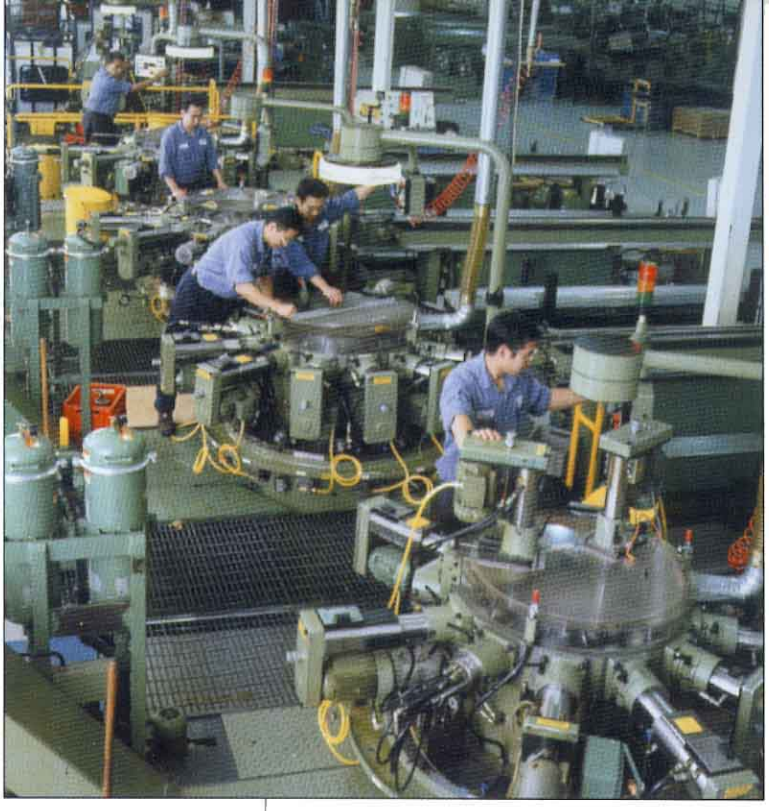


Advance Precision had seven Hydromats when it was spun off of General Kinetics in August 1999. Today, the company has 11, with two more on order. "We've doubled our machine capacity in about a year," says Ian Barrie, president.

# A technology road map

STAYING THE COURSE IN THE AUTOMOTIVE MARKET REQUIRES THAT SHOPS COMBINE UP-TO-DATE TECHNOLOGY WITH A SENSIBLE MANUFACTURING PLAN.

**By Patricia L. Smith**
*Managing editor*

To stay competitive in the automotive arena, suppliers need a strategy that gives them consistent, repeatable quality and lets them deliver on time, every time. In some cases, a shop can benefit just from the addition of new technology, but, according to Ian Barrie, president of Advance Precision of Toronto, this shouldn't be the only driver. Truly successful operations tie technology into an overall manufacturing/machining strategy that addresses goals, provides continuous improvement, results in growth, and just makes good sense.

"Early on, our parent company, General Kinetics, made the decision to go 100% automotive," says Barrie. The company, which was already machining automotive parts, recognized a potential for substantial growth, but it needed an advantage to succeed in a business that was heavily populated by established screw-machine houses. Its plan? To use precision rotary transfer machines.

Rotary machines provide a number of advantages over screw machines, reports Barrie, including consistent part quality. Most of the parts that Advance Precision makes are processed automatically, in bowl feeders or automated assembly systems. Thus, consistent part quality, batch to batch, is critical. "Our parts have to be exactly the same, every time, which lets our customers process parts without fear that an inconsistent part will shut down their automation."

