

## Faster Grooving

### Geiger precision: Wohlhaupter grooving head improves machining quality

Simply supplying good products is not enough for Alexander Geiger. The medium-sized job shop Geiger Präzision GmbH, Eggolsheim, works unconventionally but effectively. Example: Radial internal grooving of a gearbox in which the former circular milling in two operations is today completed in one operation by a Wohlhaupter grooving head – in a third of the time

“To remain competitive, it has for long not been good enough simply to supply good, accurate parts, for today anyone can do that.” Alexander Geiger, chief executive of Geiger Präzision GmbH in Eggolsheim, Upper Franconia, also wants to arouse the enthusiasm of his customers with technical solutions.

“We work exclusively with standard machines all modified by us, adapted to our range of tools and flexibly matched to our batch quantities.” For him a standard machine simply has the advantage that it runs “safely and reliably and we can get spare parts at any time”.

With a total of 60 CNC machining centres and 80 employees on two sites, Geiger Präzision GmbH manufactures chiefly engine, body and gearbox parts for the automotive and commercial vehicle industry, as well as medical engineering parts for well-known bulk purchasers. Machining is carried out on “all machinable materials – and basically wet”. Alexander Geiger places little value on the current trend of dry machining.

True to its company motto “We begin where others stop!”, this medium-sized job shop is also bold enough to take on

#### User assessment

##### The user

Geiger Präzision GmbH,  
Eggolsheim

##### The tool

Grooving head from Wohlhaupter

##### Advantages

- Machining time reduced by a third
- Better surface quality
- Improved accuracy – groove concentricity

##### Disadvantages

- None according to the user

demanding tasks in turning, milling and grinding. For example, the complete machining of gearboxes from GGG40 on two Mazak machining centres which are set at right angles to one another and fed by a robot. One of the longest and most complicated single machining processes in this respect is the radial machining of the inner ring grooves on two opposite positioned gear openings for the insertion of gasket rings. For reasons of accuracy, these grooves were previously rough machined and then finished with a second tool, and in fact using what is known as circular milling. The tool is thereby operated over a circular path on the inner margin of the bore using continuous-path control. The surface quality then depends very much on the accuracy of the cutting and feed movement. Furthermore, the swarf must be formed, tapered and transported out of the working area.

Circular grooving certainly does the job, but Geiger looked for possibilities for optimisation. At first without success, until in 2001 at a customer seminar he discovered the new Wohlhaupter grooving head.



#### Flexibility is the key attribute:

The machining centre is fed by robot. All robots and handling components at Geiger are bought “of the peg”

Today the internal machining of the two grooves is accomplished in a single operation. As a result, the machining time for the two grooves is reduced from 120s to only 40 s. For an annual production of 19,800 gearboxes, the 80 seconds per part saved add up to an annual saving in machining time of 440 hours.

Volker Schöneck, Wohlhaupter field service representative responsible for technical advice: "At that time we did not have a sufficiently large diameter tool. It was originally intended more for the brake industry and less for broader applications." A suitable grooving module was therefore manufactured, trials were run and Geiger ordered two of the grooving heads.

Of course the tool still had to be "run in and optimised". For example, it had to be ensured that the control system did not move the tool out of the bore in the end position. To have the machine linked in by the manufacturer, "was to expensive for us", says Geiger, "so we did it ourselves". The tool-side adaptations were kept within limits. For Hans Bosch, the Wohlhaupter project manager responsible for the grooving head, the problem was "only that we entered a new diameter range. But we were confident of our expertise and knew what was possible".



**Alexander Geiger:**

With the new grooving head we are well on the way to zero errorproduction



**Frank Wohlhaupter :**

Our aim was to offer a tool for high-volume production. We have grooving heads in large projects abroad, which in the meantime have machined more than 300,000 grooves without problem. We were able to bring our experience gained there fully into play here



The new Wohlhaupter grooving head is built on tried and tested methods. Only in matters of diameter were we into new dimensions

Chief executive Frank-M. Wohlhaupter explained: "Originally we wanted mainly to go into large-scale production with the grooving head. For each application, not only the grooving module but also the grooving inserts had to be perfected. Only with the experience from various large scale projects – chiefly abroad – were we able to ensure the required tool life in the range of applications."

