



*Application Story: DMG*

# CNC HELPS RUN DUAL SPINDLE MACHINE

## *BEFORE, DURING AND AFTER*

Owing to the powerful CNC onboard, a new line of dual spindle production machines from DMG is offering end users decided benefits before, during and after the machining cycles. The TWIN Series dual-spindle turning centers now incorporate the Siemens SINUMERIK 840D powerline CNC that is said to represent the highest level of performance in the CNC sector of machine tool control. According to DMG engineers, this control runs seamlessly in conjunction with the machining center's complex hardware and software packages. Key to the TWIN Series is the flexible options users can utilize when machining bar, shaft and chuck workpieces in 2.6" to 4.0" diameters, with up to three tools simultaneously in operation with a Y-axis feature to produce highly complex milling contours, slanted bores and curved surfaces. Plus, with modular expansions such as automated secondary ops, bar feeders, integrated loading and unloading portals, the TWIN Series presents even more productivity upsides for DMG customers. Finally, this builder's extensive software and tool presetter packages can all feed their data to the CNC for further efficiencies in both set-up and predictive maintenance. Thus, the scenario here is one of true collaboration between a machine builder and a control supplier, wherein the partnership benefits the end users before they begin to machine, all during the machining process and even offline, as a job finishes and the next one begins.

Designed as a highly versatile machining center concept, suitable for industries as varied as automotive, medical, hydraulics and oil/gas extraction equipment, the TWIN Series saves users time and programming costs, from the initial stages. DMG Programmer 3D Turning software enables a user to visualize, on screen, the entire machining process before the first workpiece is touched. All aspects of machine movement and tool position are simulated. Customers report up to 50% reduction in set-up time, as a result. The data compiled can be instantly transferred to the CNC with minimal operator involvement and no programming time. On some of the TWIN Series models, an additional NC-axis makes sophisticated eccentric turning possible, while an optional Y-axis is offered for eccentric boring and milling applications. Two tool turrets have 12 stations each, with all motions controlled by the CNC. The 60° machine bed provides a work area large enough to accommodate bar capacities up to 4" diameters and a CNC-controlled B-axis with collision-free movement. The B-axis is pivoted with the help of an overhead turret and can combine with the Y-axis to further broaden the machining capability.

In process, the Siemens CNC, with its five-axis interpolation and three-tool strategy, helps perform the most complex operations in an error-free mode, according to DMG engineers. The first tool machines the workpiece from the main spindle, the second tool is active on the counter spindle and the third tool is positioned onto the workpiece by the lower turret, also from the main spindle. Typical machining modes possible on the TWIN Series also include two turrets and tailstock with Y-axis, front side machining of long workpieces on the main and counter spindles with a cross traversable counter spindle, as well as collision-free four-axis machining with two turrets and tailstock on a single workpiece for long, narrow shafts. Furthermore, automation add-ons present no reduction in processing speed for the CNC and can include automated workpiece pick-up and disposal with a bar loading magazine, automatic offloading onto an integrated conveyor and a fully integrated part handling system for loading and unloading of chuck pieces.

**Above Left:** TWIN 65 dual spindle machining center from DMG

**Above Right:** Siemens SINUMERIK 840D powerline CNC

Example of highly complex parts done on TWIN Series machines

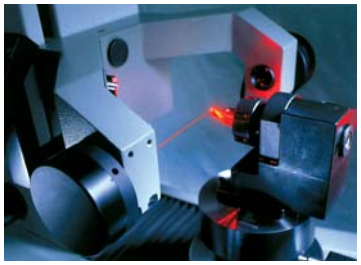
The SINUMERIK 840D powerline CNC features a high-performance, industrial PC, 15" TFT screen, fast network connections for accessing all data in real time, even to a remote location or online service assistance center, onboard diagnostics, error displays in plain text and an ergonomically friendly graphical user interface. At the extreme end, the CNC can accommodate up to 31 axes and 10 channels.

When a user begins work on the Programmer 3D Turning software, they can simulate all tool functions and machining area conditions in actual 3D display. Virtually all potential collisions are thus anticipated and avoided. Cycle time can be precisely predicted and tracked, with the push of a button, as the post-processor is incorporated. All CAD/CAM programs can be stored or the user can input new G-code. A particularly beneficial feature is the ability to section the program, paste in different configurations and have the software instantly recalculate the parameters of the overall cutting sequence.

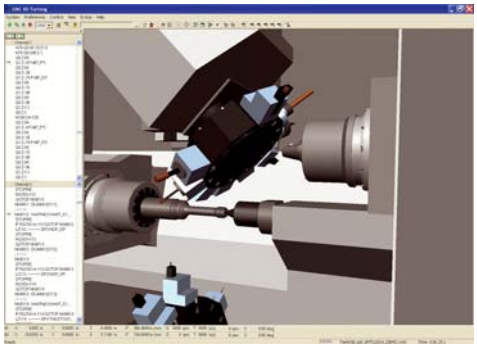
According to Mark Page, senior applications engineer at DMG, "The Siemens control enables me and my customers to do whatever we need to do, in the area of software integration. It simply allows us more flexibility in programming before the operation, during the entire machining and part handling sequence and after the job is done, in terms of validation, data transfer and predictive maintenance." DMG also offers its customers their Netservice software, through which all machine screens can be seen in real time by the builder's service techs, anywhere in the world.

DMG offers its ECO 210 tool presetter with highly advanced visualization capability, said to be more accurate and faster than previous generations, plus all data can be transferred to the CNC via RS232 while the machine is running. They have also introduced the DMG Microset tool management system that further enhances the TWIN Series. Microset is a comprehensive tool management package used for the adjustment and measurement of drilling, milling and turning tools, incorporating highly advanced image processing, CNC-compatible data transfer, Edge-Finder software for measuring the tool edge with a laser beam and superior data tracking capability. A CCD camera detects the tool edge and a live image is displayed on a 17" screen to 50x magnification. The dialog is live from clamping to edge detection to data transfer to the CNC via Ethernet or LAN. According to DMG, this system propels the standards of accuracy and performance documentation on their TWIN Series and other production machining centers to unmatched levels of quality control. Microset tool management systems can monitor small tool sizes (as cited above inthe ECO 210) as well as large tools up to 1000mm (39.37") diameters (Prima model).

As DMG product manager Dorin Schaeffer observed, "We have customers running medical/surgical instruments and we have customers running deep-sea hydraulic oil exploration equipment components on the TWIN Series machines. Both customer groups can utilize all the features of these machines, plus our software and tool presetters, to achieve faster first parts, better quality and all the support services needed, in real time. Our relationship with Siemens and the flexibility of their SINUMERIK CNC architecture help to make this dual spindle machining center concept a real winner for DMG. It's the classic mutually beneficial relationship between a builder and control supplier. In today's market, that's a powerful advantage." ■



ECO 210 tool presetter in the Microset line from DMG



DMG Programmer 3D Turning software package has resulted in 50% reduction in set-up cost for customers, owing to its highly accurate first part production simulation

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