

CASE STUDY

► DIE AND MOLD INDUSTRIES



GROB G550 – 5-Axis Universal Machining Center at POLAR-FORM Werkzeugbau GmbH

GROB G550 – AN ALL-ROUNDER IN TERMS OF METAL CUTTING

A perfectly coordinated system: Consisting of a 5-axis universal machining center, extended by a tool magazine (TM) and automated in the form of a rotary pallet storage system (PSS-R). This was the decisive point for POLAR-FORM Werkzeugbau GmbH to decide for GROB products for the first time.

Permanent bottlenecks in the milling area and high time and cost pressures in production have over the years convinced POLAR-FORM Werkzeugbau GmbH to purchase a 5-axis universal machining center with automation. An internal technical committee with all decision-makers and machine operators determined what the new machine was capable of or, better still, what existing problems it had to solve. This included issues such as deep hole drilling, milling, high payload weight, large additional tool magazine, large working memory, enormous data volume, limited space, pronounced reliability, and perfect automation. After intensive market research, three machines were finally selected. The final decision was made in favor of a 5-axis universal machine from GROB, equipped with a circular pallet storage system and additional tool magazine - a system perfectly tailored to the needs of POLAR-FORM. „We never had any doubts about our decision, but what this machine can really do only gradually became clear to us,” says POLAR-FORM

Production Manager Dietmar Klötzle, looking back pleased with the outcome.

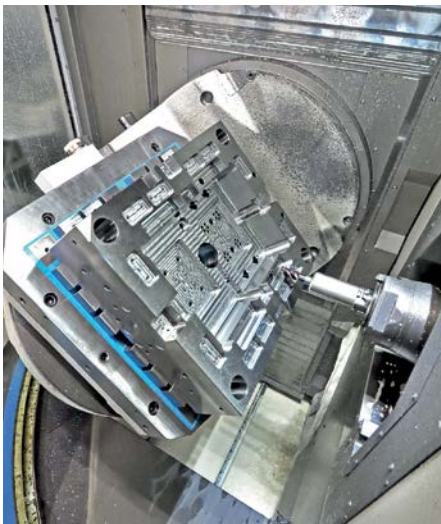
Optimal configuration – perfect training

The detailed work began once it was certain that a machine from GROB would be purchased. Despite the limited space available, the GROB layouts and installation plans provided enabled the perfect location to be found quickly. Due to a steel beam in the hall, a two-section special door was even installed in the machine. In the end, everything was just right - from setting up the machine to commissioning. The training of the employees took place on site at POLAR-FORM. Even in the initial phase, the trainees practiced on a range of parts that are actually produced at POLAR-FORM. „The idea behind this was to have the machine demonstrated on ‚POLAR-FORM parts’ and not just on any sample parts,” says Dietmar Klötzle. Since the programming of the

machine was also carried out on site using a CAM program, all the employees concerned could be called in and thus were involved and trained from the very beginning. This way, all of the basic settings were quickly covered via testing and the horizontal spindle concept of the new GROB machine could be illustrated very clearly.

Machine programming was also very simple, since it was possible to load the programs much more elegantly than before via the programming station, and this no longer had to be done directly at the machine. „It soon became apparent just how well the CAM system communicates with the G550 and Heidenhain control system,” recalls Michael Gür, team leader for rough cutting at POLAR-FORM. Now the cycles can be transferred one-to-one to the G550. A procedure that was not possible with the previous machines. „All in all, it can be said that the changeover to the GROB machine posed no problem at all,”

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Form plate with deep holes, clamped on magnetic clamping plate for 5-sided machining



KNOWING WHAT MATTERS: Michael Gür, team leader rough machining POLAR-FORM, Frank Schwarz, Measurement engineer POLAR-FORM, Dietmar Klötzle, Production manager/Procurator POLAR-FORM, Stephan Mangels, Operator POLAR-FORM und Joachim Stock, Area sales manager at GROB (f.i.t.r.)

recalls POLAR-FORM measurement technician Frank Schwarz. „Especially in light of the fact that we didn't all have to start from scratch during the familiarization phase. Certain things are the same everywhere.“

Deep hole drilling and milling on one machine

The G550 from GROB has just about revolutionized the production processes at POLAR-FORM, since up to now deep-hole drilling and milling have traditionally been carried out on two different machines. With the G550, both milling and deep-hole drilling with a tool length of over 400 mm can be carried out because the spindle moves backwards in the tunnel principle. Since the spindles of GROB machines are arranged horizontally and retract completely into the tunnel, 5 axes can

also be swivelled and machined with a maximum tool length of 465 mm. Another major advantage of GROB's horizontal spindle position is the excellent chip fall that ensures high process reliability for parts with deep cavities. Here there were always problems with chip accumulations, especially in deep pocket machining. Due to the overhead machining at -90° or -180°, the chips all fall off cleanly and drop down. A unique GROB technology. The extensive range of parts that can be processed on the G550 is a clear advantage. „Where we used to need two and more machines,“ recalls Klötzle, „we can now use one. We can use the G550 for complete milling, drilling deep holes, and machining five sides.“

