



CNC traveling column machining center matec-30 L with traverse paths of X = 6.000 mm, Y = 800 mm and Z = 800 mm for the flexible complete machining of parts of all sizes



Alu Menziken, Switzerland

Economical machining of components for aerospace industry

High-performance aluminium profiles are basic elements in modern aircraft industry. Depending on the complexity and intensity of the machining tasks the material aluminium constitutes highly significant manufacturing demands. Traveling column machining centers with long traverse paths in the X-axis, linear drives and a large tool magazine have proven a success for Swiss company Alu Menziken.

Lightweight construction is a contemporary issue and accordingly all relevant industrial sectors are in search of materials which combine light weight with high-performance and sturdiness as well as profitability. While in some sectors compromises are the rule, aerospace industry does not follow this course of action. Here security has absolute priority and therefore development and design engineers go to great lengths to balance technical, safety and economical aspects. As far as materials are concerned, aluminium has become first choice in aerospace industry. Typical structural elements are integral aluminium components, milled from the solid, and high-precision extruded aluminium profiles in diverse alloys and grades.

These integral components and extruded aluminium profiles need to be machined with high and reproducible precision, in the least number of clampings possible and in best case the machining is complete, i.e. the parts are ready for assembly. The machining itself is only allegedly not problematic for state of the art machining centers - but it sure is. In view of the predominant dimensions of the work parts which necessitate long traveling paths in the X-axis, the very tight tolerances, and the requirement of different tools for complete machining the offered range of „high-capacity“ milling machines resp. machining centers is rather limited. But the manufacturers of aerospace components made from aluminium extruded profiles are of course in need of these machines.

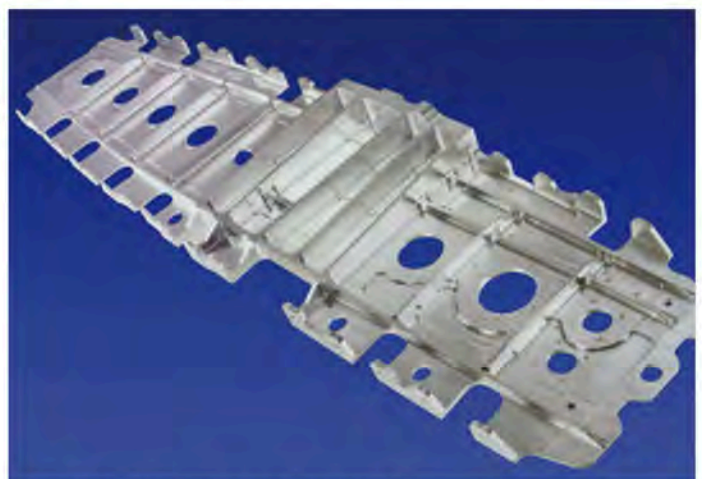
High-precision machining of parts with a length of up to 6.000 mm

Aerospace industry favors suppliers, which offer everything from one source, the complete process chain from the production of the raw material to mechanical processing/ machining to the delivery of modules ready for assembly and quality-documented.

Suppliers as described are not found all over the place - the operational unit Alu Menziken Extrusion AG Division/Alu Menziken Aerospace is definitely one of them. The Swiss Alu Menziken Gruppe produces raw parts like extruded profiles in their in-house smeltery and stud foundry in Menziken and manufactures customized aluminium alloys according to European, American and customer-specific standards. The profiles meet highest demands on quality - related to straightness, curvature or material thickness, and undergo complete machining according to customer's demands. This machining ser-

vice is offered both for small parts and for very long aluminium parts like extruded profiles.