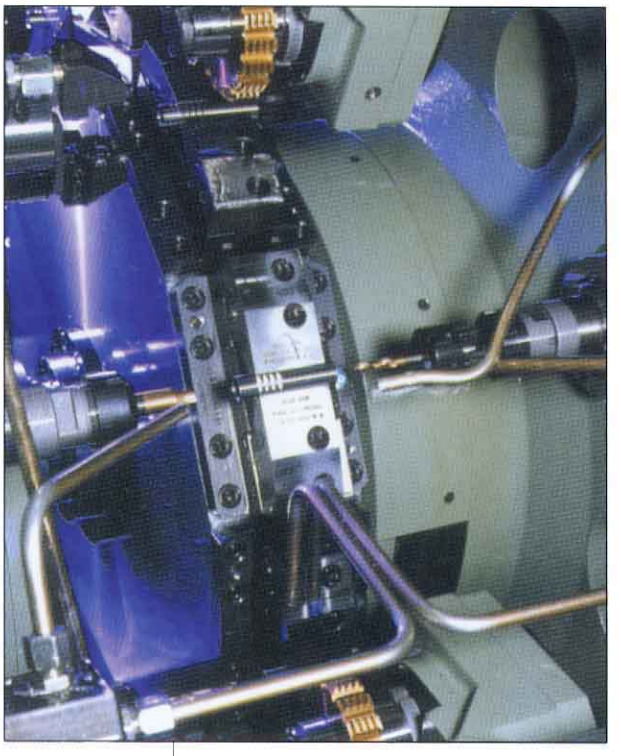
Another rotary-transfer edge relates to cost. In many cases, the rotary systems let Advance Precision produce parts at a lower cost. However, Barrie concedes he's really not competitive if a part can be screw machined complete in one operation. Rotary systems are best suited to parts requiring two or three secondary operations — even a single secondary operation.

"Parts that come off screw machines and need two, three, or four secondary operations, or are made by CNC or some other process, is where we're strong," he says. "Single fixturing gives us consistent repeatability. There's no refixturing or handling to throw parts out of tolerance. Further, the longest cycle time of a given single station becomes the net cycle time for the entire process, whereas in CNC the cycle time is an accumulation of every operation."

Barrie uses a 3½-in.-long part, requiring a through-hole, as an example. Drilling the hole in a single operation takes about 12 to 14 sec, while on the rotary-transfer machine, the hole is completed in four stations at a cycle time of about six seconds. This flexibility and repeatability also lets the shop machine a part a number of ways, selecting the sequences that deliver the best cycle time and the highest productivity.

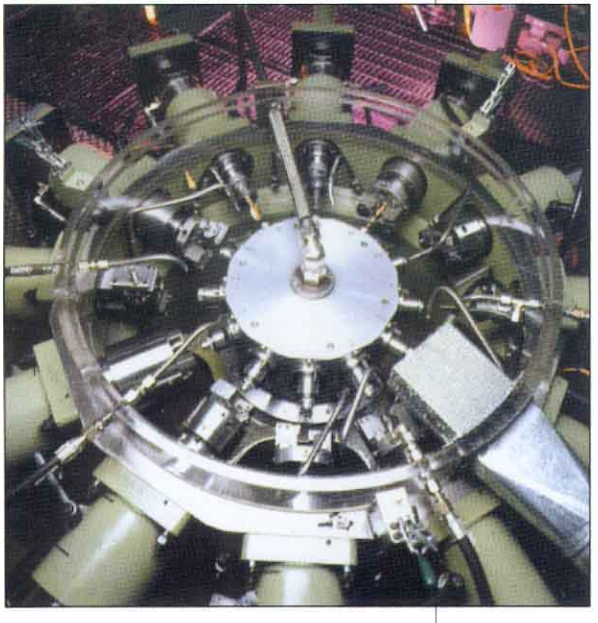
### Mapping out a strategy

Advance Precision runs three shifts, five days a week, making seat-belt and air-conditioning components. The company started with one rotary machine from Hydromat Inc., St. Louis. It now has nine HW 25/12s, two Trunnion V-12s, and one HB 32/45-16.



One of the parts Advance Precision makes is a seat-belt component that has critical tolerances. This part is run on a Hydromat V-12 Trunnion.

The company currently focuses on producing parts that fall within the scope of its manufacturing capability; however, it uses continuous-improvement practices to raise that capability to higher levels. As Barrie explains, instead of pushing the envelope, which would require constant rethinking, changing, and process reinvention, Advance Precision concentrates on increasing productivity, shortening cycle times, and reducing scrap and inventory levels.



Single fixturing gives Advance Precision consistent repeatability because there is no refixturing or handling to throw parts out of tolerance.

This technology is critical to Advance Precision's operations. "You can go into a typical machine shop and find 10 to 15 different types of machines, and none of them will be fully optimized," says Barrie. "In a growth market, you can't work that way and expect to succeed. We've focused on a single technology, and we don't see any advantage to bringing other variables into our manufacturing strategy. We intend to fully exploit the technology we have."

