

MANDELLI

HW & SW NOVELTIES

A head for titanium machining and the iPum@ software for self-diagnosis and predictive maintenance are the solutions recently developed by Mandelli to best meet the needs of its customers.

by Davide Davò and Ezio Zibetti

Machining titanium is known to be particularly tough for tools and machinery. The high stripping strength and the low thermal conductivity are some of the critical issues that characterize this metal and lead machine manufacturers to design both the structures and the systems introducing a series of targeted measures. Thanks to its great experience in this field, Mandelli has recently developed a new head specifically designed for titanium machining.

Maximum stability

"The new head arises both from the market needs and the natural evolution of tooling manufacturers partners - says Marco Colombi, Mandelli's Sales Manager. Talking about markets, the aircraft manufacturers are abandoning aluminum in favor of carbon fiber and titanium, thereby increasing the machining of this metal. Furthermore, the tendency to increase the allowance of titanium forgings to obtain a more uniform material quality inevitably involves an increase in the spindle working hours.

Moving on to the tool manufacturers, we are experiencing an increasing number of high performance tools capable of remarkable stock removal even in the presence of long tools. All this is leading to the replacement of the machines used for roughing and finishing with systems implementing both technologies and capable of shifting from heavy stock removal machining to precision machining without difficulty and with excellent results". Hence the need for a head with high torque to the spindle, high stiffness and high torque especially for the tilting axis so as to perform 5-axis machining operations with complex shapes thus optimizing the cycle times. Mandelli's answer to these needs is a head that generates a 75 kW continuous power and a 1,200 Nm torque rotating at 5,000 rpm / min. In addition to the high torque, this solution has important qualities of stability due to the HSK125 tool taper and a spring assembly chosen by Mandelli which increases the clamping force by 20% taking it to 100 kN. The HSK125 ensures greater rigidity and better coolant flow, useful to increase both the tool stock removal as well as its lifespan. "With this type of spindle we can reach 150 lts / min of coolant flow rate at a pressure of 100 bar - says Colombi. Another important technical aspect is related to the spindle special bearing system of the spindle equipped





with 4 150mm-diameter bearings placed in the front area”.

The new Mandelli head has a tilting axis with a double bearing support and can generate a 12,000 Nm continuous torque allowing for 5-axis heavy roughing. The power generated by the motors is such that it overcomes the cutting forces thus avoiding the installation of Hirth couplings.

Predictive maintenance

In addition to hardware components, Mandelli has recently developed a new self-diagnosis and predictive maintenance software. “It’s called iPum@ and it has been designed along three main lines- says Colombi. Firstly, the connection and the NC remote control which means accessing the HMC at any time and with any device, from PCs to mobile phones. Secondly, the HMC sensorization: the software computing powers are growing and this leads to the acquisition of a larger number of data. This is why the conditions of those HMC parts which are more subject to wear are constantly monitored with vibration, temperature, acceleration, pressure sensors and more. The third cornerstone of the iPum@ project is linked to the development of a self-diagnostic system to perform predictive maintenance, not preventive.

A solution that allows us to plan an intervention with a sufficient margin signalling the need for maintenance only when anomalous working conditions are detected”.

Working both on all the data gathered over time as well as on mathematical



models of the parts subject to wear, this software can make very precise statistical calculations so as to be able to forecast failures three days in advance and with a 97% reliability.

Thanks to iPum@, Mandelli will always be informed about the status of its machines.

A condition that allows the Company to develop new businesses in terms of customer care by implementing, for example, warranty upgrades based on the real level of HMC use made by the customers.



WINNING PHILOSOPHY

Continuous product improvement, efficient resource management, design and construction of highly customized, complex, performing machines that maintain their reliability over time to ensure maximum satisfaction to Mandelli’s customers. A winning philosophy, gained over decades of experience in the production of horizontal machining centers, which has allowed Mandelli Sistemi to consolidate its market position especially in industry key sectors such as aerospace and energy. The need to ensure success over time, especially in an increasingly demanding global market, has led the company to launch an innovative process of intensive improvement within its organization according to the Lean logic with the goal of achieving that efficiency providing value generation for customers / partners, employees and owners. A success that many customers confirm every day when they choose Mandelli machining centers.



Mandelli Sistemi Spa
Via Caorsana, 35 - 29122 Piacenza
Tel. +39 0523 548111
Fax +39 0523 617775
e-mail: mandelli.info@mandelli.com
www.mandelli.com

FOR FURTHER INFO AT BIMU

Hall 13 – Stand E01/E03
Contact:
Marco Colombi
Sales Manager

