Tomago Aluminium

Citect provides access to real-time information to improve productivity

CHALLENGE
To improve productivity and avoid the considerable costs involved with plant stoppages. Tomago also wanted to improve its management of raw alumina and make production data available to its business systems in order to track product creation, scrap and rework whilst at the same time complying with EPA regulations.

SOLUTION
By migrating to CitectSCADA and CitectSCADA Reports, Tomago was able to separate the functions of control from that of reporting. With improved data integration they are now provided with information within seconds of an event occurring, minimizing downtime, improving production and reducing project risk.

CONCLUSION
Citect has added considerable value by improving production, saving labor costs for report implementation and maintenance, streamlining operations and reducing the risk of emissions transgressions. Improved reliability of data interaction with business systems has aided in the management of raw materials and facilitated improved decision-making through real-time access to information.

Tomago Aluminium is the largest manufacturer of raw Aluminium products in Australia. It competes globally in one of the world’s most demanding international markets where quality supply and continuous improvement are paramount.

The company produces quality, value-added aluminium products for the highly competitive export market and is the largest consumer of electricity in New South Wales. It is imperative that extended plant stoppages do not occur as the repercussions would be considerable in terms of cost.

CHALLENGE
To keep the smelter running smoothly, Tomago requires visibility into every corner of its 110 acre site. After struggling for years with its legacy SCADA system, Tomago began migrating to CitectSCADA and CitectSCADA Reports. By providing total information integration, these systems, together with Ampla, Citect’s Manufacturing Execution Systems, would help Tomago achieve its management goals, which include improved productivity, managing reporting and control independently, and complying with EPA emissions and information storage regulations.

Identifying the problem
Aluminium is made by mixing Alumina (bauxite), and electricity in a chemical bath. This causes a chemical reaction within the bath, resulting in Aluminium formation.

At Tomago, three pot lines contain continuous streams of molten metal, each running a length of 900m. If the electricity supply to
these pot lines were to fail the molten metal would quickly solidify, irreparably blocking the production line.

In the production process Anodes are consumed into the product due to the catalytic transfer of electricity. Tomago produces its own Anodes, and is constantly striving for tighter integration between plant areas to facilitate the scheduling of these and other production processes.

Tomago is a responsible corporate citizen and is licensed to operate under strict emission targets as governed by the Environmental Protection Agency (EPA). To aid in its emissions minimization goals, Tomago uses fresh alumina to absorb gaseous emissions, which then gets burnt off in the production process. As such, the availability of fresh alumina throughout the site is extremely important. If an area runs out, then not only is production compromised, but the emissions density could increase beyond acceptable limits.

In addition to improving its management of raw alumina, Tomago wanted to make production data available to its business systems in order to track product creation, scrap and rework. This information is now available to analyze production costs and quality. To do this Tomago chose to utilize CitectSCADA Reports to harness the redundancy offered by PLC equipment and CitectSCADA.

Lastly, Tomago has a Service Level Agreement (SLA) for its electricity supply to ensure that the pot lines never shut down. Electricity is the single largest expense in the production process, and Tomago required greater visibility into the power consumption to better manage its SLA.

SOLUTION

Bringing all of the data together across the site to solve these problems was a challenge for Tomago. With its legacy SCADA system, the Process Systems team had to continually modify the SCADA production system to provide reporting information. Due to the size of the site and the awkward locations of many of the systems, this process was slow and costly. By migrating to CitectSCADA Reports Tomago was able to separate the functions of control from that of reporting.

DEPLOYMENT DETAILS

Fumes Treatment

The monitoring of gaseous emissions is a complex task, with density and anemometer gauges spread over the entire site to monitor stacks, pipes, filters and dampers. Additionally, the EPA-approved formulas which accurately calculate emissions readings in real-time, are very complex.

CitectSCADA Reports Historian is used to store these emissions readings permanently to satisfy EPA regulations, and publish them throughout the site so that action can be taken immediately.

“CitectSCADA Reports has allowed us to separate the reporting functionality from our SCADA system, and manage our reporting and control environments completely independently, vastly reducing the level of manual intervention required for continuous customization of reports.”

Stuart Henderson, Process Systems Team Leader for Tomago.
immediately if an area moves outside specific limits. Where previously management was unaware of emissions trends or transgressions until well after the event, they are now provided with data within seconds of the event occurring.

Clean alumina is stored throughout all locations on the site to provide an absorbent agent that is used to scrub polluted air. The silo levels are critical to ensure that there is a ready supply available at all times. Since CitectSCADA Reports began publishing the silo levels across the intranet, there has not been a single instance of an area running out, ensuring cleaner air and no environmental fines.

**Electrical Sub-station Monitoring**
Tomago receives a constant feed of 330,000 volts that is split into three supplies of 110,000 volts to each of the three pot lines. An inverter converts this power to DC and supplies sequenced power to the 280 pots within each line.

CitectSCADA Reports constantly monitors the incoming voltage and reports on total consumption for reconciliation with supplier billing. This has given Tomago much more power in the management of their SLA.

**Anode Paste Plant**
Anodes in the pot lines are consumed every 28 days and are replaced by new ones manufactured on the site. The paste plant makes the Anodes, and needs tight integration with the production system to schedule manufacturing and stock levels appropriately.

CitectSCADA Reports generates flat files containing Anode consumption data that is then transferred to the in-house, custom-built business system. This information is used to streamline scheduling, and to coordinate ordering of raw materials.

**Casthouse**
The Casthouse operates 24 hours per day with the critical role of converting molten aluminium to saleable product. Casting is a combination of continuous and batch processes.
A flexible and proven technology

“CitectSCADA Reports has proven its worth in our business as a flexible technology that allows visibility of operations throughout our business domain, vastly reducing the overhead required in providing information to business managers. This has allowed us to improve reliability of data interaction with business systems, availability of data to process owners and aids in the management of our raw materials.”

Stuart Henderson, Process Systems Team Leader for Tomago.

Manufacturing Execution Systems, based on the CitectSCADA Reports Server allows the identification of common causes and location of production stoppage in the Casthouse. Given that the Casthouse is the revenue generation unit on the site, any stoppage directly affects the company’s financial performance.

REPORTING

Tomago used CitectSCADA Reports to transfer data to Microsoft SQL Server for business reporting purposes, with updates ranging from 10 seconds for sub-station data, to shift summaries for the paste plant, Casthouse and Fume Treatment Center.

Tomago presents its data via three different methods, all within the CitectSCADA Reports web client environment.

Historian information is presented using the standard time-series graphing tools available within the product that includes aggregate functions such as Mean, Minimum and Maximum for a given time period, as well as access to the raw data. This time series data is also available for immediate import to Microsoft Excel for presentation and analysis.

Other data is presented via Crystal Reports for custom formatting purposes, or via custom ASP pages that Tomago developed themselves and embedded in CitectSCADA Reports web server, which provides the security and navigation infrastructure to the clients.

Real-time data is also presented in web pages so that management and technical staff can keep track of critical processes and outcomes in real-time.

CONCLUSION

Citect’s integrated solution comprising the CitectSCADA Reports and CitectSCADA, has added considerable value to Tomago, by improving productivity, saving labor costs for report implementation and maintenance, as well as reducing the risk of emissions transgressions and streamlining operations.