

Swiss Turn Machines

Custom medical parts and other complex, low-volume work create buzz in an industry known for making watches

The first market for Swiss-type machines was the watch industry. Over the years, however, many other markets have found a need for work done on this type of equipment.

Today the defense, electronic, appliance, and automotive sectors all rely on Swiss-style machinery to create small, complex parts. Where this technology truly shines, however, is in the creation of products for the medical field.

“With the introduction of CNC machines, and progress made in the medical field, this market has been particularly good for Swiss-type machines,” explained Paul Cassella, applied technology manager for Tornos US. “Parts

that could not be considered to be machined with cam-operated machines are now produced.”

In the days when Swiss turning machines were cam-operated, only specialized shops used this technology. With the advent of CNC, Swiss turning machines entered the mainstream as users realized the benefits that these machines can bring to a shop environment.

“For producing small, intricate, and fragile parts there is nothing that can rival them,” said Cassella. “You can find large numbers used in the medical, electronic, and fiber-optic sectors. These machines can run for a long period of time unattended, thus reducing the labor cost.

They are accurate and can produce parts with very close tolerances, thus reducing the scrap rate, and they can produce finished parts from barstock, eliminating the sometimes difficult decision on how to clamp the part without deforming it.”

These are some of the reasons for the increased use of Swiss-style turning machines for medical and dental devices, as they can machine all types of bone screw, dental implants, and other small and fragile parts.

The needs of the aging population have created this industry.

“Multinational companies such as Johnson & Johnson, Medtronic, Stryker, and Biomet have all invested heavily in R&D,” said Cassella. “As the baby boomers are entering into retirement age, they will need all types of operations to help keep their bodies young, from knee and hip replacements to dental implants. These companies see a lot of business to be had and large profits.”

The latest additions to the company’s product line were created with the medical industry in mind, a sign that, even in this economy, work can be found in certain areas of manufacturing.

With the current need for smaller and smaller accurate parts the future for Swiss-type machines will only expand, said Cassella.

“Machine tool builders will be offering more machines with higher RPMs, more tool positions, and more accurate positioning,” said Cassella. “We might also see ‘hybrid’ machines that have your standard Swiss-type machine blended with a machining center.”

The Technology

The machines that are used to create these parts must be configured and equipped to meet the challenges of the medical industry. High-pressure systems that can pump coolant up to 340 bars for gun drilling applications is one example.





The Gamma 20/6 from Tornos can process parts up to 20 mm in diameter and is available in five- or six-axis models.

Coolant chillers, coolant temperature stabilizers that keep the coolant at the same temperature within ± 1 degree, chip conveyors, part separators, and in-process gauging are all mainstays on today's Swiss turning machines.

In addition, emerging technology such as Ethernet connections, remote diagnostic systems, and macros to facilitate the machining of specific shapes is being used as well.

"Machine tool builders have adapted to the demands of today's market. If they do not respond to that need, they lose," said Cassella. "Machines are more flexible than ever thanks to the addition of more axes, more tool positions, more live tools, more peripherals, and quick-change tooling."

Generally speaking, users of Swiss turn machines are producing parts today that they would not have thought of machining only a few years ago. In the past the process was mostly turning with possibly a cross hole or a flat on some parts. Now this equipment can produce prismatic parts whereby the stock is rotated fractionally during the machining process.

For example, Tornos pioneered the thread whirling process for thread and gun drilling. Today it has become the norm that when machining a bone screw, the thread is whirled.

"People want to finish the parts on one machine," said Cassella.

It is this ability to finish a part completely on one machine that is helping to drive this industry—that and the grow-

ing need for smaller and smaller parts.

"Parts are getting smaller every day," he added. "Everything is reduced in size, especially in the medical and electronic industries. Companies that produce 'run-of-the-mill' work will find themselves competing on a global scale with other companies whose labor

might be cheaper."

