Aurubis Stolberg

Case Study

Semi-finished copper producer reduces WIP levels by 15% and improves delivery reliability by 20%

Aurubis Stolberg optimizes production process

With an annual production volume of more than 60,000 tons, Aurubis Stolberg GmbH & Co. KG (formerly Prymetall) in Stolberg near Aachen is one of the five largest European producers of high-precision semi-finished copper and copper alloy products for the global market. Its parent company, Aurubis AG in Hamburg, operates plants at 12 locations in 7 different European countries, is Europe's largest producer of copper and an international market leader in copper recycling.

DR. HAMED MORID, HEAD OF IT AT AURUBIS STOLBERG: "Customer retention is a vital component of long-term success. And in this respect, delivery reliability plays a key role."

The Aurubis Stolberg lines produce strips and wires for the automobile, electrical and electronics industries in complex manufacturing procedures involving up to 30 different processes. In strip production, these include cold rolling, annealing, stretcher and roller leveling, plating and cutting; whereas wire production involves processes ranging from casting, extrusion and annealing right up to final drawing and packaging.

High product standards and environmental requirements means that additional efforts are necessary: Aurubis Stolberg is certified not just to DIN ISO 9001:2000 but also to TS 16949. The quality standards of the automobile industry make heavy demands on the management and organization of a company. For that reason alone, the material flows at a semis plant need to satisfy every need. The strips and wires produced in the rolling and drawing mills make very different demands on production channels and logistics. This means that the detailed daily planning for production is an extremely time-consuming and complicated business. For many years, Aurubis' greatest challenge was to get a picture of plant-wide planning to avoid unnecessarily high levels of work in process and yet, at the same time, to maximize delivery reliability. The market's increasing demands for delivery reliability paired with flexibility confronted the company with ever more challenges.

LOOKING BACK – DETAILED PROCESS PLANNING

Since 1992, Aurubis has been using the production planning system (PPS) Chipps from the IT service provider Atos Origin. However, this software does not include a scheduling function: in other words, up until the introduction of the new Quintiq system the company was forced to use Excel spreadsheets for the detailed short-term process planning of its individual production lines to define the optimum order sequences and avoid possible production bottlenecks. In November 2004, Aurubis commissioned software company Quintiq, based in 's-Hertogenbosch in the Netherlands, to implement one of its innovative Advanced Planning & Scheduling (APS) systems. The challenge for the Quintiq Application Suite was to improve the efficiency of planning processes in the rolling and drawing mill. This solution, which is already in use at numerous companies including Alcan, Alcoa, Alunorf, Hydro and Ruukki, is tailored to meet the particular needs of the metalworking industry, which takes a small number of different raw materials and – by means of smelting, casting, extrusion, rolling, drawing, annealing, plating and cutting processes – is able to manufacture numerous different products for highly diversified markets. At every stage of manufacture, the production process becomes ever more complex. Existing ERP systems cannot cope with the planning of such intricate processes, as Victor Allis knows all too well: "The logic of these solutions is primarily based on materials lists: which raw materials can be made into components and then assembled with delivered parts into finished products," explains the founder and CEO of Quintiq.

Calling in the Dutch software provider was one part of a strategic realignment process that started at Aurubis Stolberg in 2004 (while it was still known as Prymetall). Beforehand, every operational process was analyzed in depth. "Customer retention is a vital component of long-term success," summarizes Dr. Hamed Morid, Head of IT at Aurubis. "And in this respect, delivery reliability plays a key role." Consequently, the Stolberg company set its sights high, aiming for a target figure of well over 90%.

ULRICH PATALLA, AURUBIS STOLBERG CEO: "Every company has to do its homework before installation can go ahead. Internal processes have to be analyzed and a concept for the visualization and improvements has to be worked out."

DR. VICTOR ALLIS, QUINTIQ CEO: "Users are not interested in monolithic implementations: they prefer a phased adaptation process."

