

■ Lufthansa Technik AG, Germany

Better than New

Retrofitting a machine used to repair engine housings and combustion chambers with a Sinumerik 840D sl CNC helped significantly improve its day-to-day performance.

For many people, the name “Lufthansa” is a byword for safe, comfortable air travel. The Lufthansa Technik group of companies (LHT Group), which carries out aircraft servicing and maintenance, plays a significant role in maintaining that reputation. Lufthansa Technik is one of the few service companies allowed to overhaul aircraft and engines from a wide variety of manufacturers. Indeed, for certain procedures and manufacturers, the Lufthansa Technik site in Hamburg, Germany, is the only qualified repair location in the world.

Sophisticated engine repairs

Repairs to engine housings represent a particularly difficult challenge. Engine housings are complex, heavily stressed components made of materials that are expensive to buy and process. In scheduled maintenance, it is sometimes possible to replace only those sections that show signs of mechanical and thermal stress – an alternative that is technically challenging, but financially, extremely interesting compared with using new parts. To do this, the component to be overhauled is first precisely measured and a CAD model of its actual shape is created. Next, the worn sections from the engine components are replaced with new material, which is then reworked so that it exactly matches the previous structure in terms of shape, size, and accuracy of fit. The repair technology requires machining centers of a particular size and quality, as Andreas Tölle, project engineer at Lufthansa Technik in Hamburg, explains: “Our large vertical turning and grinding machines from Jungenthal, with their solid and reliable mechanics, are completely indispensable for this type of work.” They are regularly overhauled to reflect the state-of-the-art in terms of both electrical engineering and CNC technology.

Engine components exposed to high thermal and mechanical loads must be overhauled after a predefined number of takeoffs and landings or a set number of flying hours

Photos: W. Marschner



New technology simplifies programming

Lufthansa Technik in Hamburg recently turned to Siemens to retrofit the drive technology and control system on its Jungenthal vertical turning and grinding machine center. "Everything we produce is a one-off and needs to be individually programmed and processed," says Tölle. "Our staff also needs to be able to operate all of the machines easily. That's why we are gradually converting all our machining centers to use CNCs with shopfloor software from Siemens."

The electrical engineering part of the retrofit included all of the axle drives and the CNC system. The Sinumerik 840D sl, with its Sinumerik Operate graphical user interface and integrated ShopTurn shopfloor software, made it possible to combine the turning and grinding processes that previously required two CNCs into a single control system, thus saving one control panel. This means that there is now more space around the machine and users can move around freely as they operate the grinding functions from an MP8 mobile panel. With the turning and grinding processes now combined in a single control system, programming and program management have been considerably simplified. The old CL800 cycles have been translated one-to-one into ISO cycles for the new control system. On the OP 015 control panel, more information can be visualized in a clear and transparent manner than ever before. For example, it is now already obvious during the simulation phase whether a tool can be used at a particular angle of attack. In ShopTurn, which is also integrated into Sinumerik Operate, contour sections can be easily cut out and inserted using the copy-and-paste function. The panel is also extremely useful when operating in manual mode.

Retrofitting saves time and money

To fully exploit the capabilities of the Sinumerik tool management system, Lufthansa Technik retrofitted the tool turret with Capto toolholders. This allows the Jungenthal machine to be specifically fitted with ready-made tools, simplifying in-process tool changes, eliminating the need for time-consuming scratching, and allowing entire production sequences to be

» When repairing an engine, we have only one opportunity – and there can't be any waste. The Sinumerik solution developed together with Siemens guarantees the required process reliability. «

Andreas Tölle, Project Engineer, Lufthansa Technik, Hamburg

combined into cycles and programmed processes. "More efficient tool and program management has increased our processing speeds on average by between 10 and 20 percent," explains Tölle. Equipped with the new Sinumerik CNC, Simotics S-1FK7 servomotors and the Sinamics S120 drive system, including actively regulated infeed, the Jungenthal machine now has the flexibility to deliver the efficient production processes required for aircraft maintenance. The retrofit proved particularly economical when compared to the cost of buying a new machine, even without counting the work saved on foundations and infrastructure. This resilient machine will probably also last longer than a newer model built today, says Tölle, who is already thinking ahead to the next retrofit with Siemens as its partner. ■

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contact

www.siemens.com/sinumerik
hanspeter.richter@siemens.com