Big Machine Tools for modern Turbine Manufacturing

Over the course of the last three years ALSTOM Power erected a state of the art factory for large power plant turbines in Chattanooga. Situated on the bank of the Tennessee River, the new factory comprises 350.000 SF under a single roof. Last year, casing manufacturing as the last department of the new ALSTOM factory became operational.

The casing line department uses as core equipment two state of the art heavy duty machine tools made by WALDRICH COBURG: a Gantry type milling machine tool and a vertical lathe.

The Gantry type milling machine tool covers a length of 26m, a width of 8m and a height of 8m. Dedicated to the milling machine tool are 12 spindle units, administrated, loaded and unloaded by a state of the art fully automated shuttle system. Different angular spindle units, a full NC – head, and two D’Andrea boring systems enable high complex machining of all kinds of turbine casings; this includes bearing parts and free form parts. Overall, the complex machining results in the highest accuracy while requiring only a few clamping positions. With a mobile wall the milling machine can be divided into two different areas: the operating area and the clamping area. Both areas are completely integrated in the overall safety system that allows the operator to machine on one side and to set up on the other side in accordance with the highest safety regulations. A video camera supports the operator in observing the process. During the machining process a well-supported part measuring system enables faster clamping operations as well as faster measuring operations.

In addition to the Gantry we use a customized vertical turning lathe with a turn table diameter of 8m and a turning height of 8m. It has its own set of accessories and the Gantry heads can also be used. For example this configuration allows deep hole drilling operations using the internal 50 bar high pressure coolant system, and milling operations using large disc cutter. The lathe operators are also supported by video camera and part measuring system, for completing the complex machining operations safely.

Both machine tools are equipped with the state of the art control system “SINUMERIK 840 D Solution Line,” so that extensions over the coming years are possible without limitations. Even the installation of Laser tracers is possible, so we can incorporate a large measuring system.

In this new ALSTOM factory, two traditional companies, ALSTOM and WALDRICH COBURG, together launched future oriented turbine casing manufacturing: very large, very heavy, high precision and high complex without limitations. The requirement of modern production is completely fulfilled. Machine tool manufacturing meets turbine manufacturing.

New PowerTurn at CAT - Tunneling

As Caterpillar Tunneling Canada Corporation we consistently recognize three key customer-centric drivers: timely delivery, durable quality products and responsive services.

To realize these customer commitments, Caterpillar Tunneling has made significant investments in expanding and upgrading its TBM facilities. One of the major investments is a newly installed portal type vertical lathe – Waldrich Power Turn 8000 AS. WALDRICH COBURG is a world leader in precision machining tools. The Power Turn 8000 AS is a portal type vertical lathe which can also be used as a milling machine to perform milling and drilling operations in both axial and radial directions. All machine axis guides, including the turning table, are hydrostatically lubricated enabling a high load capacity, high degree of thermal stability and absolute positioning accuracy. With a maximum part-turning diameter of 8.0 meters and maximum speed of 40 RPM the table load can accommodate up to 200 tonnes. The new machining centre brings remarkable technological and productivity advantages to our manufacturing facilities. The machine is equipped with eight attachments/heads that can be automatically interchanged. Each head utilizes a different type of cutting tool, all of which are stored in 150 different pocket magazines and changed automatically.

The recent capital investment will reduce machining operation cycle times by being able to perform multiple operations on the same machine. The enhanced capability will inevitably benefit our customers with higher velocity and industry leading quality while leveraging the most energy efficient modern technology.

by Caterpillar Tunneling
Editorial

Good conclusion to 2012 despite difficult situation

Despite a difficult situation, WALDRICH COBURG was able end the year 2012 successfully. In the 1st half of 2013 the order book continued to be marked by the weak global economy. The majority of projects were postponed time and again. In the 2nd half of the year we have seen a significant increase in the willingness to invest.

EMO in Hanover from 16 to 21 September 2013 will hopefully further reinforce this tendency. In the name of WALDRICH COBURG I warmly invite you to visit our stand B01 in hall 13. See for yourself how WALDRICH COBURG defines the term XXL machinery. We would be pleased to provide you with information about our latest developments and present our new „MultiContour“ series of products.

We never tire of investing in the future of WALDRICH COBURG. In our in-house production facilities the new precision MultiTec is cutting the first swarf on medium-sized parts. Read the article on this machine on page 4.

