitoring and Collaboration

DAIHEN Helps Power the World

DAIHEN Corporation, a $1B industrial electronics company, has been connecting people to power through a broad portfolio of electric power transmission and distribution products; dispersed power systems; as well as welding machines and industrial robots. DAIHEN products contribute to the construction of our social infrastructure, help ensure a stable supply of electricity, and support the advancement of industry.

Poor Visibility and Manual Data Entry Stopped Innovation

The DAIHEN management team struggled like most manufacturers today – how could they modernize factory operations and make their digital transformation a reality. The current status of their operations is a blur. They needed visibility into their activities to increase throughput and improve product quality. Traditional batch and offline data analysis would not meet the challenge.

Electric transformers are heavily regulated and need to meet extremely high-quality standards, which adds additional burdens for data logging. Much of DAIHEN's operations relied on manual data entry. Each transformer they produced required over 200 manual inspections, accounting for 30% of its total production time. DAIHEN management is unable to recognize real-time quality and efficiency problems in the factory. Their priorities were to automate data collection, provide visibility into real-time operations and monitor material conditions.

Empowering the Operations Team with Operational Insights

DAIHEN deployed FogHorn edge computing software in collaboration with Energia Communications, Inc. to automate manufacturing of their industrial transformers. To enable this digital transformation a new RFID tracking system and sensor infrastructure was built to digitize their data collection. FogHorn Lightning delivers real-time analytics and machine learning at the edge to identify production errors and improve efficiency.

Challenges

- 200+ manual inspections for each transformer – 30% of production time
- High volume, high frequency data too costly for cloud processing
- Expensive, labor intensive approach

FogHorn Solution

- Multi-protocol streaming data ingestion & aggregation from diverse assets
- "Dirty data" cleansing and major pre-processing needed to remove noise
- FogHorn VEL® real time analytics used to determine inspection pass/fail

Benefits

- Reduces production time and labor costs
- Delivers powerful real-time analytics to OT
- Improves quality and yield benchmarks

FOGHORN

RFID and PLC data is aggregated in FogHorn Lightning to track significant parts in the factory and their location, manufacturing state and duration in each production step. This data is high volume and high fidelity and can be very noisy. Foghorn Lightning cleanses and pre-processes all the data in real-time and unifies it into a central view of operations. The operations team no longer has to check on production updates with coworkers manually. Each employee on the production line now has visibility into upstream and downstream process steps, allowing them to focus on production and not chasing status updates with team members.

Pristine environmental conditions are critical to achieving a high-quality transformer. Precise conditions are needed in their clean rooms to ensure the iron and copper used in creating the transformer cores are free of moisture and other contaminants. Sensors were deployed to collect dozens of environmental measurements, including temperature, humidity and dust levels in their clean rooms.

FogHorn VEL real-time analytics is used to ingest data from these sensors to analyze and deliver insights into changes that might indicate an impact in the quality of the components and ultimately flag product quality inspections with a pass or fail. OT personnel, not IT managers, can use this SQL-ish, English reading-like language to input quality rules and iterate in real-time.

With the new RFID and sensor system in place, DAIHEN can understand how parts are stored, and products are built and assembled, in which manufacturing stage they are in, and how long each step of the process takes. Deployment of the new system was rapid. In only six months time, DAIHEN has 70% of the factory covered with the new infrastructure and is saving 1,800 hours a year in manual logging and inaccurate planning. Over the next year, DAIHEN expects to reach 100% coverage and 5,000 hrs/year in savings and then continue the deployment in several other factories throughout Japan.

"We knew that harnessing the power of our industrial data would enable us to improve efficiency in factory operations. FogHorn's solution offered accurate, real-time data processing, allowing us to visually analyze data during the manufacturing process, improving production quality and automating a significant volume of manual processes."

Ichiro Yamano, Executive Officer, innovation task force team, DAIHEN

http://foghorn.io