The first of the two grooving heads ordered by Geiger was delivered in November 2002. The interfaces were adapted to customer requirements on site. Hans Bosch remembers: "The mechanical interface was not a problem, but optimisation of the electronic interface took a little longer." Support from the machine manufacturer was limited, so the experts at Geiger undertook the mechanical adaptation themselves. After successful fine adjustment, the second grooving head was also put into operation on the second machine in March 2003.

**Information service**

**Grooving in one operation**

Instead of the previous circular milling in two operations by rough machining and finishing, Geiger Präzision GmbH today carries out radial grooving on gearboxes with the Wohlhaupter grooving head in one operation – in a third of the time.

**Contacts:**

•Geiger Präzision GmbH - 91330 Eggolsheim  
Alexander Geiger - Tel.: 09191 – 32098 – 17  
Mail: alex@geiger-gmbh.de

•Wohlhaupter GmbH - 72633 Frickenhausen  
Hans Bosch - Tel.: 07022 – 408 – 133  
Mail: bh@wohlhaupter.de



The new Wohlhaupter grooving head is built on tried and tested methods. Only in matters of diameter were we into new dimensions

Up to the present, Alexander Geiger is completely satisfied with his operating experience: "The tool has fully met our expectations, although it is not easy to handle. Operators must be given constant training as this special tool cannot be easily chucked like a milling tool. Everybody needs to know what to do in the event of a malfunction. However, so far, the tool is working without problem with no malfunctions." A statement no less than which Frank-M. Wohlhaupter has presumably expected: "Our aim was to offer a tool for high-volume production. We have grooving heads in large projects abroad, which in the meantime have machined over 300,000 grooves without problem.

We were able to bring our experience gained there fully into play here. "The advantage of the grooving head, Wohlhaupter emphasises, is not just the saving in machining time, but also the surface qualities and accuracies achieved.

**On the way to zero error production**

In contrast to circular milling, where the cutters engage in turn under continuous path control and reappear again, the grooving head moves centrally into the bore and the cutters move evenly out of the zero position towards both sides. This means that the

concentricity of the grooving with respect to the bore does not depend on outside influences.

We certainly achieved sufficient accuracy and reliable machining with the circular milling previously used," agreed Geiger, "but with the grooving heads we are on the way to zero error production".

With circular milling, there was always the danger of small sliver chips becoming jammed in the groove. By comparison, the two cutters of the grooving head provide support for each other, there are no unilateral cutting pressures and the reduced pressure on the machine and system increases the quality. Alexander Geiger finally sums it up, "it completes an operation in seconds without problem and completely free of chatter."

Walter Frick



Demanding task:  
The gearbox is fully machined on 2 Mazak machining centres

Wohlhaupter has also tailored the grooving inserts exactly to the application



**In profile**

**Geiger Präzision GmbH**

"We begin where others stop!", is the motto of the job shop Geiger Präzision GmbH. Rudolf Geiger Maschinenbau GmbH was established in 1968 in Rüssenbach for the manufacture of chains and special machinery. Today it still manufactures grinding machines for hard-metal machining. In addition, the parent machine shop is responsible for job orders in quantities from 1 to 1000.

Today, Geiger Präzision GmbH, established four years ago and managed by Alexander Geiger as the fourth generation, undertakes job orders for larger quantities – 1000 and upwards. In September 2003, production was able to commence in newly built premises in Eggolsheim. As a result, the company has the use of two manufacturing sites, with a total production area of, 6500m<sup>2</sup> and around 60 CNC machining centers.

Linking all machines via a DNC system allows external programming, program management and cost-effective production



Today, the internal machining of the two grooves is accomplished in a single operation – the machining time dropped from 120 to only 40 seconds