

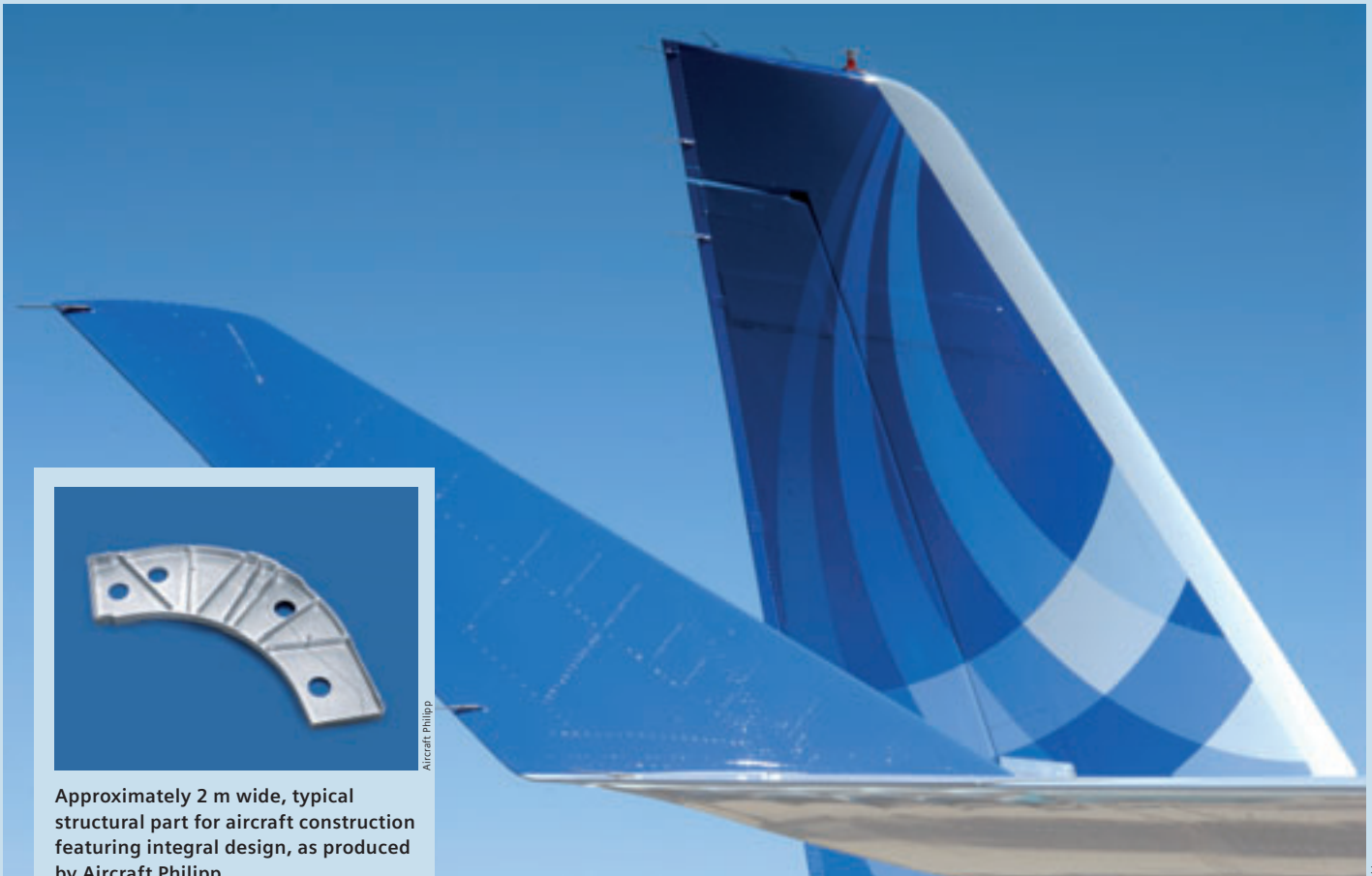
■ Aircraft Philipp, Germany

High-Flying Parts Production

Strategic decision in favor of Sinumerik 840D by aircraft parts manufacturer Aircraft Philipp.

