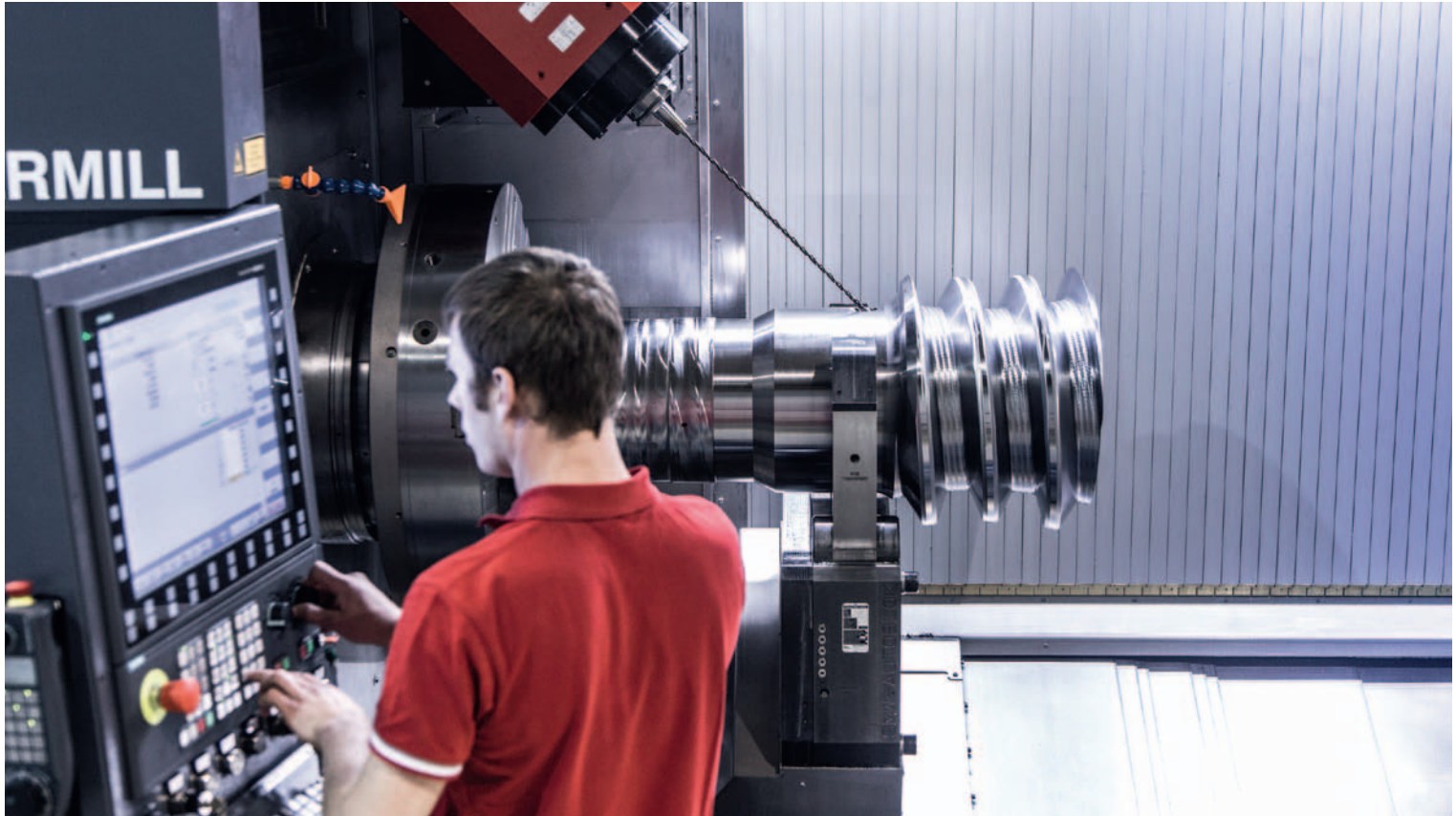


Versatile Turning-Milling Machine



Increased productivity thanks to external pre-setting and a large tool magazine (up to 200 pockets, 100 in case of the version used by Zenit S.p.A.)