The new „gear milling“ and „volumetric compensation“ technologies have been successfully integrated into our series of machinery.

Horst Rothhaupt, Director of Marketing, has taken well-earned retirement after more than 40 years with the company. The necessary changes in our management structure have been implemented with Matthias Fleischer as Director of Sales and Matthias Dill as Director of Production / Service. Read more on this issue on this page.

The scrutinisation of our internal processes and structures continues so that we can offer you, valued customer, the right service at all times. In this way we are making a significant contribution to improving your competitiveness for the future.

I wish you a pleasant read

Yours Hubert Becker

Management team with new structure

After the Director Horst Rothhaupt left the company due to his age, the responsibilities in the senior management at WALDRICH COBURG have been redistributed and new structures established.

After 42 busy and eventful years at WALDRICH COBURG, Horst Rothhaupt took well-earned (restless) retirement on 1 March 2013 and can look back on many successes in his professional career during which he was able to work his way up from commercial trainee to Director of Marketing. With his high level of personal involvement, Horst Rothhaupt is considered to be a trailblazer in the success story of WALDRICH COBURG in China, which has its origins as far back as the early 80s.

He thanked the many long-term colleagues who travelled to his farewell party from all over the world for their excellent collaboration and support in the joint projects undertaken. The fact that he could end his professional career at the high point in the development of the business was, he stated, a stroke of luck.

Horst Rothhaupt wished the modified senior management every continued success on the route that has been taken and expressed his wish that the organisation will continue to stay on course also in the future.

With the retirement of Horst Rothhaupt, Matthias Fleischer, Director of Sales now has an expanded task area and in future will report directly to Hubert Becker, Chairman of the Board. So that he can better address his tasks, Mr. Fleischer has been given high-level signature authority as defined in German law so that he can better address his tasks.

The successor with responsibility for the Assembly / Service area is Mr. Alexander Raab, formerly group leader in design. In his new position Mr. Raab is responsible for the departments Pre-assembly, Main Assembly, Electrical Assembly as well as the Technical Service, Support and Schedule Control area.

With the new organisational structure we have made sure that the accumulated wealth of experience is maintained and our know-how will be even better utilised in future so that our quality standards and our rigorous customer focus will also be continuously improved.

by Uwe Herold

545 years of know-how acknowledged

Precision from experience: our market leadership is based on exactly these values.

With their total of 545 years of experience, 17 members of staff have been honoured for 40 years of service or 25 years of service. They have experienced the growth of WALDRICH COBURG since the 70s and have been actively involved in the development of our machinery into machining centres of the highest precision.

Honoured for 40 years of service:
Rolf Hohn (Electrical Assembly), Ulrich Hübner and Norbert Knoch (both Maintenance), Volkhard Krause (Tool Making), Volker Lang (Operating Instructions), Edwin Schmidt (Pre-assembly), Helmut Schneider (Main Assembly), Peter Schneider (Electrical Assembly) and for 25 years service:
Heiko Flege (Main Assembly), Willi Grollmus (Marketing), Alexander Hohenstein (Small Parts Production), Matthias Hohmann (Milling Head Manufacture), Angela Krause (Shipping), Jens Languth and Stephan Ritz (both Attachment and Gearbox Manufacture), Oliver Weber (Milling Head Manufacture), Detlef Wittmann (Crosstrain Manufacture)

by Sven Grosch

The senior management honours members of staff for long-term loyalty to the company. (Not in the picture: Heiko Flege, Alexander Hohenstein, Volkhard Krause and Peter Schneider)
Flexible manufacturing system for internal gearing

The Siemens Drive Technologies division, with its site in Voerde, is considered a global player and worldwide technology leader in mechanical drive technology. Together with WALDRICH COBURG, Siemens has developed a new machine concept for the complete machining of internal gears. These components are primarily used in wind turbines.

The plant is a highly automated flexible manufacturing system comprising two MultiTurn machining centres each with two supports, two tool changers andattachment changers, a common pallet transport system with six round pallets and two precision set-up stations. Each machine is equipped with a turntable and an integrated pallet carrier. The hydrostatically supported table is used in turning or milling mode.

