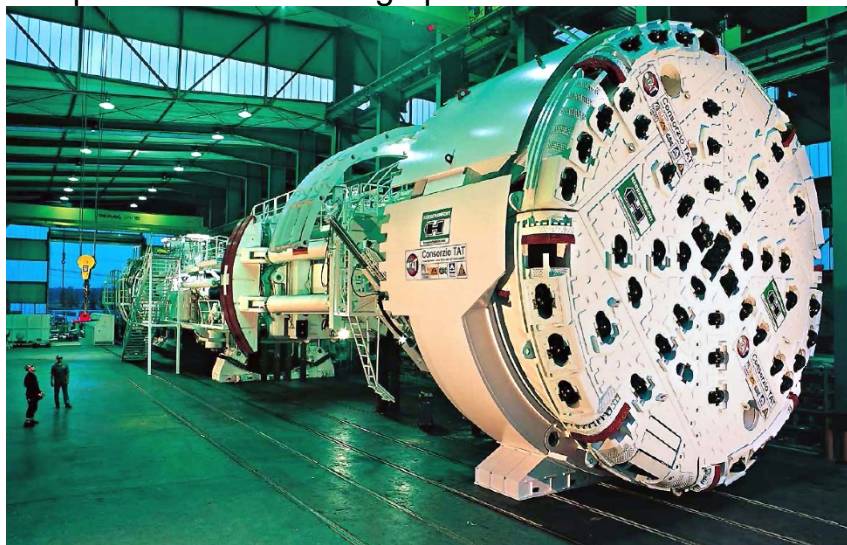




MILL-TURN CONTROL ENABLES SHORT LEAD-TIMES IN TUNNEL BORING MACHINE MANUFACTURE

The world's longest and deepest rail tunnel, the Gotthard Base Tunnel, opened in June 2016. The 57 km (35 mile), twin-bore, high-speed link under the Swiss Alps between northern and southern Europe aims to replace one million lorry journeys by road per year. The four tunnel boring machines that were used to excavate the pair of 8.83 metre diameter bores through over 85 km of rock were built by Herrenknecht AG in Schwanau, southern Germany.

To produce its machine components out of wear-resistant steels, the manufacturer invested in an RTT 30 bed-type milling machine with B-axis swivelling milling head and integrated rotary table from MTE, Spain. The mill is fitted with a HEIDENHAIN TNC 640 CNC system, which is capable of controlling both prismatic and turning operations.



With this machine / control combination, the company succeeds in

simultaneously milling and turning in one setup and in short lead-times components up to 2,100 mm in diameter, 1,500 mm long and weighing up to 15 tonnes. Operation is said to be easy for the operators, which is important for Herrenknecht as detailed machining operations are programmed by the operators at the TNC control, such as cycles with grooves, recesses, hole patterns and inclined holes. Only the basic program comes from the CAM system.

Programmer Uwe Liedl said, “The TNC 640 makes complicated machining transparent. Our machine operators are always given a choice between different strategies and can easily follow the cycles, so complex metalcutting processes become clearer.”

Every year, the Herrenknecht components factory with a workforce of over 450 delivers standard components for assembly worth 60 million euros, including drill heads, cutting tools, transmission housings, rings and more. Parts are machined from wear-resistant steels such as Hardox 500 or fine-grained steel like S690. In addition, spares have to be produced immediately if there is a drilling machine failure on a construction site.

Technical manager Stefan Göggel said, “In some cases we have to take a component off the table of the RTT 30 in the middle of machining for a spare part to be manufactured as quickly as possible.

“The TNC 640, with its mid-program start-up function, makes it quick and easy to continue the previous cycle when it is resumed.”

The interaction between the bed-type machine and the TNC 640 mill/turn control makes it possible to perform complex machining tasks in just a few setups, with 3D simulation of the process beforehand. For example, on one

occasion a billet 800 mm long, 960 mm in diameter and weighing four tonnes was milled and turned to produce pockets, cross holes, angled face milled features, knurled areas and more, during which nearly 80 per cent of the material was removed to leave just 850 kg.

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