Zenit

The company founded as a small workshop in 1968 by the Gasparini family has always preserved the role of a family business: the third generation leading the company today shares the parents' and grandparents' growth strategy based on a consequent quality policy, the latter being indispensable in order to stand out from the competition. Thanks to the experience gathered in the course of time, the permanent striving for keeping the production facilities up to date with state-of-the-art technology and the great professionalism of the personnel, the company based in Piacenza could secure significant market shares whilst having evolved into one of the most important providers of rolls and cylinders, the high quality of which is appreciated by both manufactures and users of machines and plants. Depending on the type of the manufactured cylinders (made of steel or aluminium, copper-plated, grooved, rubberised, made of carbon fibre, cooled/heated) and their intended purpose, the dimensions of these products vary significantly: diameters can range from a few dozens to approx. 2,000 mm whilst lengths of up to 9 metres are possible. Be it standard or special production: each product is manufactured in very small numbers. Approximately 60% of the orders relate to the manufacture of one or two pieces which hardly ever need to be reproduced.



Requirements Profile

- Production of rolls and hydraulic cylinders
- 5-axis complete machining
- High precision in both machining and surface qualities
- Turning and milling technology
- 3D simulation and collision monitoring



Foil rolls with a diameter of 350 x 3800 mm supported by the steady rest and tailstock

Flexibility and Precision in Production

The production site of Zenit S.p.A. occupies 10,000 m² in an industrial area of 20,000 m². Divided into different areas, it accommodates more than thirty machine tools for the various stages of roll and cylinder machining, plants for automatic welding and surface treatment in copper and nickel plating processes as well as balancing and measuring machines.

'Most of the mechanical works carried out by us', explains Antonio Gasparini, managing director of Zenit S.p.A., 'deal with turning and grinding, but we have got milling machines as well. Our machinery has been arranged so as to be able to meet the typical requirements of a company manufacturing very different products in very small numbers. In these cases, flexibility is the key to keep up with the competition on the market. Due to the type of the products manufactured by us, we have to place particular emphasis on precision and quality in the machining processes which, depending on the rolls' intended purpose, involve varying limit values. In general, the production cycle includes turning, milling, drilling and subsequent grinding as well as the movements in the different machining stations and setups.'

'Besides extending the entire processing cycle, the transport from one processing or assembly station to another naturally involves the risk of inaccuracies. Apart from needing powerful machine tools that enable quick changeovers in the tool change, the operations require total concentration in order to be able to continuously optimise the productivity and thus the production costs. In this context, we recently invested in a 5-axis turning and milling centre of the latest generation made by EMCO. This machine helps us improve our production quality, and we benefit when it comes to the production times, production costs and machining quality.'

