NEW DEVELOPMENT FACILITY AT BURKHARDT+WEBER: INITIAL TESTS COMPLETED.

The new, ultra-modern BURKHARDT+WEBER development facility was completed during the winter of 2014/15. Systems engineering worth over € 300,000 was installed by the company's own specialist departments, including a modular test bench substructure, a powerful hydraulic system with over 16 configurable channels, a generously sized cooling system for various media and a complete CNC control system based on Sinumerik 840D sl.

Since the start of 2015, the first prototypes have been loaded onto the system by the development experts and are undergoing fatigue testing. All parameters relevant to operation, including lubrication, pressure, vibration, temperature curves, current consumption etc., are automatically recorded.

One example is the fatigue testing of a rotary coupling for the torque table developed by BW. Although the component is just a small element of the overall machining centre, the durability of this assembly is of critical importance; after all, every medium is transferred from the stationary to the rotating part in the rotary coupling. Due to the high speeds, however, all the seals must feature a no-contact design.

D160 quill unit on test bench.

Because every single core component was developed and manufactured at BURKHARDT+WEBER, these fatigue and function tests are part of the process for all new and updated products. This ensures the high standards of quality and durability demanded for each assembly.
The tests are supervised by a test engineer, with support from experts in the specialist departments.

Benjamin Braun (VM)

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RENK AG AUGSBURG

TWO MACHINING CENTRES WITH 4,000 TOOLS – HOW DOES THAT WORK?

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Publisher
BURKHARDT+WEBER
Fertigungssysteme GmbH
Burkhardt+Weber-Strasse 57
72760 Reutlingen, Germany

Tel +49 7121 315-0
Fax +49 7121 315-104
info@burkhardt-weber.de
www.burkhardt-weber.de

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TWO MACHINING CENTRES WITH 4,000 TOOLS – HOW DOES THAT WORK?

»RENK had the courage to take a new direction; BW gained our confidence in the planning and tender phase, and together we have achieved an ambitious objective – we now have our first fully machined housings and know that our commercial goals are within reach.«
Gebhard Singl, project initiator and lead production manager, RENK AG

Augsburg-based RENK AG came to BURKHARDT+WEBER with an unusual project: two high-precision machining centres with an interchangeable stock of 4,000 tools for flexible machining of a huge array of different high-performance gear units with a lot size of one.

RENK AG, a MAN subsidiary, is a global market leader for fully automatic powershift transmissions for tracked vehicles and special-purpose gear units for industrial facilities and ships.

The task at the headquarters in Augsburg was to replace an older FMS from Fritz Werner and thus take a technological leap forward in terms of cycle times, productivity, flexibility and precision. The project team headed by production manager Gebhard Singl worked over several months to produce a specification book to account for all conceivable future manufacturing tasks and the related requirements.

Starting from a wide range of housing types and materials, extremely tight geometry limits and positional tolerances, a reduction in clamping positions and the use of zero point clamping systems to save tooling times, the team quickly arrived at demanding tool requirements. The very complex geometry of the powershift transmissions and the large number of machining processes made a multitude of long boring bars, angle heads, NC-controlled facing heads and individual housing-specific tools necessary. Applied to the overall type mix and the single lots passing through the system, it quickly became clear that a large central magazine with rapid access times and sophisticated tool management were required.

After shortlisting a number of potential suppliers, the specialists at BURKHARDT+WEBER Fertigungssysteme emerged as the ideal choice; after all, the BW machining centres are considered extremely and consistently precise in the market and are widespread in the demanding machine tool and press engineering industries. BURKHARDT+WEBER was also in a position

Background magazine with 3,000 tools.

to manufacture almost everything itself: two machining centres of type MCX 1000 with a workpiece swing diameter of 2,200 mm, gear spindles that run up to 10,000 rpm but still feature high torques, tool magazines with almost 500 tools and even a background magazine with a further 3,000 tools.

NC-controlled facing heads that determine precision were made by BW, as well the automatic tool extensions and the automatic shuttle system for swapping tools between the two machine magazines and the central background magazine. The teams headed by project manager Martin Wimmer from Renk AG and Dieter Eissler from BW got along excellently and, step by step, worked through the list of objectives with the assigned specialists.

There were genuine highlights along the way, for example the special 900 mm damped boring bars, in part with thin shanks to avoid delicate studs that had to spindle the high-precision bearing seats. There is an old German shipbuilding saying that "length runs", but here it was precisely the unfavourable L/D ratio that presented a major challenge. Equipping the spindles with a large face contact of Ø 160 mm – pioneered by BW two decades ago – produced improved true running and greater transverse stability. The boring bars' high tilting moments and weights were no problem for BW; after all, the company is the undisputed global market leader for these machining centre variables (150 Nm and 75 kg).

It had to be possible to handle all standard and special-purpose tools in both the machine and the background magazine, a further requirement of the RENK specialists. They also specified the need to swap entire tool sets between the machines and the background magazine, thus making it possible to dramatically reduce the time need to switch to a new set. A solution involving two tool shuttles was quickly found and connects the machine magazines with the common background magazine, allowing eight tools to be transferred in one go. In order to save space, the two shuttles were arranged over a convenient aisle.

An MES is responsible for the system's communication with the company's technical and commercial control systems.

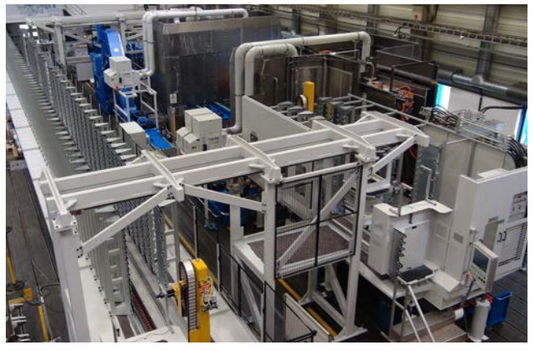
Powerful top-level administration software tailored to everyday use generates all the tool transport jobs for all tools within the entire system. Depending on the tools needed by the workpiece to be machined, the tool management ensures that the tools are supplied to the relevant machine. A user-friendly interface allows the tools in all three magazines to be visualised and organised. 19" operating panels at the loading and unloading magazine stations ensure ease of use. Weight-dependent straight line velocities of up to 200 m/min ensure that all tools requested are provided within a short time.

All chips are centrally transported to a chip crusher, where they are transferred to a briquetting system that outputs the compacted chips on a small conveyor belt. As a result, there is no chip container transport. To ensure no interference with workplace ergonomics, the chip disposal system is under the floor, as is the central coolant system that was installed in a special

Generous tooling ergonomics.

soundproof room. The working platform located between the four front pallet changers of the two MCX 1000 machines offers operators outstanding freedom of movement to load and unload while simultaneously preparing subsequent jobs or turning in new clamping positions. Oil aerosol separators and chip extractors with vacuum technology round off the requirements for an extremely clean environment.

The overall period from preliminary planning up to the point when the BW engineers handed over the operational system to the RENK team came to 22 months. With regular meetings, flexible fine-tuning and the great motivation of everyone involved, the entire project was driven forward by its own internal momentum.



In the foreground: the transfer shuttle.