

BLOHM PROFIMAT MC 610 VS reduces non-productive times by half

Christoph Fedler, Project Manager in the Equipment Management department at Rolls-Royce Germany, was faced with a challenge: An increase in capacity was required for the master discipline at the Oberursel location, that of grinding curvic couplings with micron precision.



The BLOHM PROFIMAT MC 610 VS successfully used at Rolls-Royce

Rolls-Royce, active in the fields of "Civil Aviation", "Defense" and "Power Systems", employs around 10,000 people at eleven locations in Germany. In Mr. Fedler's area, "Civil Aviation", the company is the leading engine manufacturer for wide-body aircraft from Boeing or Airbus, for example. Aviation is a huge growth market and one that assures Rolls-Royce full order books for years to come. This puts Rolls-Royce under pressure to maintain and increase productivity, which it aims to do by investing in new technologies, among other things.

Complex requirements

Rolls-Royce specified five main requirements for the new grinding machine: 1. Extreme manufacturing precision. 2. Repeatability

and therefore process stability. Because the drum on which the curvic coupling is ground already has a high production grade. 3. High technical availability of the new grinding machine. 4. Process conversion from oil to an emulsion-based coolant. 5. Simplification and time saving in workpiece set-up by using a customized set-up station.

Complex project

In the 1st quarter of 2015 the team led by Christoph Fedler put together the specification for the new grinding machine. During the course of a year Rolls-Royce evaluated a number of suppliers and held technical discussions with them. Blohm Jung GmbH in Hamburg finally won the contract with the BLOHM PROFIMAT

MC 610VS. "With the PROFIMAT you can achieve a tolerance range that sets you apart from the competition. Experience with an existing BLOHM PROFIMAT MC has also played a vital role. This has been running reliably and precisely in our operation for over ten years", Christoph Fedler explains the decision. It took another year before the BLOHM PROFIMAT MC was commissioned. "It was a complex project with high requirements and it required adaptation during the project planning phase. "BLOHM Project Management has always responded quickly and presented solutions, even when the conditions were challenging", Christopher Boll, Head of Equipment Management at Rolls-Royce, reflects. The new BLOHM PROFIMAT MC 610 VS was put into operation shortly before the end of 2017 and delivered positive results from the outset.



For Tim Riegelhof the hand scanner makes things much easier. The data have scarcely been read in, before the software automatically sets the workpiece-specific NC program.

50 % reduction in non-productive times

For Rolls-Royce the investment in the BLOHM PROFIMAT MC 610 VS has more than paid off. "We have been able to reduce non-productive times by up to 50 %", enthuses Michael Lange, Component

The BLOHM PROFIMAT MC 610 VS

The PROFIMAT MC is a high-performance grinding center. This extremely compact traveling-column machine offers everything that modern production solutions require, with a machine width of just 2400 mm. Different spindle variants enable a wide range of application. The five-axis CNC profile grinding machines in the series can optionally be equipped with a horizontal spindle for drive capacities up to 60 kW as well as a stationary or an NC-swiveling vertical spindle with grinding spindle speeds of up to 60,000 revolutions per minute. The traveling-column machine is suitable for conventional grinding tasks as well as for CD, IPD and all CBN processes.



A strong team around the BLOHM PROFIMAT MC 610 VS: Christoph Weber, Team Leader; Tim Riegelhof, Operator; Wolfgang Scheid, Maintenance; Michael Lange, Component Planner; Alexander Schneider, Component Planner; Ulrich Haar, Sales/Project Manager (Blohm Jung GmbH), Christoph Fedler, Machine Procurement Project Manager (from left to right)

Customer-specific adaptations

The performance of the vertical spindle has been adapted to the customer's specific requirements. To enable better control of the Z-axis, BLOHM also installed two adjustment mechanisms, so-called gantry drives. The PROFIMAT MC has been equipped with a zero-point clamping system with four nests, specifically for Rolls-Royce. The diameter of the machine rotary table is 800 mm. The stainless steel working space is enlarged at the sides for the grinding wheel changing aid, so that the cup-type grinding wheel can be replaced more easily from the working space. Another innovative feature: The set-up station is equipped with a rotary table outside the machine, which is identical to the rotary table inside the machine. The workpiece is clamped on the rotary table and fixed directly to the zero-point clamping system by means of the base plate. The operator can turn the rotary table and calibrate the workpiece to the required radial/axial runout tolerance. The clamped workpiece is then inserted with the base plate into the machine, and the grinding process can be started.