Better quality with half the delivery time

The rotary tables, important at POLAR-FORM

featuring a diameter of up to 800 mm for injection molding machines, are a good example of production optimization. Where previously three operations were necessary, these can now be completely machined in one clamping. Many jobs that used to be run on two or three machines and sometimes required external machining are now running on the GROB machine. „If everything runs on one machine, I can skip the changeover and reduce not only my throughput times but also my sources of error,“ says Klötzle. „As we all know, quality is always best when everything comes from one source.“ Previously, after milling, the rotary tables were routed to external turning and then clamped onto a separate deep-hole drilling machine. Turning is replaced by milling on the GROB machine. Even deep hole drilling works excellently on the G550, saving a lot of cycle time. Only the gear-toothing of the rotary tables is still done externally, and this too could

KNOWING WHAT MATTERS

Company philosophies can be invented, but it is the employees who have to live and implement them. POLAR-FORM has been producing single- and multi-component molds for customers in the fields of medical technology as well as the automotive, household and consumer goods industries for over 27 years. Quality, adherence to delivery dates, and a commitment to service excellence are in the foreground. Always according to the company maxim „Knowing what matters.“ „To be able to meet our high standards, we rely on well-trained employees. Because in contrast to pure production, tool and mold making requires specialists and the best technologies,“ states Klötzle explaining the company philosophy. Technologies like those offered by GROB in Mindelheim. A perfectly coordinated system for POLAR-FORM Werkzeugbau GmbH.



POLAR-FORM Werkzeugbau GmbH – Lahr

be realized on the G550 using the new GROB gear-tooth cycles. The machining process runs largely without operator intervention through the GROB circular pallet storage system, with the result that a great deal of work could be reclaimed in-house, and the added value is once again created at POLAR-FORM. With improved quality and a 50 percent shorter delivery time.

Automation increases flexibility and reduces costs

Another innovation at POLAR-FORM was the use of automation, combining a rotary pallet storage system (PSS-R) and an additional tool

magazine (TM). In the PSS-R13 version, thirteen pallet storage locations are now available on three levels. This made it clear that with so many applications, the tool magazine must also be appropriately large, otherwise the pallets cannot be operated.

With the additional tool magazine, the desired, complex machining tasks can be carried out with a total capacity of 217 tools. The TM works with a self-sufficient machine control, whereby the tool management is handled by the machining center itself. „In the milling area, we used almost no automation,“ recalls Klötzle. „But now we have the opportunity to let the machine run all night long. All in all, the added value created by the tool magazine and the automation, in combination with the

GROB G550 machine, is enormous“.

Another aspect of the professionalism at POLAR-FORM is summed up by GROB Area Sales Manager Joachim Stock, who has accompanied POLAR-FORM in an advisory capacity from the very beginning, when he says: „It is also interesting to see how meticulously POLAR-FORM has dealt with clamping and die technology in general. Because the machine and its automation are one thing, the clamping and handling of the tools is another. Deep-hole drilling in particular requires a certain amount of know-how, and it takes time to learn this until all processes are understood.“

COMPANY PROFILE ► GROB-WERKE

For more than 90 years, our company has been one of the global players in the development and manufacturing of machines and production lines. Our customers include the world's most prestigious car manufacturers, their suppliers and many other renowned companies from various industries. With our production plants in Mindelheim (Germany), Bluffton, Ohio (USA), São Paulo (Brazil), Dalian (China) and Turin (Italy), and worldwide service and sales subsidiaries, we are represented around the globe. The GROB Group generates worldwide revenue of over 1.5 billion euros with a workforce of about 6,800 employees.

Our portfolio ranges from universal machining centers to highly-complex manufacturing systems with own automation function through to manual assembly stations and to fully-automated assembly lines. Furthermore, production plants for electric motors and assembly lines for battery and fuel cell technology are part of our product range. GROB engineers are delivering solutions for the technology involved in spraying engine components, in cutting high-strength turbine housings and machining structural and chassis components. By developing GROB-NET4Industry, our proprietary industrial software for the digitalization and networking of production systems, GROB is taking a giant leap into the digital future



YOUR CONTACT:

GROB-WERKE GmbH & Co. KG

Industriestraße 4
87719 Mindelheim, Germany

Phone: +49 (8261) 996-0

E-Mail: info@de.grobgroup.com

Internet: www.grobgroup.com



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