

**Drastic reduction in piece**

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**production times**

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High-performance machining with the TRAUB turn-mill center TNX65/42

# Drastic reduction in piece production times

The company history of Otto Schmid Metallbearbeitung is closely associated with the development of the TRAUB turning machines. With cam-controlled machines of the A series in the former garage of the company founder to the latest high-tech turning/milling center in a modern new building, the company under Otto Schmid junior has continually developed to become a supplier with currently 9 employees. Since 1959, Schmid has used only TRAUB machines in the production of small series or high quantities. The latest CNC turn-mill center, a TNX65/42, fulfils here the high expectations in their entirety.

Author Rudolf Beyer

With typical Swabian mentality, the master machine mechanic Otto Schmid started with the production of turned parts in Schwäbisch Gmünd-Bargau in a large garage originally intended for his transport business, on two cam-controlled TRAUB turning machines A25 and A42. The quality of the products brought the young company commercial success and a good reputation in the industry. Soon, they were supplemented by another TRAUB turning machine of the type TB. In 1985, the graduate industrial engineer Otto Schmid jun. joined his father's company. In the same year, a TRAUB TNM42 was purchased. When Otto Schmid jun. took over sole management of the company, production was moved to a new industrial building in January 2000. At the same time, the first CNC sliding headstock automatic was bought from TRAUB, a TNL16. Over the following years, the company invested in further machines, of

The new turn-mill center TNX65/42 from TRAUB

Otto Schmid: 'In the collaboration with our customers, we attach importance to outstanding reliability and efficient workflow.'



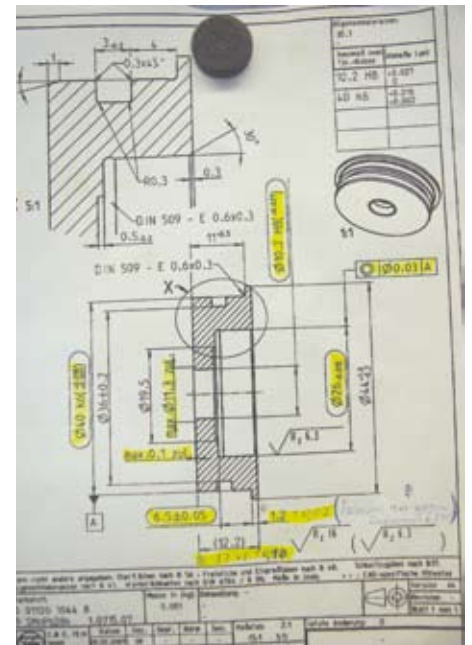
Karl-Heinz Ziegler, Regional Sales Manager INDEX-TRAUB: 'The consistent orientation of the machinery of Schmid to TRAUB turning machines also generates savings potential because many tools can be used on the existing and on the new machine.'



the series TNS26, TNC42 and TNC65. The programmable machines gave the end products a faster production cycle and the capacity of the company was increasingly enhanced with these CNC machines. In this way, the company has accompanied practically all development stages of the manufacturer from Reichenbach, which has been a subsidiary of the INDEX-Werke in Esslingen since 1997, until the present day. The culmination and highlight for the time being is provided by TRAUB's latest CNC turning machine, the TNX65/42.

The question arises as to why the company has been putting its faith so consistently in the machines from TRAUB for such a long time. Otto Schmid: 'We started our company with used, cam-controlled machines from TRAUB and also initially acquired 4- to 5-year-old TRAUB machines second-hand when we introduced CNC technology. Very simply because new machines would have cost twice as much. The hourly rate of a new machine cannot usually be allocated to the revenues for the relatively simple parts that we produce. Of our 11 CNC turning machines, all of which we bought second hand with the exception of the TNX65/42, some of them have not been in the product program of TRAUB for more than 12 years. Nevertheless, TRAUB offers a spare parts availability of almost 100% for these, even today. The regional proximity to Reichenbach is very important here. When I happen to have a problem with spare parts here, I call the TRAUB service department and can go to their factory within an hour, because the TRAUB service department has usually got this part ready within the hour. This means that I can collect it directly and then install it immediately. My machine is then up and running again after three to four hours.'

Another question arises as to why the company made an exception at the beginning of the year and bought a new TNX65/42. Otto Schmid: 'Just over a year ago, we were awarded a larger contract that very soon took up the capacity of our TNC machines. The customer increased the quantity; we then had to use a second machine for the parts. The quantities continued to increase so that soon the second machine was not enough either. So a new investment was needed. We succeeded in making a contractual agreement with the customer regarding guaranteed quantities and a term of three years. This meant that a certain basic workload was ensured; the risk of an investment in a new machine became manageable for us. At the moment, the moment is only running on these parts. The higher costs for a new machine compared to a second-hand one pay off because the parts can now be produced considerably faster than on the existing TNC machines, with 40% time savings on the TNX65/42. Many other parts too that are still running on the older machines could be produced even more efficiently on the new machine.'



