



Deep hole drilling machine for connecting rod production at VW Shanghai

Precisely Drilled with Know-how

The company Loch Präzisionsbohrtechnik GmbH specializes in deep hole drilling machines. Purchasers of these machines include automotive manufacturers around the world. One machine was delivered to Volkswagen Shanghai only a short time ago. The fully automatic, extremely precise machines are equipped with Siemens control systems and safety engineering.

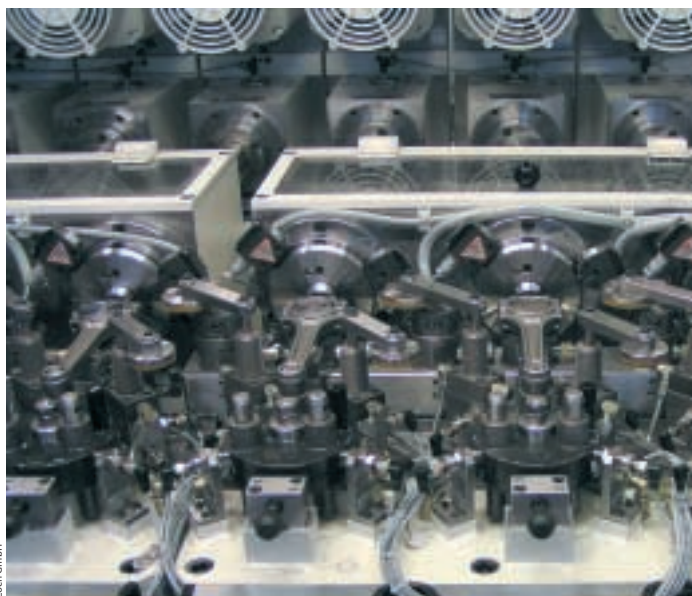
Loch Präzisionsbohrtechnik GmbH, a mid-size company in Ergolding, Germany, delivered connecting rod deep-hole drilling machine for the VW plant in Shanghai. This six-spindle special machine makes a longitudinal hole in the connecting rod which is used to supply oil to the small connecting rod eye. This hole is very deep relative to the diameter, therefore, deep hole drilling technology is best-suited for this purpose.

Deep hole drilling machines from Loch operate with a gun drill where the coolant is delivered directly to the cutting edges through a hollow shank and the chips are evacuated. The cutting edge, which is not in the center, is guided in a drill bush during centering. As soon as the drill bit penetrates the material it is guided by the drilled hole. That is why the highest precision during centering is imperative – it is decisive for the accuracy of the entire hole.

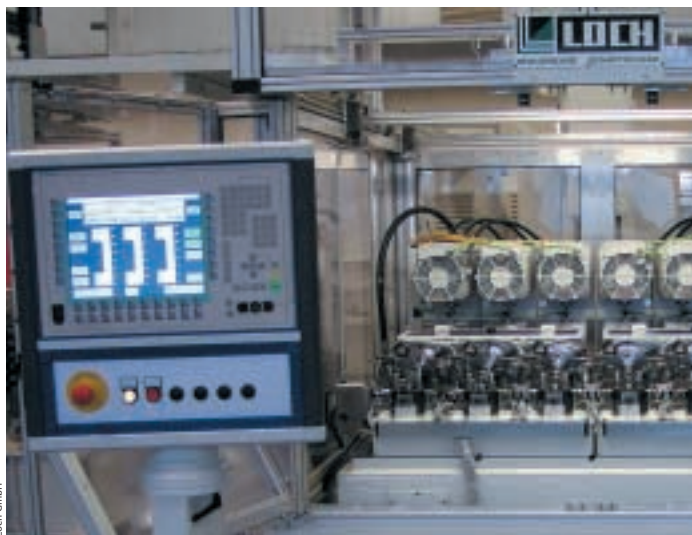
Quality made in Germany

The machines are not just assembled and put into service at the company's headquarters; they are also developed and planned there. Approximately 40 employees assemble ten machines per year for customers around the globe. The companies are automotive and commercial vehicle industries and their suppliers, as well as aerospace, nuclear energy, machine building, hydraulic, steel and tube factories, mold making, tool building and contract manufacturing.

The enormous vertical range of manufacturing of the machine building company is amazing. "While many companies offshore their production, we still design our machines here at the Ergolding site, manufacture the parts and assemble the machines," explains proudly the company's president, Wolfgang Loch. "After all, we can only reliably guarantee promptness of delivery if we are not dependent upon vendors. That is why our customers



One mounting bolt each for connecting rod eyes holds a connecting rod in place during machining. Drill through the large connecting rod eye to the small connecting rod eye



The deep hole drilling machine at VW Shanghai has a deep hole drilling unit with six spindles. Shown on the left is the operator panel PC 670

receive products from us that are truly still 'Made in Germany'."

Precise drilling with Simatic S7

The deep hole drilling machine for VW Shanghai is equipped with a deep hole drilling unit with six spindles. These spindles are distributed onto two feeding axes. The spindles are driven by 3.5 kW asyn-

chronous motors; servo-synchronous motors handle the feed drives.

A gantry with two axes and two six-fold grippers handles the automatic loading of the system; a separator is situated upstream of the gantry.

All functions are executed automatically – from the feeding of the connecting rod to the further processing of the con-

necting rod on the next machine. Loch is counting on the Simatic S7-317F for the control system. "We have chosen this control system because three independent safety circuits are necessary – and that can be accomplished easily with the 317F" explains Bernhard Dittrich, Manager of Electrical Engineering at Loch. These three circuits of the safety peripherals are located centrally, directly beside the CPU in the same control cabinet. The ET220X peripheral, with its high degree of protection IIP65/IP67), which is not safety relevant is coupled decentrally via Profibus as is the decentralized drive Simodrive 611U.

Convenient functions for machining and diagnosis

"This concept renders the drive system relatively intelligent," confirms Bernhard Dittrich. "Individual positioning records can be saved, selected and run through – and that is why, with this machine, we can dispense with an additional CNC system," he explains further. In addition, the configuration software for the drive is very convenient and tool monitoring is accomplished via a digital interface.

The visualization system consists of a Windows-based Simatic PC670 with operator panel; ProTol/Pro is used for control and monitoring tasks. Optionally available for the visualization of fault messages are ProAgent and Pdiag. ProAgent is utilized to detect and visualize disruptions that can be read out of S7 programs. These diagnostic capabilities are tremendously important, especially in the automotive industry. Aside from conventional programming, S7Graph is also possible for sequencer. The displays appear in clear text in multiple languages, currently English and German, later possibly Chinese as well. ■

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