The two machining centres can be used for turning, drilling, milling and gear milling. The advantages are clear. The space required by the plant in production is approx. 40 - 50 percent less than four separate conventional machines. Due to the smaller number of clamping processes and minimum non-machining times, the workpieces are manufactured more quickly, more accurately and more cost-effectively. The highest quality and productivity are the always in the foreground.

The workpieces are clamped on the high-accuracy set-up stations and can be stored temporarily on three stations. The workpieces are loaded and unloaded from the machinery using these intermediate buffer stations.

A basic requirement from Siemens was the automatic changing of the gear cutting tools to drastically reduce the non-machining times. In the past this variant was not possible on the “special gear milling machines”. Each MultiTurn is therefore equipped with two gear milling heads. The automatic tool change is realised by means of a complete milling head change.

On the machine there is a service station in the attachment change area for inspecting and presetting the gear milling cutters. Here the operating personnel have a clean working area for fitting the tools with new indexable inserts and then checking them. Non-machining times saved due to insert replacement in the machine.

The new clamping device is an innovative in-house development from Siemens AG. The previous “chuck” has been replaced with eight separate clamping blocks that can be very quickly adjusted pneumatically for mounting different size workpieces securely and exactly. The concept is extremely variable and permits set up while machining is in progress even with heavily fluctuating quantities and diameters. Due to the shape of the clamping blocks it is possible to flush the swarf of the pallet using two water nozzles during gear milling.

Each machine is equipped with two supports (M3 and TM2). This feature permits simultaneous turning, drilling and thread cutting operations as well as a reduction in the machining times. (Suggestion: no paragraph here) The turning processes (roughing and smoothing) are mostly undertaken simultaneously. The two supports work on different workpiece contours. During this process the work sequence is continuously synchronised and checked by the Siemens CNC. The finishing operations are implemented with “in-process measuring operations” so that manual measurement is reduced to a minimum. During the automatic measuring operations in the machine one support (TM2) carries the “finishing turning tool” and the other support (M3) a measuring probe. The turning tool on TM2 undertakes a measuring cut and the measuring probe on M3 measures the actual diameter. The correction then required is undertaken automatically by the CNC control system and the diameter fully turned using TM2.

The milling power of the gear milling head is 63 kW at a nominal speed of 95 rev/min. Furthermore the head has an automatic pivoting plane in the range +/- 10 degrees to adjust the helix angle of the gearing. The milling head is only used on the M3 Masterhead support. The M3 support is guided hydrostatically and has optimal damping properties during milling.

During the milling process the Z axis position remains unchanged as a function of the workpiece. The vertical movement of the milling head is only undertaken using the machine’s crossrail. The crossrail is also guided hydrostatically on the two machine bases and has electronic position control by means of a „gantry axis”. The complete system has very high stiffness. Profile milling cutters with indexable inserts are used as gear cutting tools; these tools are of single, duplex or triplex design. During the machining two or three gaps are milled simultaneously using these tools. The tools are designed for dry or wet machining.

The complete system is protected against overload by the monitoring of the power consumption during milling. The system is taught-in specifically for each component. Tolerance bands define the range in which the power is allowed to fluctuate. If the value is exceeded or dropped below due to insert fracture, wear or variations in the blank etc., the milling process stops. This technology permits optimised reliable machining.

To check the quality of the gearing a software application has been developed that permits the measurement of key features of the gearing (pitch, flank line, profile line and dimension over bals) already on the machine tool. These measurements are subsequently repeated on an external measuring machine and compared. In this way the high accuracy requirements are checked even during the machining in the machine.

With the investment in this high-tech production plant Siemens AG is demonstrating its high level of innovation in technologies of the future. (Currently we still have a large number of open problems: chip removal / current 4-day standstill due to faulty cooling unit, Herr Schillig and Herr Rohmert are on site in CW33...) Finally we would like to thank the internal gearing manufacturing team around Herr Dr. Baxmann (Head of Production Large Casting Machining/Internal Gearing) for the cooperative partnership with which they have supported us during the entire project.

by Peter Schneyer

Technical highlights

- 2 x WALDRICH COBURG MultiTurn machining centres, each with 2 supports
- 4 x Tool arenas comprising 4 Kuka industrial robots each with 160 tool stations per arena
- 4 x Spindle unit changers, each support has several additional heads that can be changed automatically
- 1 x Pallet system with 6 round pallets, 1 x Transport shuttle, 2 x precision set-up stations and 3 storage stations
Leonardo da Vinci

Markets are becoming increasingly global. For this reason trainees are participating in the Leonardo da Vinci project and visiting companies in Europe for three weeks.

