



■ German Aerospace Center

Turning More Efficiently

Cost-effective retrofit of a turning machine ensures the manufacture of flow-critical parts for many years to come.

The "Systemhaus Technik" at the German Aerospace Center manufactures components for basic research into flow technology

Even complex parts can be programmed in no time with the intelligent contour editor of the Jobshop software ShopTurn



The German Aerospace Center near the Cologne/Bonn airport operates a shopfloor in its “Systemhaus Technik” (SHT) technology department for manufacturing and repairing flow-critical parts. This includes turbine heads, wind tunnel models and test bed components. The highly complex parts for basic research must be finished to the highest degree of precision, and always in batches of one.

As well as modern machining centers, the SHT shopfloor operates a tried-and-tested Type K55 Ravensburg CNC turning machine. Designed for up to 4.5 tons of heavy blanks and a maximum clamping length of 3500 millimeters, it is indispensable in the manufacture and repair of large turned parts. However, the control technology had since become outdated, and only one of the employees completely understood the unit’s time-consuming programming and operation.

Much simpler operation

In November 2007, Siemens was therefore called on to retrofit the machine control and drive technology. The key requirements were to keep downtime to a minimum, to provide a cost-effective solution and to ensure much simpler programming and operation. Working with the German Aerospace Center operators, Siemens developed the concept for an optimized, plug-compatible solution that allows fast machine retrofits.

A high-performance Sinumerik 840D sl is now used as the automation system, and ShopTurn has been installed as the operating and programming interface. These components ensured that the plug-compatible solution was compact and simple; it was even possible to dispose of two switch cabinets.

Shopfloor software generates added value

ShopTurn displays the process from the perspective of the operator. The CNC supports the individual work steps using interactive graphics and practical, pre-defined and flexible machining cycles.

During programming, ShopTurn work steps and G-codes can be combined into one program as required. ISO programs can be integrated, changed or even re-written at any point during a ShopTurn part program. This means experienced ISO programmers can utilize their valuable expertise even with the new control technology, without having to re-learn. In addition, existing part programs can be loaded into the new control system via USB stick or over the network and run unchanged. The new ShopTurn-controlled machine can also interact directly with the post-processors of the CAD system used at the “Systemhaus Technik”.

The shopfloor processes will become simpler as a result of ShopTurn. “Today, the same part program is used for pre-turning and finish-turning after annealing,” says operator Stefan Haake. “The pre-turn cycle automatically takes the defined dimensions into account.”

In flow technology applications, free-form contours are very common. Stefan Haake describes the process: “Today, we receive a DXF file from the CAD system with a projection of the free-form, which we convert into a ShopTurn contour with the CAD Reader tool, and then import this directly into the control system. On the machine itself, we only need to update the remaining geometry elements of the construction.”

Fast commissioning

In total, the German Aerospace Center believes the ultra-modern automation system with Sinumerik 840D sl and ShopTurn was no more expensive than other solutions – and offers several advantages in everyday use. A PC installed with ShopTurn allowed employees to familiarize themselves with the new operating and programming options of the machine even during the retrofit. Commissioning only took one-and-a-half weeks, including the remeasurement of the machine geometry.

“The level of cooperation exceeded our expectations,” says Production Manager Frank Gördel. “And where else could we have found consultancy services, all of the components, installation, commissioning and the training software from a single source?” Not to mention the individual training at the Technology and Application Center in Erlangen.

It soon became clear that the Ravensburg K55 with its new automation system, now turns parts more accurately and with better surface quality. This is due to the excellent control properties of the drives, and the fact that the machine has become much quieter thanks to the removal of the fans, making it easier to hear the sound of metal removal and enabling process control.

The improved productivity and increased availability of the turning machine are also bringing economic benefits to research operations: As with all other institutes of the German Aerospace Center, the shopfloor has to generate at least a third of its budget with orders from private industry and that percentage is rising. ■

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