*Drastic reduction of piece production times for this part on the TNX65/42*

TRAUB has apparently managed a real leap in technology with the TNX65/42, which was presented for the first time just under two years ago. The machine is considerably faster than the legendary TRAUB TNC. The rapid traverses of the axes, the turret switches and also the new TX8i-s react more quickly. As usual with TRAUB, the programs are upwardly compatible. Where the kinematics match, the programs are the same. One reason for the drastic reduction in piece production times of 40% is, according to TRAUB sales manager, Hans-Joachim Koschig, the configuration of the TNX65/42. The machine is equipped with 3 tool carriers. Each tool carrier

*In the modern production hall of Otto Schmid Metallbearbeitung, individual parts and series in large quantities are produced on 11 TRAUB CNC turning machines*





*Hans-Joachim Koschig, Sales Manager at TRAUB: 'One reason for the drastic reduction in piece production time of 40% is the concept that it is possible to work on the TNX65/42 with 3 tool carriers on both spindles simultaneously and independently.'*



*From left: Karl-Heinz Ziegler, Regional Sales Manager at INDEX-TRAUB Joachim Koschig, Sales Manager at TRAUB and Otto Schmid are delighted at the precision, cost-efficiency and flexibility of the new TNX65/42*

has a X, Y and Z axis. With these kinematics, the 3 tools can be applied simultaneously and independently of one another and irrespective of the spindle (even with short workpieces). With many other machines, a turret is primarily assigned to another spindle. And of course the non-productive times also contribute to a reduction in the piece production times.'

The TNX65/42 machines geometrically complex series parts with a diameter of up to 65 mm and a length of up to 300 mm. As the machine can also be used as a chuck machine with a 175 chuck, the main spindle has torques of up to 190 Nm. Sales manager Koschig is convinced that, as a bar machine, it is actually impossible to cause a machine standstill.

Depending on the selected configuration, the machine designed as a modular system is equipped with two, three or four tool turrets. The company Schmid selected the variant with three turrets and three Y axes.

The turrets each offer ten holder stations. With multiple occupancy of all 3 turrets, there are thus up to 60 tools in the machine. With turret switching, chip-to-chip times of 1 second are achieved. Each station can be fitted with a powered tool ( $P_{max} = 5.5 \text{ KW}$ ,  $M_{max} = 17.5 \text{ Nm}$ ,  $n_{max} = 6,000 \text{ rpm}$ ).

The stable tool holders with a VDI30 receptacle can be universally used in all turrets. The highly precise tool holder positioning developed by TRAUB facilitates changeover precision of  $\pm 10 \mu\text{m}$  (drill rod with a projection length of 100 mm). This results in substantial costs savings in the machine set-up as no alignment and adjustment of tools to be centered is necessary. The spacious work room also helps to keep the set-up intervals small. Radial tools with unclamping lengths of 72 mm can be switched collision-free even under utilization of the  $\pm 40 \text{ mm}$  Y path. This means that the cumber-

*Since the company Otto Schmid Metallbearbeitung GmbH was founded 58 years ago, turned parts have been produced solely on single spindle bar automatic and sliding headstock automatic from TRAUB*





*For years, the company history of Otto Schmid Metal Works has been closely linked with TRAUB lathes.*

some shortening of standard tools such as screw taps or reamers in the set-up process is eliminated.

The TX8i-s control which is known for its user-friendliness has been given not only an entirely new hardware but also a larger 15" screen for the TNX65/42 from the PC via the NC, the drive amplifiers and motors. The convenience of the software has remained the same as it is generated from the identical source data. As is always the norm with TRAUB controls, the upwards compatibility of existing NC programs and CNC functions is thus ensured.

This and the user-friendliness of the control is a very important topic for Otto Schmid. 'For as a basic principle we program on the machine. 99% of our workpieces are repeat parts. The programs are first created, optimized and stored on a laptop. From there, they are read at the machine where

necessary into the control. The control is also therefore an important reason for us to stay with TRAUB. In the many years, in which we have known firstly the TX8F, then the H and now the I control, this workshop-oriented programming has been easy and reliable to use. The fundamental understanding how programming is done and the synchronizing is already understood by our qualified staff from the other series. It very clearly makes the work easier when you only have one make of control in the company. Even at the operating panel, it was always only details that changed in the changeover from one control generation to the next.

It was also impressive how reliable and convincing TRAUB calculated the piece times for the part that was to be machined on the new TNX in the proposal phase. Schmid: 'I am impressed how uncomplicated and non-bureaucratic such a process is at TRAUB. The piece production time was calculated at TRAUB based on our existing NC program. The test department offered me the option of testing the calculated time on the new machine in the demo center – and for as long as I wanted! Although I was very impressed by the result, for the profitability of the investment was thus already ensured, I was given the information that this piece production time could undoubtedly be improved further:

Hans-Joachim Koschig adds: 'The piece production time that we submitted in the offer is calculated by us in our programming system. Real non-productive times are stored here. When feeds and cutting speeds can be depicted like this in reality, then a maximum deviation of  $\pm 3\%$  in the piece production time is to be expected. That is why we are sure that these times are correct. The risk is actually the technology. If the required quality is not achieved with a drilling, additional work processes such as e.g. reaming are necessary. And that of course changes the piece time calculated. That is why it is also in our interest that we carry out trials as promptly as possible with

the customer part or with the critical elements of the part so that we can guarantee a particular level of productivity. Even if you are familiar with the time characteristics of all the tools in permanent practice in practice, there is still potential for optimization. With the existing part, the downtimes of the workpieces were known because the part had already been produced for a year on other TRAUB machines. We were thus able to use the existing program as a basis; the rest was then really easy.'

Which recognizable benefits does the new machine have? Otto Schmid: 'We can produce substantially more complex parts entirely in one clamping with three turrets. With machines with a smaller tool supply, two or three clampings would otherwise be needed – with the disadvantage that positioning tolerance errors would have to be tolerated. We can also substantially reduce the piece production times because we work with three tool carriers independently of one another on the main and counter spindle. The new machine is also substantially more precise. The heat movement of the machine is very good. When the machine is switched on in the morning, the first part deviates by 0.005 mm from that of the previous day. This temperature stability is possible thanks to the machine's thermo-symmetric structure. This means that we have to correct and re-machine less. To date, the machine has had no malfunction; I am entirely satisfied. The machine is reliable. You switch it on in the morning, and then it runs. I hope that continues to be the case.'

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