Today, air travel is one of the safest means of transportation. This is due in no small part to the impressive care taken by manufacturers and suppliers with parts and components. As well as functioning correctly, the parts must also be lightweight, which frequently necessitates the use of special materials and also extensive machining. To top it all off, production must also be cost-effective.

Aircraft Philipp is based in Übersee, Germany, and was founded in 1998. The company is living proof that it is possible to establish oneself in this difficult environment even today. Two large vertical machining centers from Starrag Heckert form the hub of the company's machinery setup, working in conjunction with an automatic pallet loading system from Fastems and Gildemeister turning and milling centers. Additional



Approximately 2 m wide, typical structural part for aircraft construction featuring integral design, as produced by Aircraft Philipp

small machining centers from Alzmetall and Starrag Heckert are also in use. In addition to cutting, Aircraft Philipp is also able to offer welding, varnishing, galvanizing services and heat treatment. The aircraft specialist does not restrict itself purely to production; it also has footholds in CAD/CAM services and quality assurance.

Up to 31 axes in ten machining channels

In terms of the control system, a clear decision has been taken in favor of the Sinumerik 840D. The system is equipped with two Intel Pentium processors and uses the Microsoft Windows operating system, which enables virtually free programmability and communication in a computer-dominated production environment. The current flagship is equipped with the NCU 573.5 and supports ten machining channels that run in ten operating mode groups and offer 31 axes.

The control system features all the necessary functions for highly productive machine tools. These include, for example, high-speed processing with Look-Ahead, pilot control processing with no position lag, NURBS interpolation and powerful five-axis functions. The CNC control is suitable for all technologies including drilling, milling, turning, nibbling, stamping, grinding and laser processing. Internal measuring systems can be incorporated. The numerous safety routines include Safety Integrated, an intelligent, comprehensive safety technology solution.

Aircraft manufacturing also requires a powerful compressor, milling radius correction for five-axis side-milling that also adjusts the tool length when the radius has been corrected, and, if necessary, Advanced Position Control – a new system for acceleration feedback. Particularly in large machines, the natural frequency is detected by a position measuring system and fed back into the drive as a counterforce. This active damping creates more even workpiece surfaces.

Ideal for the aerospace industry

Aircraft Philipp had several reasons to opt for the Sinumerik 840D. “There are good reasons why this control system has become a standard within the field of aerospace production,” states Joachim Schardt, head of CAD/CAM services at Aircraft Philipp. He goes on to tell us, “We can continue using the system should we extend our activities to include other production types, as it can handle all machining types. The option of integrating it with the automatic palletizing system from Fastems was particularly important for us. This would not have been possible with any other control system. And finally, it was also important for us to use a German control system supplier.”

The control system fits perfectly into the company’s process chain. All programs are created offline and simulated in terms of removal. Machine simulation with the Vericut system ensures that the programs are correct. They are then transferred to a central server via the post processor. From here, they can be

Sinumerik 840D compressor functions

The linear interpolation in the control system causes acceleration jumps in the machine axes at block transitions. This in turn may cause resonance in the machine elements, resulting in noticeable bevel patterns or vibration on the workpiece surface. The compressor combines a sequence of G1 commands according to the specified tolerance level and compresses these to form a spline that can be executed directly from the control system. Surfaces become significantly smoother, as the machine axes are able to work in greater harmony and machine resonance is prevented. This enables higher processing speeds, and the machine is subjected to lower levels of stress.



CNC machining programs are simulated offline as standard, in order to prevent errors and collisions right from the start



Working area for the GMX 300 linear from Gildemeister and the Sinumerik 840D

retrieved by the control system as needed. The interaction of the CAD software, post processor and Sinumerik 840D “works without any problems,” as Joachim Schardt emphasizes.

SinDNC as transmission medium

Large machines that are connected to the palletizing system Fastems are provided with program support via this system; in other machines, SinDNC is used as a “transmission medium”. At Aircraft Philipp, all machines are connected to the Ethernet network and can make use of services such as remote diagnostics and remote maintenance.

Siemens is also a partner to and a service provider for Aircraft Philipp. The Bavarian aerospace company is currently conducting tests aimed at further enhancing the surface quality of parts. This test series is supported by personnel from the virtual production area. The goal is to establish the ideal coordination between the program, control settings and machine parameters. ■

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