AUTOMATION AT ITS BEST

One of the three largest packaging steel producers in Europe relies on our competences to help improve it's competitive position.

METALS

PLANT MODERNIZATION

WITHIN ONLY 39 DAYS

ANDRITZ

ENGINEERED SUCCESS

Plant modernization – an increasingly important business segment

ThyssenKrupp Rasselstein GmbH is a subsidiary of thyssenkrupp Steel Europe AG and the only manufacturer of tinplate throughout Germany. The company is one of the three largest packaging steel producers in Europe and operates three continuous annealing furnaces at its plant in Andernach, Germany. After over 30 years' operation by the continuous annealing furnace (a key component in Rasselstein), the lack of spare parts and the sporadic breakdowns in the electrical equipment made it impossible to guarantee reliable plant operations any longer. In view of these circumstances and in order to improve its competitive position, Rasselstein decided to modernize the plant.

RELIABILITY IN OPERATION AND TRUST IN OUR PROJECT MANAGEMENT

In August 2014, METALS finally won through against strong competition and was awarded the contract to modernize continuous annealing furnace #4. An important factor in the award of this order was the extremely successful modernization of continuous annealing furnace #3 in 2012, with a total shutdown time of only 33 days.

In order to meet the customer's requirements, the entire automation system, the drive technology (conversion from direct to alternating current), the mechanical equipment in the entire inlet section including disposal of scrap, the inlet and outlet accumulators, as well as parts of the outlet section including the inspection stand had to be entirely or partly renewed, and around 260 motors had to be replaced. To be ready for the rebuild, all of the automation and drive components were connected up to one another in our electrical workshop in Graz, which had been commissioned to manufacture the switch cabinets and local control boxes, so that the plant could operated in simulation mode in order to train the customer's operating and maintenance personnel. Some of the equipment required, such as the new electric room including air conditioning, the 3.15 MVA transformer, the new main control stand, the PLC and server cabinets, the control voltage distributor, the UPS system, and the drive cubicles had already been installed beforehand while production was still running and wired after the cable trays had been extended. One third of the approximately 260 drives and the plant network were already started up before the main shutdown period due to the very short shutdown time available.

CABLE CLUTTER? A WORD OF FOREIGN ORIGIN FOR OUR SPECIALISTS

In the plant, 4.5 km of cable trays and approximately 100 km of cable were laid, 100 linear meters of drive cubicles were installed, as well as a SIVACON S8 low-voltage distribution center, 25 linear meters of RIO cabinets, 14 operating stations, 2 control stands, over 50 local control boxes, 5 control systems, 14 strip centering devices, and 15 strip tension measuring devices.

The entire HMI and engineering system was implemented in a virtual environment. We used a SCADA (Supervisory Control and Data Acquisition) system from Siemens linked to an existing DCS (Distributed Control System) from ABB and a virtual environment from VMware. The new Siemens control system was able to communicate with the existing ABB control system via Ethernet TCP-IP. Thin clients were used as operating stations to communicate with the virtual computers (VM) via Ethernet/RDP (Remote Desktop Protokoll). For diagnostics conducted with physical computers, a PDA (Process Data Acquisition) system was used with CaptureCam (synchronous recording of video film and measuring data) supplied by iba.

STRIP BREAKS AT PROCESS SPEEDS OF 300 M/MIN NOW BELONG TO THE PAST

Due to the new strip drive and strip tension controls, the plant can now handle strip at much higher speed without any difficulty and without drifting off center, as well as strip that caused problems when running through other plants. Before modernization, drastic speed reductions, for example in an emergency stop, caused strip breaks at process speeds of 300 m/min, thus leading to shutdowns lasting several hours (loss of production). These shortcomings were also eliminated by the modernization work performed.

The biggest challenge in this rebuild project was completing disassembly, assembly and start-up, including the ramp-up curve, in just 52 days. The situation was complicated by the fact that the electrical installation company had to file for insolvency during the preliminary installation work. It was only possible to ensure that electrical installation work could continue uninterrupted by several departments taking appropriate fast and unbureaucratic action. At peak times during the rebuild work, up to 20 companies with approximately 200 machine fitters and start-up engineers were working on the site.

As part of the modernization work, a mathematical model was also installed to control all the strip parameters over an annealing cycle (i.e. heating and cooling) within the pre-determined tolerances. This is done by taking the thermodynamic equipment, the emission factor, and the thermodynamic conditions of the jet pipes, the furnace rollers and the furnace housing into consideration.

In spite of the initial difficulties, the ramp-up curve ultimately achieved was much steeper than the customer had originally planned. ThyssenKrupp Rasselstein was extremely satisfied with the results of the modernization work, and after successful hand-over of the plant, the customer also emphasized the particularly good collaboration with METALS.

BACK TO PRODUCTION

Hard coils that are welded together to form an endless strip are annealed in a continuous annealing furnace. After being cleaned in an electrolytic pre-treatment stage, the strip enters the furnace, where it is heated according to an annealing curve and then cooled down again under controlled conditions.

The company is back again with it's production - as one of the three largest packaging steel producers in Europe.

Line data	
Year of modernization	2015
Strip thickness	0.10–0.60 mm
Strip width	700–1,280 mm
Process speeds	
Inlet	750 m/min
Process	550 m/min
Outlet	750 m/min
Year of construction	1983/84
Material	cold-rolled steel
Capacity	430,000 tons p.a.

SOME AMAZING PROJECT DATA

200 Machine fitters and engineers

> 20 companies working

14 operating stations

14 strip centering devices

4.5 km cable trays

100 km cable laid

> 50 local conrol boxes

25 linear meters of RIO cabinets

100 linear meters of drive cubicles

15 strip tension measuring devices

2 control stands

5 control systems

ENGINEERED SUCCESS FOR FLAT PRODUCT PROCESSING

ANDRITZ Metals is one of the leading global suppliers of complete lines for the production and processing of cold-rolled strip made of carbon steel, stainless steel, aluminum and other non-ferrous metals. The lines comprise equipment for pickling, cold rolling, annealing and heat treatment, surface finishing, strip coating and finishing, punching and deep drawing, and re-generation of pickling acids. The business area also supplies turnkey furnace systems, as well as comprehensive services for the metal working industry.

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