

# PROCESS CHAIN SHORTENED

**Four-sided clamping vise:** Recently the responsible parties at Rodriguez in Eschweiler have been relying on a Hermle C40 equipped with the Hainbuch QUADROK plus clamping system for the manufacturing of linear technology components. With this system the firm was able to significantly minimize idle time and increase machining precision.

The enterprise was founded as a design office and trading firm. The focus is on thin-ring bearings and also linear technology. Now the company, which six years ago separated from the American parent company in a management buyout, is also extensively involved in manufacturing – in particular for special products and for linear technology components.

„It all started with the end machining for precision steel shafts”, explains Andreas Neuweiler, who as Product Manager for Linear Technology, also shares responsibility in manufacturing.

„The turning jobs have been continuously expanded; several years ago grinding operation capacities were also added. Initially the goal was to manufacture the components for special solutions ourselves.” For the machining of linear technology components, in particular, a 3-axis system was procured, in which the components were clamped with vises. „For the broad range of workpieces that we manufacture, at first this seemed to be a universal solution”, explains Neuweiler.

„However, it reached clear limits – on the machine side and also on the

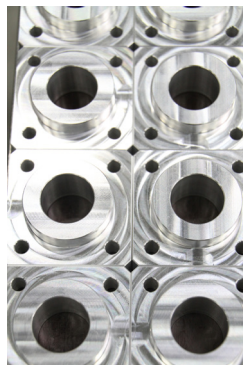
workholding technology side.” Aluminum alloys are primarily machined for the linear technology components; as a rule sawn blanks come onto the machine. The employees at the machines also program the workpieces themselves.

## Previous solution reached its limits

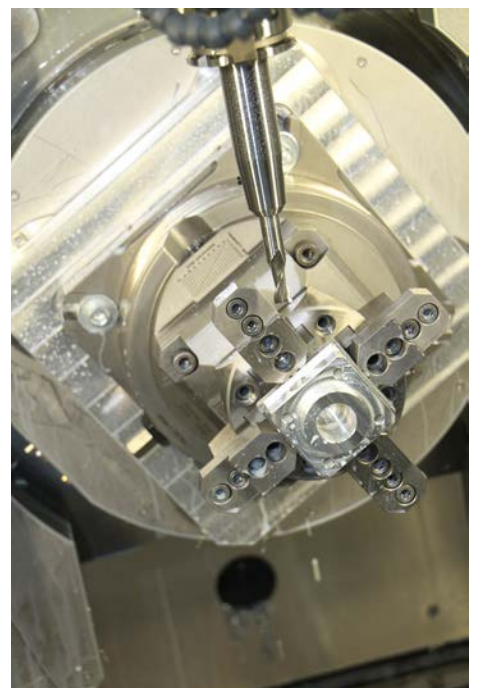
On the previously used 3-axis machine, with smaller workpieces, it was possible to clamp multiple parts simultaneously in the work space in order to minimize tool change. „However, in the long run the machine was simply



◀ At Rodriguez, the QUADROK plus clamping system ensures that the machine can apply its power and precision on the workpiece, undiminished.



▲ From now on, for a flange shaft with a 25 mm shaft capacity the machining time is reduced to 5 min.



▲ The clamping system guarantees the highest level of precision - as a rule the tolerances are in the lower single-digit  $\mu\text{m}$  range.

◀ For drill-finishing, an H7 fit is required, the tolerance in the rectangularity of the bores to the plane is under 2  $\mu\text{m}$ .

too slow and also it was too imprecise”, states Neuweiler. „Among other reasons, this was due to the frequent rechucking of the workpieces – with each subsequent setup the system-related inaccuracies accumulated.”

For example, overall three clamping processes were necessary to manufacture a flange shaft bracket; a part with which a shaft is held and on which there can be different possibilities for mounting. As a rule, at Rodriguez the component is manufactured with diameters between 12 and 80 mm, as well as lengths from 43 to 232 mm. In addition to drill-finishing the opening for the shaft, which requires an H7 fit, among other things, mounting bores must be introduced, moreover additional milling tasks, such as trimming of the workpiece, were also required. Here, for example, for shafts with a 25 mm diameter there was a pure runtime of 7 min per part for one flange shaft, and that did not include the respective set-up times. The workpieces were set-up in a triple clamp set-up.