DR. HAMED MORID, HEAD OF IT AT AURUBIS STOLBERG: "We were able to reduce WIP levels by about 15% and the lead times were shortened by several days."

ULRICH PATALLA, AURUBIS STOLBERG CEO: "We have improved delivery reliability by 20%."

WIP LEVELS SIGNIFICANTLY REDUCED

Internal logistics was also under scrutiny. Copper prices had risen enormously, as had many other metal prices, at the time of the implementation, which made stocks in production and inventory considerably more expensive. The aim was to substantially reduce the levels of work in process (WIP). The Quintiq solution was incorporated into the existing ERP system at Aurubis Stolberg and linked to Chipps. A specially designed integrator was deployed to ensure fast and trouble-free integration into the existing IT environment without the need to modify any of the existing systems. Working with the new software was a great leap forward for the workers at Aurubis. They found the colorful, user-friendly interface and icons particularly beneficial. The productivity of the Quintiq Application Suite is, however, fully dependent on plant-specific modifications which have to be drafted and developed in-house. Thanks to its scalability, the Quintiq software offers the maximum possible flexibility. Experience shows that the solution can not only be smoothly integrated into existing systems and technologies, but is also easy to adapt to new requirements – even when company growth exceeds expectations and large-scale operational changes have to be made.

OPTIMIZED SETUP TIMES A MUST

Precise scheduling for every order, shorter lead times for production – those were the most important aims for the Stolberg-based company. The brief from Aurubis was to significantly reduce the turnover time between order receipt and delivery and optimize the sequencing of orders. In addition to deadlines, the latter also had to take technical details such as lot size, alloys and production temperatures into account. Optimally harmonizing annealing and cooling processes leads to significant time and energy savings: it can take up to two hours to heat a furnace up to 500° C. Therefore, to enhance productivity and improve delivery reliability, it is necessary to optimize setup times, in other words reduce heating up and cooling processes to a minimum.

The actual implementation of the Quintiq Application Suite started in November 2004 and was finalized in September 2005. During this time, Quintiq modeled company-specific applications for Aurubis on the basis of its standard software modules. The result was a collaborative solution that incorporated all of the required resources and brought them together into a cohesive unit. The Quintiq software is now connected via an interface to the Chipps system which continues to carry out classic ERP tasks including the submission of tenders and suggesting delivery dates. The ERP software carries out the initial planning on the basis of the proposed delivery date. The Quintiq solution then concentrates on the actual scheduling. The delivery date calculated by Chipps is binding for the Quintiq software.

RESULT – IMPROVED DELIVERY RELIABILITY ACHIEVED

By 2009, working with the Quintiq solution had become second nature to the employees in the Aurubis scheduling and production planning department. When all the up-to-date figures are available for orders, work schedules and production technology, the software draws up a detailed plan for the daily production at least twice a day. Data is updated every half an hour, meaning the Quintiq solution essentially works in real time, a fact that considerably reduces the workload for the various Aurubis schedulers. A scheduling tool that is capable of automatically developing various scenarios is used to map a planning window for every single production process. This allows employees to see at a glance exactly how the order will be affected if the targets set by the software are not kept.

Using a company data collection system, which was developed specifically for Chipps, the Quintiq system registers the completion of each stage of production and checks the subsequent schedules. At the same time, it checks the progress of other orders and can reprioritize if other deliveries need to be brought forward, for instance, because of imminent deadlines. Thanks to Quintiq, it is possible to react immediately to unexpected events, such as a stoppage on one of the lines. Aside from the production temperatures, the order sequence devised by Quintiq is also dependent on the characteristics of the alloys and the capacity utilization of the plants. Orders with very similar or even identical characteristics are processed consecutively. The Quintiq Application Suite is able to process around 1,600 projects simultaneously.

Four years after the implementation, Aurubis Stolberg is very proud of the result and Dr. Morid points out that these positive results can be improved even further in the long term thanks to the expandability and optimization capabilities of the Quintiq application.

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