

IMPLEMENTATION OF MES FOR IMPROVED PLANT EFFICIENCY

Wipro digitizes the shopfloor for Sesa Sterlite Limited, enabling improved asset utilization and accurate decision-making in production



INDUSTRY LANDSCAPE

The aluminum industry is witnessing growing market opportunities. However, for an industry that is among the most capital intensive, the continuous drop in margins has had the worrying effect of forcing plants in mature markets to shut down. Leaders in the industry are pausing to take stock of their manufacturing operations. At the top of their agenda are strategies meant to drive down costs and increase plant asset utilization. To do this, they are seeking reliable operational data - that establishes the relationship between production at the shopfloors, the workforce engaged, quality of materials and costs - to enable better business decisions.

CLIENT BACKGROUND

Sesa Sterlite Ltd. is an associate company of Vedanta Resources Plc which is listed on the London Stock Exchange, and is part of the FTSE 100. Vedanta is the largest mining and non-ferrous metals company in India with operations in other parts of the world as well.

THE OPPORTUNITY

Sesa Sterlite Ltd. has a 1.6 mtpa aluminum smelter complex with modern infrastructure at Jharsuguda, India. The complex consists of a potline production unit used to produce molten metal and a casthouse foundry that turns out products such as wire rods, billets and ingots. The client wanted to ensure that asset utilization was high and costs were kept low. To do this, the client decided to bring digitization to the shopfloor and gain access to accurate plant and operational data, which, in turn, helped improve decision making.

At the core of the digitization plan was a Manufacturing Execution System (MES) linking Operational Technology (from equipment and assets) with Information Technology (automated monitoring systems, rules engines, alert mechanisms, data management, analytics, enterprise systems etc.). The system would replace operators who spent their time working on paper, measuring and making log entries related to production, down-time and equipment condition and later transferring them to spreadsheets. Sesa Sterlite Ltd.'s new MES aimed to turn the shopfloor into a paperless environment.

“At Sesa Sterlite we are on the path to modernization that creates superior and more cost-aware processes. We know that such initiatives as those implemented by Wipro will ensure we become more competitive and less vulnerable to risk.” - Abhijit Pati, Chief Operating Officer, Sesa Sterlite Ltd.

“Data quality and availability has always been a challenge in the aluminum industry that is struggling to bring down costs. Today, accurate and dependable data that links plant and asset metrics to business is critical to drive excellence in operations.” – Subrata Banerjee, CIO, Sesa Sterlite Ltd.

SOLUTION

After a detailed evaluation, a centralized Ampla solution from our partner Schneider Electric was seen as the best-fit product and was implemented at the Jharsuguda smelter site. The MES monitored, managed and integrated process data of plant operations, material inventory, maintenance and quality to enable production reporting.

The integrated environment incorporated solutions at three business systems levels:



Real-time communications infrastructure that integrates plant control systems, Data Historian and MES

Ampla MES that provides a single repository of contextualized business data for down-time, inventory, quality and production



Integration with ERP using SAP MII for down-time events and condition-based monitoring from vibration analyzers, production data and consumption of consumables such as reagents used in metal casting

Salient features:

- Down-time management and real-time utilization and availability metrics of plant equipment
- Generation of production data for meaningful physical verification of end-products such as bundles of metal products
- Metal grade data of in-process metals and raw materials received that enabled corrective actions
- Records of physical inspection of products during production for quality
- Recording and reporting for two production units, viz. potline and casthouse
- Condition-based monitoring of assets from field sensors (e.g. vibration analysis)
- Role-based dashboards with options to drill down to detailed plant KPIs in real-time such as Overall Equipment Effectiveness, Mean Time To Repair, Mean Time Between Failure, Current Efficiency, etc.

BUSINESS IMPACT

- Reduction in metal loss per kilogram of the metal processed in the potline by 0.02%
- Reduction in costs associated with Anode Effect by 30%
- Power consumption reduced by 0.2% during Anode Effect
- Increase in overall profits by \$0.5 million per month due to efficiency and production improvements
- Increase in availability of key assets in the potline by 0.6%
- Improvement in management of downtime
- Enabling accounting for metal losses at the furnace
- Facilitating accounting for metal production losses when the unit was not running to capacity
- Enabling tracking of end-to-end cycle-time of the product
- Enabling accounting for generation of scrap (e.g. the ingot and billet lines during cutting and sawing)
- Online production posting to SAP by integrating with bar coding system, thereby avoiding delays in production dispatches
- Product costing enabled via SAP integration

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