„The machining did not correspond to the standard that we had envisioned”, points out Neuweiler. „We wanted to reduce the number of clamping set-ups, and if possible, we wanted to completely machine all relevant manufacturing dimensions in one clamping set-up. For our parts spectrum only a 5-axis machine can do this. Consequently we looked around for a solution and finally purchased a high-capacity Hermle C40.”

In addition to its performance, the new machining center also scored with high rigidity. „In order to reliably bring the advantages of the machine onto the workpiece, the wide range of workpieces must be precisely and securely clamped”, emphasizes Neuweiler. „Therefore we decided on the QUADROK plus clamping system from Hainbuch. In order to reliably clamp the different dimensions we use the 120 and 200 clamping units.”

The QUADROK clamping system considerably facilitates set-up; with a single system a wide variety of clamping situations can be securely covered. The typical Hainbuch pull-back principle also makes allowance for larger material tolerances, the jaws always reliably pull the blank in the middle. Workpieces to 250 mm can be securely accommodated with the two clamping units.

## My opinion

It was not just the products, which are undoubtedly technically outstanding, that convinced Rodriguez. Also the service and the fact that Hainbuch is always interested in listening to the users, clearly ensure that the employees swear by „their” Hainbuch systems.

Here it is important that the application technicians in Outside Sales not only want to sell, but are also really interested in the challenge that is confronting the user, and they work out a customized solution for the customer. Here motivated clamping technology manufacturers, like Hainbuch, have earned a good reputation as „problem solvers”, who can effectively support the user with their competence and experience.

**Richard Pergler, editorial office fertigung**

## Profile

### Rodriguez GmbH

Capability beyond the standard and competent consulting in the selection of the right roller bearing technology for the respective application, are the key strengths of the supplier of thin-ring bearings, precision roller bearings, special bearings, and linear technology. Components and systems for the automotive industry are also included in the product line.

The clientèle includes companies in the area of drive technology, automation, printing technology, electronics, vehicle technology, precision mechanics, semiconductor technology, wood machining, plastics technology, food industry, aerospace, mechanical engineering, medical technology, metrology, assembly, optics, robotics, packaging technology, and machine tools. The company, which now also has several locations in Germany and abroad, has a total of 118 employees.

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▲ A Hainbuch system is also used on the newly procured MoriSeiki NLX 2500 SY.



▲ Product Manager Andreas Neuweiler and master manufacturing Detlef Winkens are convinced of the possibilities offered by the Hainbuch QUADROK plus.

## Efficiency at maximum precision

"Now the components are machined in a five-sided clamping set-up, the shaft capacity is drill finished, the bores are set. In the second clamping set-up the sixth face is finished machined and additional geometries are introduced", explains Neuweiler. "Thus, with the 25 mm flange shaft bracket the machining time is reduced to 5 min, scrap is no longer worth mentioning, and set-up times are also significantly reduced."

With the Hainbuch QUADROK plus clamping system, now the operators achieve extremely precise results - the cylindricity of the main bore is tolerated at 4  $\mu\text{m}$ , likewise the diameter has a maximum H7 tolerance of 4  $\mu\text{m}$  and the rectangularity of the location surface for the bore is less than 2  $\mu\text{m}$ . "At higher accuracy the process time has been significantly

tightened with the new Hermle machine and the Hainbuch clamping system", points out Neuweiler. "At the moment we still clamp the workpiece manually, this process can be executed significantly faster than was the case with the solution we used previously. However, the QUADROK plus system also offers the possibility of hydraulic actuation." This option is particularly interesting if the machine needs to be automatically equipped. However, currently this is not yet planned at Rodriguez. "But we are certainly considering machining an additional parts spectrum on the C40," sums up Neuweiler. "Combined with the QUADROK plus, extremely versatile possibilities occur in this area - among other things with the QUADROK plus we were able to implement turning jobs to 50 rpm on the turntable. But for us this is still a ways off." ■

## Pure professional knowledge

### Reliable also when turning

A MoriSeiki NLX 2500 SY has been newly procured, primarily for rotation-symmetric parts, on which, among other things, shafts to 100 mm in diameter and 6000 mm in length will be machined.

Thus, the capacities at Rodriguez are extended; previously the firm was able to machine shafts up to 70 mm in diameter and 3000 mm in length. Due to the firm's good experience with Hainbuch, a Hainbuch clamping system will also be used on the „new“ machine - the Toplus with mandrel on the sub spindle should ensure maximum accuracy and fast set-up here.



At Rodriguez a wide variety of linear technology components are manufactured on the Hermle C40.