

Watch for the Piranha

BY KIP HANSON

Quebec cutting tool manufacturer achieves new levels of precision and productivity

Most machinists don't give much thought to how their end mills and drills are made. As long as they provide reasonable tool life and can remove metal quickly and accurately, who cares what grit wheel was used, or what brand of software is needed to calculate the complex geometries applied to modern cutting tools?

It's a good thing, then, that Érick Péloquin cares. The president and owner of Optimum Canada, he's been concerned with designing and producing high quality carbide cutting tools since 1994. Together with his 32 employees, he supplies a broad assortment of high performance end mills and specialty cutters to the Canadian aerospace industry and its suppliers, as well as those in the medical and military markets.

A solid model

Most would agree that a successful business is a good problem to have, but too much success may lead to an inability to keep up with rising demand. This was the challenge faced by Péloquin and his team recently, leading them to invest in state-of-the-art grinding technology: a pair of Walter Helitronic Power five axis CNC tool and cutter grinders with robotic part handling and inline vision system, sold and supported by Machine Tool Systems.

They're not the company's first

THE PROBLEM

Increase grinding output while keeping labour and investment costs under control.

THE SOLUTION

Purchase a pair of automated CNC tool and cutter grinders equipped with vision inspection systems.



Robotic part loading and unloading allows unattended machine operation.

THE MACHINE: HELITRONIC POWER

Work Area (XYZ):	460 x 320 x 660 mm (18.1 x 12.6 x 26 in.)
Max. part diameter:	320 mm (12.6 in.)
Max. part length:	350 mm (13.78 in.)
Max. wheel diameter:	200 mm (7.9 in.)
Spindle rpm:	10500 std.
C-Axis Travel:	+/- 200°
Linear resolution:	0.0001 mm (0.0000039 in.)
Radial resolution:	0.0001°
Rapid traverse (XYZ):	15 m/min (590 ipm)

Walter CNC grinders, but rather their eleventh and twelfth such machines. The new Helitronic Power grinders are, however, Optimum's first foray into automation, a move that allows the company to run larger production batches and do so in an unattended manner. They're also in keeping with Péroquin's long-standing motto of keeping current with technology.

“The aeronautic industry is placing significant demands on machine shops. Advanced composites and geometries, and exceedingly hard materials with machinability rates in the low teens are becoming more common.”

“Since the beginning of Optimum Canada, the market, the processes, the quality expectations, as well as the production capacity have changed a lot,” he says. “We have been able to apply the necessary energy in order to follow the market, or even anticipate it, and have used this model to get to our

current level. This is the same model we will use as we enter the global marketplace.”

Engineered for performance

Optimum's product lineup is extensive. Its Piranha brand of end mills range from two flute to six flute square, ball nose and radius cutters, with a broad assortment of flute styles and lengths. Performance features of these tools include:

- Variable helix, variable flute geometries to help break up the harmonics that lead to chatter.
- A tapered core lends superior strength, assuring no deflection machining even during heavy cuts.
- Edge preparation eliminates the micro-cracking that can occur with carbide cutting tools.
- A double rake cutting angle improves chip flow, leading to greater metal removal.
- Nanocomposite PVD coatings extend tool life and increase lubricity, an important feature when machining nickel based and high temp superalloys.

The company also offers a variety of spot drills, burrs and double margin drills for composite cutting, and an assortment of specialty cutters. Says Péroquin, “combining expertise with innovation, our tools can tackle all types of materials, including steel, advanced materials such as super alloys, aluminum, wood and composites.”



The two newest machines are automated, but that doesn't eliminate Optimum's need for skilled machinists.



With tool geometries becoming ever more complex, the importance of grinding path simulation can't be overstated.

MACHINING | Grinding



Optimum Canda continues to expand. Érick Péloquin, the company's president, says his vision is to become the largest manufacturer of specialized cutting tools in North America.



It's not easy work. Manufacturing end mills requires that the operator understands the machine mechanics of five axis grinding using wheels of various geometries. The machine's onboard Tool Studio software helps with simulation of the grinding paths, but there are many factors that can affect the outcome of the manufacturing process, including grinding wheel wear, its diameter and shape, grit size, stiffness, and composition, as well as the geometry of the finished workpiece. The choice of workpiece material is also important, as carbide quality can vary greatly between suppliers.

Péloquin says the aeronautic industry is placing significant demands on machine shops. Aside from the arrival of advanced composite materials and part geometries that are becomingly quite difficult to produce, he's also seeing exceedingly tough and hard metals—in some cases, machinability ratings in the low teens are becoming common, an obstacle that calls for the very best in cutting tool technology.

“Optimum Canada continues to expand and evolve with the pace of technology,” Péloquin adds. “Our vision is to continually work in partnership with our major clients to save them money by leveraging our expertise, to be their centre of excellence in high performance cutting tools, and therefore to become the largest manufacturer of specialized cutting tools in North America.”

Moving forward

His plan is working. In October 2016, Optimum Canada won the Commitment to Innovation award at the Gilles Demers gala gathering of 250 aerospace SMEs in Quebec. “To our surprise, we have also been shortlisted for the



Probing systems from Renishaw pick up tool edges and check for wheel wear.



The Piranha line of high performance end mills is cutting deep inroads into the Quebec aerospace market.

evening's flagship award, the Aerospace SME of the Year," notes Péroquin.

Péroquin's desire to become one of the world's largest cutting tool manufacturers isn't some pie in the sky dream. He has recently developed and deployed a marketing strategy that he anticipates will allow the company to triple its current volume with exports to Mexico, France and the US by 2022.

That vision, if successful, will require eight additional fully automated CNC grinders, more staff, and a greater ability to cope with rising demand. "Through a partnership with the largest distributor of industrial machinery in Quebec, Pilot PB, we have already invaded and in some cases dominated the Quebec market," says Péroquin. "Internationally, we are working to implement our strategy. Preliminary talks are already underway with an on-site integration firm in Toulouse, France, and we have signed contracts with two distributors in two of the most popular aeronautical regions in Mexico, Monterrey and Queretaro."

Bold plans, to be sure, yet Péroquin recognizes the need for caution in a changing, oftentimes unpredictable market. "It is important for us to climb the ladder one step at a time," he notes. "We wish to avoid the adverse effects of too rapid growth, which would lead to a loss of customer confidence in our production capacity, as well as our consistently high quality levels. This confidence has ensured that Bombardier Aerospace, Pratt & Whitney Canada, GE Aviation, Rolls Royce, Héroux-Devtek, Sonaca, Mecachrome and L3-MAS trust us year after year, and we don't intend to lose it." SMT

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