

# Quality + Productivity + Availability = FOGS D40

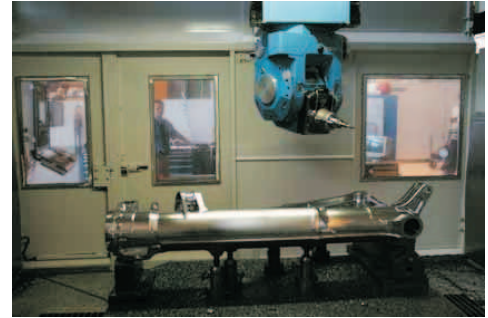
## High-speed machining center exceeds expectations

Mönchengladbach

In May 2005 production engineers at Liebherr Aerospace Lindenberg GmbH (Liebherr Aerospace) started the production on their new high-speed machining centre. After critical tests and intensive evaluation they eventually acquired a Droop+Rein FOGS D40 Over-Head Gantry High Speed Machining Center from Dörries Scharmann Technologie GmbH (DST). Eighteen months later, Bernd Molinari, Production Engineering Manager at Liebherr Aerospace, takes stock. "Machining quality has met the forecast values; at 95% availability is well over that of comparable machines, and productivity in terms of time per workpiece has risen by 25 percent. All things considered, the machining centre has manifestly surpassed our expectations."

The five-axis machining centre is now used in three shift operation to machine forged steel Landing Gear Legs for the Embraer series EJR-190/195 passenger aircraft. Liebherr Aerospace produces the landing gears at its principal German site at Lindenberg/Allgäu (south-west Germany). The company, together with its umbrella company SAS in Toulouse, numbers among the global players supplying systems for helicopters, and for medium and long-haul aircraft. For this reason, besides the technical requirements stipulated by the international aircraft industry, the economic criterion of competitiveness of orders also plays a special role. At Lindenberg, the high productivity levels provided by the FOGS D40 are helping to meet these criteria.

Currently the clamping area of the machining centre (2,500 x 6,000 mm) is divided in to a section for machining and a section for setup. This was done to accommodate future orders requiring a greater work piece size, where the total area of the clamping area would be available for the work piece. The FOGS D40 has full 5-Axis machining capabilities and roughs and finishes the parts in three set-ups.



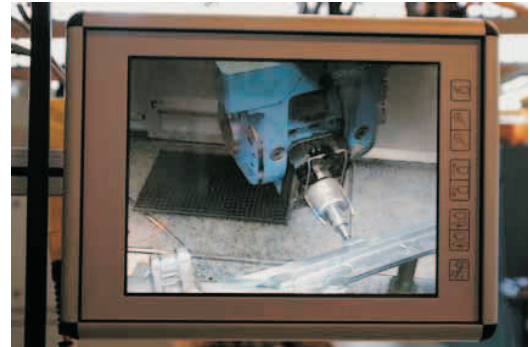
Machining of Landing Gears on a FOGS D40

The final "high speed" finishing operation completes a uniquely wide range of operation for this type of machine tool. This performance is facilitated by the machine's innovative design concept. The "Over Head" gantry principle provides the high stiffness required for rough machining combined with the high dynamic performance needed for the finishing. The extremely well proportioned cross rail on which the cross rail head (Y-Axis) is mounted also contributes to the outstanding all round performance of the FOGS D40. Mounted in the cross rail head is the ram (Z-Axis) to which is attached the Fork Type Head, which provides the 5-Axis capability through the rotary "B" and "C" Axes."

The choice of the relevant appropriate machining head forms the basis of optimum results on the various work steps and requirements such as roughing, semi-finishing and finishing. Changeable milling heads and spindles are available to do this. Mr Molinari is firmly convinced that the achievements constitute more than the sum of its components and that the joint efforts of the purchaser and the supplier, working together as a team has contributed to the high level of success that the project has realized. Mr Molinari further stated: "The cooperative and trustful relationship between our two companies has succeeded in providing benefits for both, not least through the business relationship developed between Liebherr-Aerospace and DST".

#### Pictures:

- 1: From start to finish, the FOGS D40 mills the finished landing gear strut from the drop forged part.
- 2: The operator can observe the milling operation even at positions where the view is obscured.



Videocontrol of milling operation

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