In November 2012 the trainees Sebastian Bohms and Philipp Müller visited companies in Belgium and the Netherlands as part of the Leonardo da Vinci programme.

In Alvey in Belgium and Weveler in the Netherlands they gained international experience on training and work processes in other companies for three weeks. They became familiar with the differences to the apprenticeship system in Germany. “The exact opposite of what we experience in Coburg.” This is how Philipp Müller describes the differences between one-off manufacture and industrial mass production.

In April two other trainees visited the SKF in Sweden as part of the programme. Like their predecessors they will pass on their experiences and impressions to their colleagues.

The Leonardo da Vinci programme is an initiative of the European Union to promote cross-border training in Europe. The stay at the companies abroad was organised in collaboration with the local vocational school. Sebastian Bohms and Philipp Müller reported “live” on their experiences in a blog that can be found at www.face book.de/WaldrichCoburg.Ausbildung.

by Jens Oswald

First swarf

With a new machine WALDRICH COBURG is further improving quality in large and medium-sized part production.

Since March, building 28 for large part production has been enriched with a real jewel. After an assembly period of almost four weeks, the MultiTec 3000 AT-M4 placed in operation represents a strategically important addition to the machinery available for in-house mechanical production. It is contributing to ensuring that qualitatively demanding workpieces for our machine tools can continue to be machined exclusively on in-house production machinery.

The key data: The MultiTec is 8.5 metres high and 7 metres wide. It is 20 metres long. It is therefore in no way inferior to its large brothers in the same building. The machine of double-table design has a milling power of 45 kW. The tool changer and the attachment changer permit fully automatic machining.

A novelty on a WALDRICH COBURG machine tool is the measuring system for volumetric compensation installed on the MultiTec 3000 AT-M4; this system is integrated into the machine controller.

In future we will be able to offer this feature to our customers – either as an additional feature on a new or existing WALDRICH COBURG machine tool, or in the form of a service as part of our range of services on site at the customer.

by Uwe Herold

Prize winners

The first prize in the Praxis Academy run by the educational initiative „Campus of Excellence” went to two students who wrote their project thesis at WALDRICH COBURG.

„Analysis of the potential for the intensification of the commercial service business“: This is the title of the the sis with which Tobias Nerlich and Johannes Paas took first place in the Praxis Academy run by the Campus of Excellence.

With their thesis they have shown how the share of the service business in the overall turnover can be further increased.

by Jens Oswald

New member in company group

The corporate group around WALDRICH COBURG is growing. At the end of 2012 a further technological gap was closed with the acquisition of the Italian business SAFOP S.p.A.

The maxim is to increase customer loyalty by offering an even broader range of products from a single source.

SAFOP S.p.A. with its large and medium-sized horizontal lathes, turning/grinding centres for machining valve balls, multiple spindle machines and large number of other special machines, e.g. also for the railway industry, supplements excellently the product portfolio of the two machine tool manufacturers already combined, WALDRICH COBURG and C.B.Ferrari. On its Pordenone site in northern Italy the company employs around 120 staff.

Building on the powerful technology of SAFOP, integration in the corporate group will offer numerous synergies as a platform for the successful, future development of the company and also the entire group. The corporate acquisition rounds off the range of machinery we offer to our customers.

by Uwe Herold

Changing up a gear

CAT-Racing wants to further improve on the good results obtained last year with the C13-Luchs.

WALDRICH COBURG is CAT-Racing’s main sponsor again this season. 2012/2013 was the team’s most successful season yet. Hard work and perseverance have borne their fruits. Last year it was possible to achieve top-ten places for the first time. With a ninth place on the Red Bull Ring and 21st place in Hockenheim the team was only „warming up”. Two 2nd places in Spain and Italy followed. This season the team wants to achieve as a minimum the same results.

Again this year, CAT-Racing was able to win WALDRICH COBURG as its main sponsor for the fifth time and will participate in the events at Silverstone, Hockenheim, in Austria, Spain and Italy.

by Sven Grosch