

Fully automatic deep hole drilling

TBT loading system allows unmanned shifts

Along with other precision machined components, GLUMANN Maschinenbau in Chemnitz, Germany specialises in producing long rotating shaft type parts. Deep hole drilling plays an important role the production of these items and so, in order to keep up with the growing volume demands from an engineering customer, the contract manufacturer decided to equip its new deep hole drilling machine from TBT with a fully automatic loading system and Dettingen/Erms-based TBT developed the ideal solution.

Deep hole drilling is an important technology for any contract manufacturer that processes shaft type parts within its portfolio. Many shafts require relief holes or have to be supplied with lubricant. That's why GLUMANN Maschinenbau has seven deep hole drilling machines in operation, including two from TBT for hole depths up to 2000 mm.

The larger machine, an up-to-date ML500, is mainly used to work on various configurations of shaft for a long-standing engineering customer. The diameter of the holes in these shafts can vary, up to 80 mm. BTA/STS deep hole drilling method is the technology used. In this method, the cutting oil is fed to the tool under pressure along the outside of a hollow drill tube. The drill head itself, which is mounted onto the end of this tube has hard metal (carbide) cutting plates or



inserts and has openings directly behind the cutting plates which allow cuttings and cooling lubricant to exit out of the hole through the inside of the drill tube and then into a chip conveyor.

Gerhard Glumann, chairman of the board and production director looks back: "As the quantity of shafts to be processed on this machine kept increasing, we had to come with a new solution to stop us getting into delivery deadline issues". We opted for a fully automatic loading system, so that the machine could be operated unmanned once

all processing parameters have been set. We presented this plan to our machine manufacturer TBT, who then worked upon a solution for us."

Developing systems which facilitate fully automatic operation of deep hole drilling machines is part of everyday life for the experts in Dettingen/Erms and many solutions are available as standard. In this case, TBT designed a unit precisely tailored to meet the requirements and conditions at GLUMANN.

Components on two levels

"After inspecting the space situation at the end-user, our designers came up with the idea to arrange the components in a space-saving layout over two levels, raw parts above, and finished parts below. Each level has a conveyor chain system to bring the parts in and out", explains Karl Heinz Napowanez, sales director at TBT. "On the upper level, approximately at the height of the machine spindle, there is room for around 20 raw parts. That's roughly the amount which is usually processed during a shift. The length of the shaft catered for, can be adjusted from 500 to 2000 mm, which means it can be used for a very wide range of component lengths," he adds.

Above the component conveyor chain, a two-armed gantry grab moves backwards and forwards on rails. As for the working process itself: The grab collects the raw part



from the upper level, goes to the drilling spindle and puts the part into a self-centring steady rest between the three-jaw chuck and a female cone, then returns to the waiting position. The three-jaw chuck clamps automatically, and the drilling process can start. After drilling, the shaft is released and the grab lifts the part again from its processing position and passes it on to the lower level. One important detail, the grab has also been designed by TBT to be flexible. It covers the whole range of diameters which GLUMANN needs for its customers, from 80 to 140 mm, and so does not have to be converted.



Integrated into control

“One thing was very important for us,” emphasises Gerhard Glumann, “the positioning of the loading unit behind the machine. This is different to many other automated solutions in machining technology and was necessary so that we can easily process individual one of orders for example, without any difficulty by bypassing the fully automatic loading operation. This means the ML500 is accessible from the operating side like any standard machine, with no access

restrictions. The loading system is fully integrated into the machine control system. The operator only enters key data such as length of part to be processed, drilling diameter and depth. This means the machine “knows” the part in question and can run the NC program. TBT has built in even more features: total tool life,



which the tool is expected to achieve, can be set via two different workpiece counters, which trigger different reactions in the program execution. This means the machine stops for a change of cutter in good time before tool failure. The ML500 also has feed force and coolant pressure monitoring. If the wear and tear on a tool should exceed a certain level more quickly, or if any other problem arises, the machine will also shut down automatically.

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