Companies that can distinguish themselves in high-end work with very close tolerances and machine exotic materials can gain a competitive advantage.

Automation Systems

It's no secret that automation can help a manufacturer stay competitive.

"Automation helps a manufacturer run around the clock with a minimum of supervision," said Cassella. "Machines today are sold with automatic bar feeders so they can run unattended for long periods of time. Cutting tools can be checked in several different ways, such as with a broken tool detector, which is generally used to check for a broken drill."

Tools also can be checked by monitoring the load on the axes or vibrations, and components can be measured automatically with feedback to the machine for an automatic offset. ■

For more information, visit www.tornos.us.

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**Late Model CNC Broaches, CNC OD Grinders, Crank Shaft
 Milling Machines, Robots, Toolroom, Material Handling Vehicles**

- (20) CNC Masterless Cam Grinders: Toyota GCH32X63B (To 1995)
- (4) CNC Multi Wheel Crankshaft Grinders: Landis SFE; (4) Landis Spindle Transport Carts
- (4) Multi Wheel OD Cylindrical Crankshaft Grinders: Toyota 50MGWA-40X63 (1999); (3) Warner & Swasey 10X20 CM4
- (6) CNC Crankpin Grinders: Landis SFE Single Head
- (3) CNC Single Wheel Post Grinders: Landis 3SEH
- (3) CNC Angle Head OD Cylindrical Grinders: Toyota 32X63 (To 1995)
- (8) CNC Turn Broaches: Heiler DRZ-400/1 Dbl. End Opposed Horiz. (To 1995); (6) Kennametal/Hertel 27" Dia. Cutters; (23) Tool Carts
- (2) Horizontal Twin Disc Grinders: Besly DH6-30 Dbl. End Opposed
- (3) CNC 6 Axis Robots: (3) ABB (To 2003); (1) ASEA
- (14) CNC 3-Axis Servo Gantry Robots: (3) Bleichert & (1) ABB Dual Head Cam Roughing Line; (5) ASEA/Bleichert Toyota Cam Grinding Line; Landis SFE Line; (4) ABB Type IRB610 Dual Head (1996)
- In-Process Gauging & Inspection Equipment: Scherr Turmco 30" & Optical Gauging 14" Optical Comparators (1993); (2) Balance Engineering In-Line 10-Station CNC Crankshaft Balancers; Marposs Camshaft Final Inspection Machine; Adcole Vertical Shaft Inspection Machine; Inspection Air Gauge Crankshaft Gauge; (2) Adcole Stand-Alone & AST Roll-Scan Computerized Crankshaft Inspection Gauges
- Hot Run Engine Test Carousel: Pico 3.8L/4.2L V-6 "Off" Carousel Multi-Stand Rotary Engine Testing Station
- Toolroom Equipment: Summit 12" X 40" OD/ID Cylindrical Grinder; Okamoto 20" X 80", Jones & Shipman 6" X 16", Boyar Shultz & Acer Surface Grinders (To 1996); (4) Bridgeport Mills (1) CNC; (2) Engine Lathe; Barber Colman 16-16 Gear Hobber; (3) Dove Arbor Presses; More
- Cutter Grind Department: (2) Walter Christen CNC 5-Axis Tool Grinders; (2) Thompson 4EA Broach Grinders; (3) G&L Winslow Drill Point Grinders; Cincinnati Milacron, Seneca Falls & Devlieg Tool Grinders; Zoller Computer Controlled Tool Presetter (1996); More
- Personnel & Material Handling Vehicles: Broderson 8-1/2-Ton Hydraulic Deck Crane; Tennant LPG Rider Scrubber; (15) CWF Baker & Crown Walk-Behind Electric Forklifts; (23) Crown & Baker 6000-Lb. Elec. Pallet Trucks; (4) Cushman 3-Wheel Electric Personnel Carriers; Raymond 4000-Lb. Narrow Aisle Electric Forklift; Forklift Parts

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