Mindtree **NxT**

Connected Manufacturing solution for remote monitoring of efficiency

Background

The client is a leading manufacturer of transmission line towers with operations across substations, infrastructure and industrial electrification projects, offering integrated solutions for a broad spectrum of power transmission and distribution undertakings.

The client had factories in three different cities and wanted to gain visibility of the operations to analyze productivity trends, handle breakdowns and perform condition monitoring of 50+ key machines remotely from their headquarters.

Challenge

Given the above context, the factory heads of the client's plants were typically faced with these challenges that needed to be addressed:

1. Accurately determining OEE

Overall Equipment Effectiveness (OEE) is a product of machine availability, performance, and quality of output. Hence, OEE is an all-encompassing measure of how effectively assets are being used in producing quality output.

- Firstly, considering the components of OEE, the machine availability concerns how downtime can be minimized, especially that which is unplanned.

- Secondly, the performance of the machine is a measure of how effectively it is utilized in the available time to produce the desired output. Performance concerns include line balancing - essentially balancing the operator and machine times to ensure least idle periods.

- Finally, the third component of the OEE deals with the quality of the output produced. This is a ratio of the actual number of components that meet all requirements over the total numbers produced.t

2. Energy Consumption

Data available from various sources was limited in its ability to provide insights about energy consumption. There was a need to develop insightful analysis on major areas of consumption and explore the possibility of energy conservation to the best possible extent.

Solution Overview

Apart from the challenges highlighted above, there were other practical difficulties that had to be overcome for the solution to be implemented. Some of these were:

- Cabling in a plant area of about 300 thousand square feet involving heavy working environment with hot operating conditions and metal scrap was a challenging task. This necessitated a wireless architecture for seamless data transmission.

- Various levels of machine automation posed a complexity with respect to the data acquisition, which led to the customization of our approach as per the asset category.

Accordingly, Mindtree NxT deployed the Connected Manufacturing solution with the following key features:

Data gathering

Data gathering from sensors (Level, Temperature and Pressure) and machine controllers (Through OPC, MODBUS and the machine OEM's proprietary protocols), and wireless data transfer from machine controllers/sensors to the central data store.

Local interactive HMI

This enabled the operators to trigger alerts to dedicated groups through the HMI interface for any event related to production or maintenance to ensure immediate action.

Andon display board

The local HMI at the machine location displays only the information for the individual machine. Thus, for the consolidated plant information, the measured data is visualized at a local Andon display board in real-time for quick decision-making.

Intuitive dashboard

The powerful Insights NxT platform, with its out-of-the-box connectivity, was deployed to bring all the data to a common destination. The analytics engine of the platform was leveraged to analyse and visualize the trends for key information such as utilization, energy consumption, and operation efficiency, which were displayed in the dashboards.

Benefits realized

By working with the Mindtree NxT team and utilizing the powerful analytical insights derived from the platform, the client realized the following benefits:

- Shift productivity improved by 2.5 hours through insight-based interventions.

- Instantaneous 'Machine Idle/Under Breakdown' intimation through message triggered from HMI

- Insights-driven energy conservation practices resulted in higher power saving.

- OEE-based benchmarking provided an accurate picture of machine utilization and resulted in outsourcing cost reduction by 15%

- Post-breakdown response time reduction from 30 to 5 minutes by digitizing the process.

- Streamlined root cause analysis by replacing manual paper-based record keeping with HMI-enabled recording of breakdown causes.

About Mindtree

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