Retrofit of Geiss milling centers

Retrofit as tuning for production

At MS Design in Austria, 3+2-axis Geiss milling centers had proven their worth for years in the manufacture of high-quality automotive tuning components. The automation technology, however, was no longer state of the art and was reducing manufacturing performance. The smart solution: a retrofit with an upgrade of the control and drive technology. The tried and tested milling centers can still be used and are now faster and more flexible, while a new CAD/CAM connection creates more time for actual production.

MS Design, based in Tirol, Austria, is well known among automotive manufacturers and private car enthusiasts for its high-quality design tuning. At its base in Roppen, around 50 km west of Innsbruck, the company manufactures tuning parts for many European car brands: front and rear aprons, door sills, spoilers, and special fenders. These aftermarket parts are often designed by the car manufacturers themselves, but MS Design is also developing components in-house with growing success.

Design tuning: function and quality

The tuning components are mostly realized as deep-drawn plastic parts. Finish machining ensures the correct final contours and the necessary cutouts. The
High manufacturing quality can be seen in the precision and clean surface of the tuning components that are immediately ready for spray painting.

For many years, MS Design has been using three 3+2-axis milling centers from Georg Geiss for the final machining process: two FZ 2250x1500s and one FZ 1000x600 (the figures refer to the worktop size in millimeters).

The preformed blanks are mounted on workpiece-specific holders inside the center’s machining space. Because the workpieces are flexible, during the machining process a vacuum holder, in addition to the mechanical clamping fixture, maintains the exact position – both around the target contour and around all the cutouts. This ensures the ability to comply with the gap measurements and tolerances specified by the car manufacturer.

Florian Larcher, head of the repair and maintenance section, explains: “We really appreciate the Georg Geiss machines because of their rigid construction with fully welded frames. They are low-vibration, even with the relatively high portals, long traverse paths, and long tools that we need. This means we can mill shapes that have a high surface quality that is ready for spray painting without any further finish machining.” Although they had been in use for 15 years, the machines were still performing their quality-critical tasks perfectly, so it was understandable that the company and its employees were unwilling to give up such reliable machines.

**15-year-old automation**

The machines’ original automation was no longer state of the art, however, and was preventing them from being integrated more efficiently and flexibly into the well-organized production processes on-site. This meant that parts programs that were created on one of the three machines would work on the other two machines only if time-consuming adjustments were made. The parts programs had to be created or modified directly on the CNCs of the machines themselves. This resulted in idle times that reduced productivity and yield. Back when the machines first went into production, network or USB connections for importing or exporting parts programs or tool data were still exotic functions.

**Impending large-scale order**

The pressure to make a decision increased with the prospect of winning a major order, and MS Design decided on a retrofit with an extensive upgrade of the drive and control technology. On the recommendation of a business partner, MS Design turned to Siemens AG’s branch office in Vienna. The service team based there had already carried out a large number of successful retrofits on a wide variety of machines, as a full-service provider or in collaboration with the operator, machine manufacturer, or other partner companies.

The upgrade process quickly gained momentum. MS Design sent Siemens Vienna machine descriptions, drawings, circuit diagrams, some photos, and a catalog of requirements as the basis for the bid. The tuning parts manufacturer had prepared the documentation in great detail, so the automation specialists at Siemens were able to draw up not only the quotes but also all the project plans at the same time. The car parts supplier awarded the contract and shortly afterward received the project planning documents together with circuit diagrams and the control cabinet layout.

**Standardized CNC**

These documents provided for a standardized Sinumerik 840D sl CNC for each of the three machines, with an OP 012 operator panel, Sinamics S120 drives (including feedback-capable Smart Line Modules for energy-saving feed-in/feedback), and standard Simotics S-1FT6 feed motors. Each machine was additionally given an HT2 mobile handheld terminal. The safety engineering was also updated.
The company made a general switch to the Safety Integrated functions integrated into the Siemens products for improved protection of people, machinery, and the environment. Safety-related communication would take place via Profibus using the Profisafe protocol.

**Only a short break**

The upgrading work, that is, the dismantling of the previous motors and control cabinets and the reinstallation and wiring of the new components, was carried out by technicians commissioned by the car parts supplier. A retrofit specialist from Siemens was on-site to answer questions while programming the PLC functions required by the machines in parallel with the installation work. The close cooperation paid off. The first completely upgraded machine was able to resume operation in just over a week, and all three machines were in shakedown operation two weeks after the upgrade started. Optimizations were complete just one week later, and the Geiss milling centers were once again available for production.

**Result: significantly greater efficiency**

The positive effects of the retrofit can be seen in operation. The machines now acquire their programs via the network straight from the drawing office or the production planning department. The new Sinumerik 840D sl CNCs are directly and comprehensively supported by the NX-CAM CAD/CAM system used at MS Design. The parts programs are freely interchangeable among the machines. As a result, the Geiss milling centers can be used far more flexibly. Another plus for productivity: there is now more cutting time available on each machine because programming work is no longer carried out on the machine itself – the parts programs tested and optimized via simulation are created in the office away from the shopfloor. The intelligent set-up functions of the Sinumerik Operate user interface noticeably shorten nonproductive times. The bottom line: a vast improvement in overall productivity, and the machines are second to none.

**Retrofit enables rapid response to market opportunities**

Larcher says: “Unlike with a new purchase, the retrofit enabled us to respond very quickly to the altered order situation. We saved a lot of time and money in comparison to a new investment. We can not only continue to use the durable machine mechanics but also the foundations and the workpiece holders – and we didn’t have to make any changes to our company’s infrastructure either. Siemens’ experience with retrofits like this and the fact that all the hardware and software components were coordinated with each other and came from a single source gave us the confidence in the project and scheduling that we needed at this stage of the business.”

The upgrade work at the Roppen site is complete, and the machining facilities and manufacturing organization are ready to meet upcoming challenges. Although no further retrofits are needed at MS Design for the foreseeable future, Larcher adds, “But we can certainly pass on with confidence the recommendation that led us to Siemens as a retrofit partner!”