A Rewarding Investment

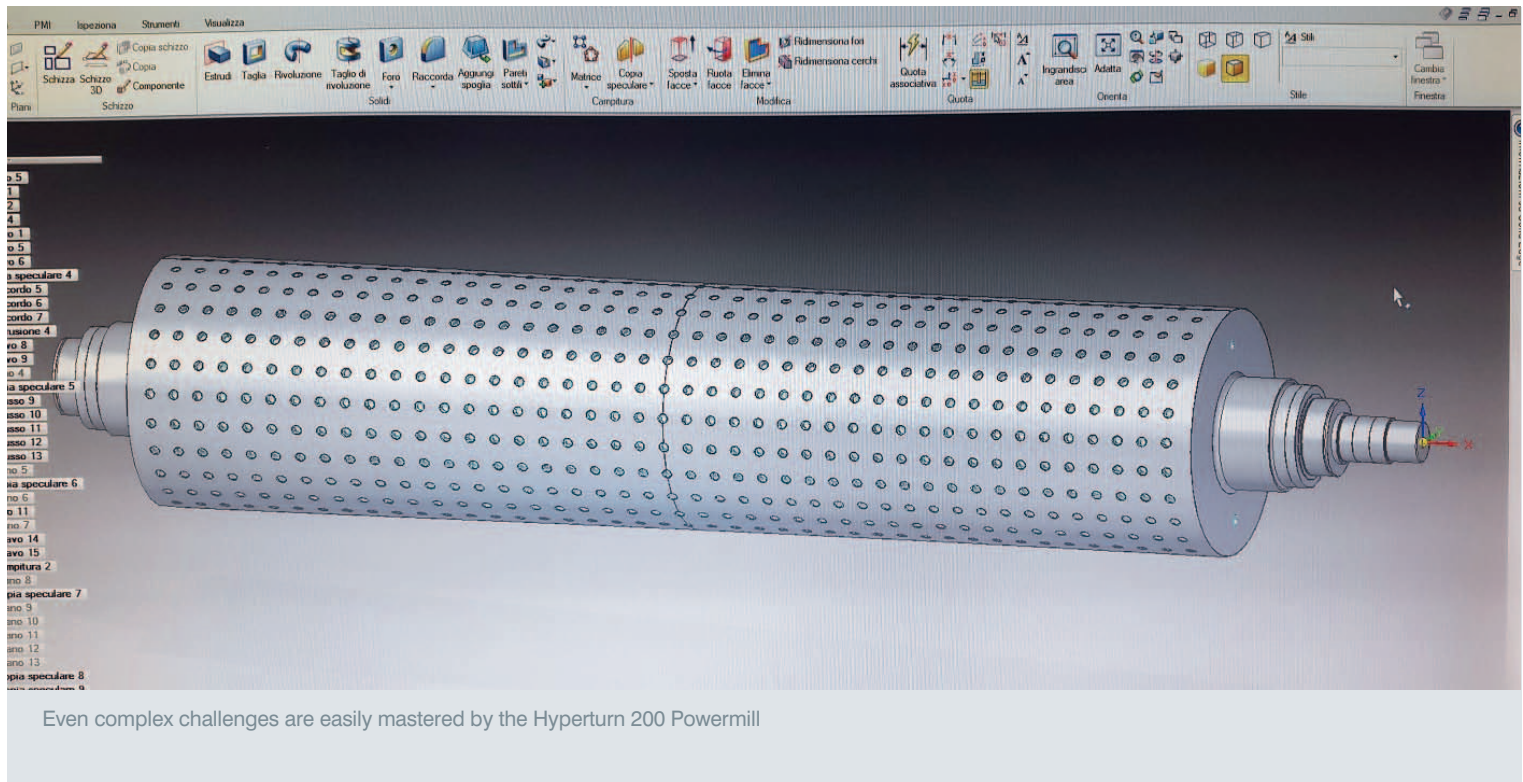
The machine mentioned by Gasparani is EMCO's new Hyperturn 200 Powermill turning and milling centre designed for the complete machining of complex and large pieces. Although EMCO has been developing multitasking machines for years, the Hyperturn 200 Powermill takes machine dimensions to a whole new level: being considerably bigger than the current models from EMCO's machine range, the machine is the result of the merger of the different expertise

provided by the EMCO Group companies. Zenit S.p.A. has proven to be the ideal customer for such a solution, which is due to the type and variety of the products to be machined. At this point we would like to emphasise that the EMCO Group develops and manufactures a wide range of machine tools at the highest technical level: from common turning and milling machines to universal CNC turning centres, from CNC turning and milling centres to high-speed milling and drilling centres. Special solutions tailored to the customer's needs are possible, as well.

'The persons responsible at EMCO Italy', tells Gasparini, 'offered us this turning and milling centre that not only was a novelty due to its size, but that also required us to change our mindset as regards production: there it was, the machine with five axes and the capability to carry out all works, works that had previously been done using turning, drilling, milling and grinding machines. For years we had considered investing in this new technology, which quickly led to a



Multitasking Machine Hyperturn 200 at Zenit Spa in Piacenza



Even complex challenges are easily mastered by the Hyperturn 200 Powermill

shared interest between EMCO and us, and thus to the purchase of the Hyperturn 200 Powermill with digital Sinumerik 840D sl control.'

'In order to achieve the roughness stipulated by the design data, the rolls we produce often require further processing operations including grinding. Using the machine made by EMCO, we are able to achieve values of up to 0.7 Ra in turning processes. Thus, subsequent grinding becomes superfluous, which means one work step less for us. This is a clear advantage when it comes to times, precision and costs.'

'What is more, I have to pay tribute to the technicians from EMCO Italy who managed to assemble the machine so quickly', continues Gasparini. 'We received all the support we needed to begin production straightaway.'

The Hyperturn 200 Powermill combines two technologies which are strongly represented within the EMCO Group: turning and milling. Mecof is considered a manufacturer of extremely powerful and flexible milling solutions. The result of the merger of Emco Mecof's know-how and EMCO's expertise in turning is nothing less than the Hyperturn 200 Powermill. It joins both technologies which contribute their respective strengths.

