


A FAST TRACK IN MACHINING RAIL COMPONENTS



Full Z-axis reach of 31.5 in allows the use of shorter, more rigid tool lengths for deep cavity milling. The Z-axis thermal compensation software dynamically offsets spindle growth to maintain the ± 0.001 in tolerance required on the drawbars.

THE PASSENGER TRANSIT DIVISION OF WABTEC USES A DUAL-PALLET HORIZONTAL MACHINING CENTER WITH A LONG-REACH LIVE SPINDLE TO INCREASE PRODUCTIVITY 66 PERCENT ON RAILCAR DRAWBARS.

Best known for manufacturing products that can slow railcars down, Wabtec Corporation (Wilmerding, PA) is keeping its own operations on the fast track, recently increasing the production of two-piece drawbar assemblies by 66 percent at its Spartanburg, SC plant with a HMC 1600 horizontal machining center from MAG (Erlanger, KY). The 31.5 in live-spindle reach in this machine tool has eliminated a second machine and setup, while its generous capacity has allowed engineers to add the third major component of the drawbar assembly, the yoke, on the pallet as well, freeing up another machine in the process.



The dual 63 in x 49 in pallets and 360,000-position contouring table reduce setup and cycle time by allowing the drawbars to be machined as a set. A rugged worm gear drive with clamp securely holds axis position and enables precision 4-axis machining of a variety of part geometries.



Increased demand drove the need for greater productivity on the drawbar machining operation, which previously machined these 400 lb mild steel drawbars on a single-pallet horizontal spindle machine with limited reach. Another machine was used to cut features deep inside the parts.



Founded as Westinghouse Air Brake, Wabtec provided the first straight air brake systems to the railroad industry dating back to the late 19th century. Nearly 140 years later, with 50 manufacturing plants and approximately 7000 employees worldwide, the company continues to design, manufacture and assemble a broad range of railway components, as well as power generation and off-highway equipment.

Its 350 employees at the Passenger Transit Division in Spartanburg manufacture products for virtually every major intercity passenger transit system in North America, as well as OEMs such as Alstom, Bombardier and Kawasaki. Product lines include pneumatic, hydraulic and electro-pneumatic brake equipment, car couplers and current collectors, along with a full range of high-performance electronic and pneumatic transit door mechanisms. Wabtec recently received the IRIS (International Railway Industry Standard) certification from the



A wide variety of thread mills, boring bars and some customized tooling are used to machine the drawbars and other railway components on a tombstone fixture.

Union of European Railway Industries, which is based on ISO 9001, adding railway-specific requirements.

Increased demand drove the need for greater productivity on the drawbar machining operation in Spartanburg, which previously machined the 181 kg (400 lb) mild steel drawbars on a single-pallet horizontal spindle machine with limited reach that resulted in the need for another machine to cut features deep inside the parts.

"We identified setup reduction and machine speed as two areas of opportunity for improvement. We found solutions to both areas with this dual-pallet HMC 1600," said manufacturing engineer Dale Simms. "We were looking for a machine with long spindle extension that would allow us to eliminate a second machine and two hours of cycle time, which had been needed to cut the hard-to-reach pads on these parts. Before we purchased a new machine, we ran tests at the MAG Fond du Lac, WI plant with the spindle extended ten in, 15 in and 20 in. The machine performed very well. Its twin pallet design is inherently more productive."

The dual, 1600 mm (63 in) x 1250 mm (49 in) pallets and 360,000-position contouring table allow Wabtec to machine the

drawbars as a set. The hydrostatic table on the machine provides a rigid platform while a rugged worm gear drive with clamp securely holds axis position to enable precision 4-axis machining of a variety of part geometries. Full Z-axis reach of up to 800 mm (31.5 in) allows deep cavity milling to high precision, using shorter, more rigid tool lengths. The exclusive Z-axis thermal compensation software, which is standard on the live spindle, dynamically offsets spindle growth to main-

tain the ± 0.0254 mm (± 0.001 in) tolerance required on the drawbars.

The 35 m/min (1378 ipm) rapid traverse rate of the HMC 1600 is a key factor for Wabtec in being able to decrease its cycle time. "This is remarkably fast for a large machine," noted Simms. Heavy-duty hardened and ground roller guide ways enable high acceleration/deceleration rates and extend wear life by nearly 10 times more than ball-type ways. A 75 second pallet-change and 15 second tool



The 31.5 in live-spindle reach eliminated a second machine and setup, allowing engineers to add the yoke of the drawbar assembly on the pallet, which freed up another machine in the process.

change also improves cycle time.

Wabtec uses a wide variety of tools to produce the drawbars and other railway components, including thread mills, boring bars and some customized tooling. "We have two 50-tool pallets set up in a 100-tool magazine for the drawbar work, and we bought an extra 50-tool cart for some of the smaller jobs we run on the machine," said Sims. The HMC 1600 is available with tool cassettes capable of carrying up to 300 tools with a maximum length of 650 mm (25.6 in), and weighing up to 40 kg (88 lb). A chain magazine with a tool capacity of 50 kg (110 lb) is also available. Maximum tool diameter is 125 mm (4.9 in) inside a full magazine, and 300 mm (11.8 in) inside an empty-adjacent.

The Wabtec HMC 1600 is equipped with Renishaw probes and software that are used to align castings on the fixture and to conduct preliminary checks on part features before all components undergo final inspection on a CMM.

"Once we put the job on the MAG machining center, our production jumped from 4.5 parts per day to 7.5 parts per day," smiled Simms. "We realized a nice bonus, too, when we were able to add the third component of the assembly onto the pallet, which freed up another machine for other work." ■

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