Planner at Rolls-Royce. Thanks to this huge reduction, additional workpieces can now be transferred from other machines to the new BLOHM grinding machine. So the new PROFIMAT MC doesn't just replace the predecessor machine, but also expands capacity. Further benefits of the machine? It is much easier to operate. Because of the customized set-up unit, for example. This enables the operator to set up a new component outside the machine while another workpiece is still being processed in the machine. Exceptional process reliability is offered by the measuring probe, which measures defined quality parameters during the grinding process, and transmits the data online to the Rolls-Royce quality assurance program. In addition, the PROFIMAT MC can be used for grinding master parts. It can thus produce extremely high-quality workpieces for use as measuring devices in production.

To further improve quality the coolant nozzles have been customized, in respect of both shape and the ability to adjust their vertical position (C-axis). This means the workpieces are optimally cooled.

"A special challenge for Blohm Jung GmbH was the vertical dressing unit. We really put their design engineering skills to the test here", Christoph Fedler acknowledges the demand. The original machine is designed for a grinding wheel diameter of 400 mm. Rolls-Royce, however, requires a grinding wheel diameter up to 560 mm. It must be possible to move the cup-type grinding wheel into both the dressing and changing position. The space for all of these steps inside the machine room is extremely tight. "Our design engineers really did a fantastic job here", acknowledges Ulrich Haar, Project Manager at Blohm Jung GmbH.

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The measuring probe measures the defined quality parameters during grinding.

Software



Transfer of the process parameters directly to the customer's monitoring systems.

The operator interface of the BLOHM software is based on the Siemens 840 D Solution Line. The interface, also specially adapted for curvic grinding, is self-explanatory and the operator is guided intuitively. "The software has a modular design and is clearly structured", says Christoph Weber, Team Leader at Rolls-Royce. "The software is also our insurance policy: If the operator measures and enters something wrong, the software picks this up at once and issues an error message." The handheld reader is another impressive feature. Each component can be scanned in with the barcode, the relevant NC data are transmitted to the software automatically and the parameters for the grinding process are adopted accordingly.

Optimizations planned

"The machine is fantastic! The service is fantastic", sums up Christoph Weber. The only downside: The machine needed to be transported from Hamburg to Oberursel by special truck. However, the heavy transport permit was not available and did not arrive for ages, but the old machine had already been dismantled. An external factor, which had a huge effect. Thanks to the productivity of the BLOHM PROFIMAT MC 610 VS however, the backlog was quickly cleared.

After the initial experiences with the new machine, optimizations are now planned. At present the profile shape of the grinding wheel still has to be dressed too often; the solution is to have a grinding wheel with another specification. The aim is also to simplify the set-up station: "Once again we have received dedicated support from the BLOHM team and appreciate the innovative and respectful cooperation", Christoph Fedler is full of praise.

About Rolls-Royce

Rolls-Royce is a world-leading manufacturer of propulsion systems and is represented in Germany by its business divisions "Civil Aviation", "Defense" and "Power Systems".

Within the group, Germany has the second largest workforce after the United Kingdom, with over 10,000 employees at 11 locations. Rolls-Royce Germany has been present with its own branches since 1990 and is active in the aviation industry. Since August

2014 Rolls-Royce Power Systems has been fully owned by Rolls-Royce. The long-established German company headquartered in Friedrichshafen previously operated under the name of Tognum and supplies large engines, propulsion systems and decentralized energy systems.

www.rolls-royce.com

About Blohm Jung GmbH

BLOHM and JUNG grinding machines have been used worldwide for decades, wherever productivity, performance and precision are required. They are developed in Hamburg and produced in a modern manufacturing facility to high quality standards. More than 15,000 delivered machines reflect the international recognition of the BLOHM and JUNG brands. This accumulated experience forms the basis for the company's special grinding expertise in the area of surface and profile grinding. The product range includes standard machines for surface and profile grinding in individual and small batch production, as well as customized production machines. As part of the UNITED GRINDING Group, Blohm Jung GmbH is represented internationally with its own branches in India, China, Russia and the USA.

www.blohmjung.com

About the UNITED GRINDING Group

With a turnover of around 700 million euros, the UNITED GRINDING Group is one of the world's leading manufacturers of precision machines for grinding, eroding, laser cutting, measuring and combination machining. With its eight company brands MÄGERLE, BLOHM, JUNG, STUDER, SCHAUDT, MIKROSA, WALTER and EWAG, UNITED GRINDING offers a broad application knowledge, an extensive product portfolio and a complete array of services on the international market. The Group employs a workforce of around 2500 employees and has more than 20 production, service and sales locations and agencies throughout the world.

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