The high capability and productivity are reflected in the technical data: the main spindle features a torque of 6410 Nm and a capacity of 84 kW. In case of the milling spindle, it is 630 Nm and 80 kW, respectively. That is why the new Hyperturn 200 Powermill is suitable for the complete and precise machining of large and complex pieces. The high performance enables the processing of pieces with a turning diameter of up to 1,000 mm and a maximum length of 4,000 mm; the weight of the pieces processed by the machine can be up to 1,500 kg when held in the jaw chuck only and up to 6,000 kg between jaw chuck and tailstock. The version used by Zenit S.p.A. also includes an NC steady rest, which is important when it comes to the machining of very long and slim shafts or heavy parts.

The stable travelling column features the typical "box-in-box" frame construction of the Emco Mecof machines. This construction guarantees perfect rigidity and stability, and thus a high degree of precision. The B-axis is equipped with a torque motor and has been integrated in the travelling column's frame construction. An electrically welded steel construction, the cross slide features an extraordinary high degree of bending stiffness and torsion resistance – a

decisive prerequisite for the completion of high-grade turning and milling operations.

According to Gasparini, 'The Hyperturn 200 Powermill certainly constitutes a strategic investment for Zenit S.p.A., because it has given our company the opportunity to expand its know-how and expertise when it comes to 5-axis machining. Although the technology is quite complex, the support of EMCO's technicians helped us acquire this know-how rather quickly. The cooperation between customer and supplier always plays a vital role. In this case, however, I dare say that the counselling and support have almost been more important than the machine itself.'

'This turning and milling centre has proven to be the perfect solution for our type of production: not only are we able to process our usual products faster, at lower costs and with increased quality, but we could also expand our product range by more complex products, i.e. those products that require the interplay of 5 axes, helical milling or the placement of large drillings with a narrow tolerance – just to name a few examples.'

For Zenit S.p.A., the use of the Hyperturn 200 Powermill lays the foundation for mastering new challenges and facing further ones in a different and more efficient way.



Some rolls require hundredfold drilling and milling with very narrow tolerances

Work area

Swing over bed	1050 mm
Max. diameter	1000 mm
Length between spindle and centre (MK 6)	3200 / 4200 / 5200 / 6200 mm
Travel in X	915 mm
Travel in Z	3100 / 4100 / 5100 / 6100 mm
Travel in Y	+/- 300 mm

Main spindle and sub-spindle (optional)

DIN 55026 spindle connection	A2-15"
Power chuck diameter	500 / 630 / 800 mm
Max. spindle speed (with drive)	1800 rpm
Max. drive capacity of the main/sub-spindle	84 kW
Max. torque	6410 Nm

Tailstock with quill

Travel (without steady rest)	3000 / 4000 / 5000 / 6000 mm
Quill travel	250 mm
Quill diameter	200 mm
Max. contact pressure	40000 N
Tailstock travel speed	15 m/min
Clamping cone with integrated bearing	MK 6

X-, Z-, Y-axis

Rapid traverse speed X/Y/Z	30 / 30 / 30 m/min
Feed force X/Y/Z	30/20/30 kN
X-axis diameter	
Ball screw x pitch (2 units)	63 x 20 mm

Main spindle / C-axis

Angular resolution	0,001°
Max. torque	5000 Nm
Spindle break – holding torque	6000 Nm

Milling spindle / B-axis

Tool system	HSK-T 100 / PSC80 (Capto C8)
Max. drive capacity	80 kW
Max. spindle speed (opt.)	6500 (10000) rpm
Max. torque (opt.)	630 (340) Nm
Stroke, B-axis	240°
Rapid traverse speed, B-axis	50 rpm
Minimum indexing	2,5°
Minimum increment, B-axis	0,001°

Tool magazine

Tool magazine pockets	50 – 100 – 200
Max. tool length	600 mm (opt. 3 x 1000 mm)
Max. tool diameter	120 mm
Max. turning tool weight	25 kg

Coolant system

Coolant pressure	40 / 14 bar
Feed rate at 20 bar	30 l
Filter system	40 Micron
Cooling tank capacity	1400 l

Power consumption

Connected load	125 kVA
Compressed air supply	6 bar

Dimensions

Total length including chip conveyor	12400 – 15400 mm
Height	3400 mm
Width / including control panel	4000 mm
Weight (depending on type and accessories)	40000 – 54000 kg

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