MICROLAND®
Making digital happen

Ahead since ***1989***

Microland accelerates Industry 4.0 journey of one of the largest refractory manufacturers providing turn-key solution on **real time production intelligence and employee productivity** using its Smart Manufacturing suite

MICROLAND®
Making digital happen

Ahead since ***1989***

CLIENT

One of the largest refractory manufacturing companies that provides products and services for Coke event, Pellet plants, DRI, Blast furnaces, Stoves, Troughs and others, who recently embarked upon an Industry 4.0 journey to stay competitive and scale up its operations.

CHALLENGE

The objectives of the project included **improving operations & product quality, modernizing the floor processes, and build a predictive approach to maintenance**. The refractory manufacturing process involves passing the refractory casts through a 180-meter-long kiln involving different stages of pre-heating, heating, superheating, cooling, and takes an average of 7 days. Each stage is defined by specific temperature, air flow and pressure enabled by over 100 burners and blowers. Any deviation in the required temperature-curve along the length of the kiln makes the whole batch of expensive refractory products defective. Hence, it is most critical to monitor and manage operating parameters in real-time, to ensure corrective actions against occurrence of any deviation.

Additionally, all critical production data like product input/output, batch, cycle time, etc. was captured manually through logbooks and did not provide real-time visibility on operational performance and the trends. The plant required a complete digitization of the shopfloor workflows to ensure not just better visibility, but also improve product traceability upon receipt of any customer complaints.

SOLUTION

Shifting gears to accelerate into Smart Manufacturing

Microland was chosen as the partner to drive the transformation because of its deep IT-OT expertise combined with analytics capabilities. Microland embarked upon the manufacturing process transformation for the client to address the challenges of reducing product defects, providing real-time insights, ensuring paperless workflows, and predictive maintenance of critical assets. The initiative commenced with an ROI backed assessment to define the business case and development of a phased implementation plan. Microland customized its Smart Manufacturing solution leveraging PTC ThingWorx® & Kepware platforms and deployed it at Client's silica manufacturing plant within four months.

Microland Operations experts deployed and configured a data EWON industrial gateway to collate data from existing Siemens PLC which in turn collates data from dozens of sensors installed on the production floor. The EWON gateway enabled ethernet connectivity and enhanced network redundancy since it has capability to store more than 1 Million data points. The Microland team also configured Kepware Server, KEPServerEX® which uses OPC Unified architecture protocol to secure information from the gateway and feed into the ThingWorx® platform.

Shopfloor transformation – going mobile & paperless!

To enable digitization of the production floor data capture process an application was developed and deployed on a rugged hand-held device to allowed capturing of key data points and an approval workflow was defined to ensure data integrity was ensured by the shop floor supervisors. Microland defined end to end workflows and configured the assets to compose the digital twin view of the production on the ThingWorx® platform. An important design consideration was to have persona defined screen layouts for operators, production supervisors, maintenance teams and leadership. The workflow steps were configured with preset alarm thresholds which could also be changed dynamically as the system gained more intelligence by absorbing more data over a period. Additionally, SMS alerts were configured using Twilio to enable key personnel to take prompt actions. 10+ management dashboards were created for the management team to take decisions by providing real-time insights, predictions and recommendations.

INSIGHTS & OUTCOMES

$ 200K
Reduction in Cost of Quality in Phase I

100 MAN DAYS
Improved worker productivity

↓60%
Reduction in time in product traceability

- The real-time insights and proactive interventions on the kiln operations have significantly improved the product (brick) quality by reducing the defects due to firing issues. Visibility into asset health through installing wireless vibration and temperature sensors has brought a paradigm shift from 'unplanned breakdowns' to 'predictive maintenance,' ensuring consistent production.

- The digitization of the process has led to breaking down information silos and enabled the client leadership team to have real-time visibility into the operations with actionable insights, which was earlier limited to only manually ingested data on the ERP. Custom dashboards showing operational metrics, alarms, trends, predictive insights, etc. were tailored to various personas in the factory.

- The shop floor has gone completely paperless with the implementation of mobility solutions and workflow automation. It has improved productivity by around 20% through eliminating logbooks and has reduced time to backtrack issues during customer complaints by more than 60%. The digital workflow enablement has also ensured higher customer satisfaction.

- As the next phase, Microland is closely working with the client towards building a machine learning-based predictive maintenance model to enhance decision making and expanding the modernization across the factory by covering additional units for other product lines.