In Alu Menziken's Mechanical Manufacturing Division 30 qualified employees engage in the manufacturing of work parts on state of the art CNC machining centers. Due to the standard lengths of extruded aluminium profiles of up to 6.000 mm, long-bed milling machines and machining centers are the first choice. Up to date 12 machines are in use. Five of them carry the sign of the German machine manufacturer matec Maschinenbau, Köngen. The business relationship between Alu Menziken and matec was started in 1997, since then a number of matec traveling column machining centers in diverse configurations have been purchased, at first 2 machining centers matec-30 HV with mounted rotary tables, designed as 4-axis systems for flexible horizontal-/vertical machining. 2005 a traveling column machining center type matec-30 L (pict.) with a traverse path in X of 6.000 mm and an integrated swivel table for the flexible complete machining in 4 axes followed, 2007 and 2008 again 2 matec-30 HV were ordered, both with traverse paths in X of 6.000 mm, one of which is installed in Menziken, while the other one was shipped to the company's pressing plant in the USA.



Workpieces based on extruded aluminium profiles are important components in aerospace industry



Left: matec-30 L, working area with mounted rotary table. Machining of aluminium profiles.

Above: Aerospace aluminium profiles after complete machining on matec-30 L

Linear drive for rapid speed of up to 80 m/min in the X-axis

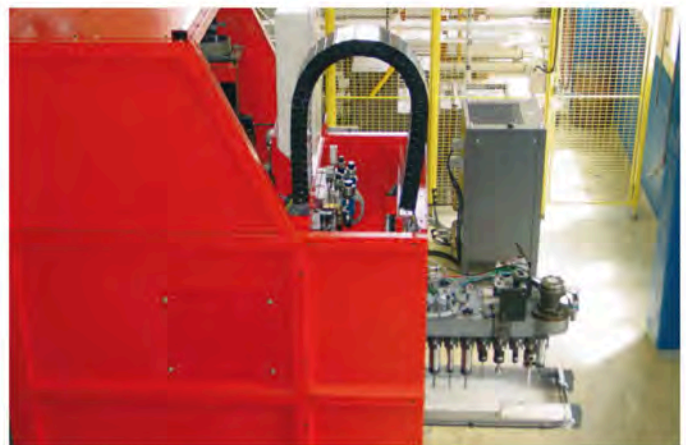
The CNC traveling column machining center matec-30 L purchased in 2005 was the first machine in Alu Menziken's Mechanical Manufacturing Division with a linear drive in the X-axis, providing a rapid speed of up to 80 m/min. The axes Y and Z have a quite dynamic rapid speed of up to 48 m/min, thus drastically lowering non-productive time, usually caused by long traverse paths - in this case X = 6.000 mm, Y = 800 mm and Z = 800 mm.

For the flexible complete machining of work parts the matec-30 L is equipped with a large tool magazine with a capacity of 128 tools. The tool diameter is 130 mm max. (adjacent places empty), the tool length is 450 mm max., while tool change time (chip-to-chip time) is only 4,5 seconds, which also minimizes non-productive time.

The milling head is equipped with a spindle with 18.000 rpm max. and a torque of 100 Nm (190 Nm) at 40% DC, which is more than sufficient for high-performance milling on extruded aluminium profiles of all dimensions. For the complete machining of very long profiles the machine is equipped with two swivel tables size 400 mm x 3.000 mm, the profiles can either be clamped in chucks or be fixed in beam chucks and positioned in a swiveling range of +/-90°. This permits highly flexible machining. As and when required, the complete machining of small or large parts, very long parts or a number of short parts in a row can be performed.

The matec-30 L has a Heidenhain iTCN 530 control, which is known for best results in 4-/5-axis machining and is characterized by a practical, logical, easy-to-operate interface. Practical experience has demonstrated the reliability and precision of the matec machines. matec after sales service has also contributed to customer's satisfaction. One of the main reasons, why Alu Menziken has chosen matec machining centers is the consequently customer-oriented matec modular system, which permits customer-specific standardized machine solutions. The persons in charge at Alu Menziken Aerospace emphasize: "The customer gets the optimal solution for his requirements and no trade-off or "compromise" and so in the end really gets what he wants".

Author: Edgar Grundler



Tool magazine with 148 tool places integrated in the traveling column