Jobs that fall within the company's comfort zone are primarily families of parts with high volumes that can be produced with the same machine units. Keeping these families on one machine minimizes downtime from machine changeover.

"We run 60% steel, 35% aluminum, and 5% brass," Barrie says. The steels are 12L14, 12L15, 1144 stress-proof, and 1144 fatigue-proof. Every part is of a different material, or at least a different diameter of the same material, each with its own special barstock.

Another example of the family approach is one part type made in two diameters, 17 mm and 19 mm. The company produces each in steel, aluminum, and brass; so, in effect, it makes six different parts. But this requires some degree of compromise. The high volumes are in the steel and aluminum, so rather than change tooling for the brass part, the company machines it with the same tooling as the two other materials.

"Employing an effective machining strategy means we can operate comfortably at around 85% efficiency," Barrie explains. The company measures efficiency by the number of good parts it makes during a 120-hr work week. For the most part, says Barrie, Advance Precision consistently runs 80% to 85%: "And we're really pouring the parts through — to the tune of 22 million to 24 million yearly. And that's on the rise."

### Supply-and-demand chain

One of the greatest challenges Advance Precision faces is balancing the forces of supply and demand. "We're near the end of the chain in terms of the build cycle," remarks Barrie, "and we get

sourced relatively late. As a consequence, our inventory fluctuations are quite steep. Some months our customers will think they've got plenty of parts, and they'll reduce orders. Then, they'll work a couple of days overtime and suddenly need more parts, right away. We're working on systems that will let us deal with these swings without having to rely on buffered inventories."

On the other hand, those that supply Barrie with raw materials — steel, aluminum, brass — create another balancing act. For example, certain steels may have a five to six-month delivery window, creating a problem trying to align raw material availability with anticipated customer demand. A similar situation exists in sourcing cutting tools. In this case, it's getting suppliers to deliver good perishable tools where they're needed, when they're needed. The operative word here is "good" in that the tools must be consistent. Putting inconsistent tools on a rotary transfer machine results in stopping and adjusting every time a tool is changed, which, in turn, leads to unnecessary downtime.

"We're trying to address these issues by consolidating purchasing to single-source providers," Barrie says. "We're hoping to build enough muscle to make our suppliers sit up and take notice and perhaps address our needs differently. Our customers expect us to deliver quality at a fair price and on time. They don't want to carry our inventory, nor do we wish to carry more supplier inventory than we need."

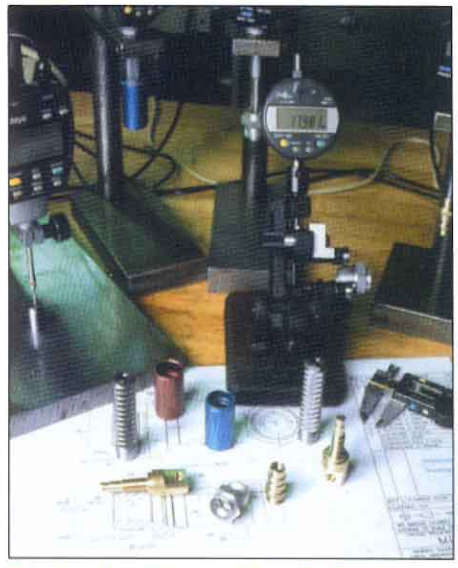
A close-up view shows some of the automotive parts that Advance Precision produces on its Hydromat rotary systems.

### The quality issue

"The automotive industry preached *quality, quality, quality* for 30 years," Barrie says, "while the subtext was actually *price, price, price.* Today, I feel much of that has changed — not that price and delivery aren't mandated. They are. But the industry has learned that quality does save money, internally and in warranty costs. It's worth something, and now the industry won't pay for anything less than consistent, reliable quality."

When Advance Precision was part of General Kinetics, it maintained quality at the military, or MIL Spec, level. Today, the company is even more stringent, because, as Barrie explains, when a shop cranks out parts at four or five a second, it doesn't want to make them wrong for too long.

"We have a quality assurance group that sets our control plans," Barrie says, "but our operators and production people carry out those plans. We use a sophisticated Altegra SPC system that works with the machine control."



Advance Precision machines steel, aluminum, and brass parts. Every part is of a different material, or at least a different diameter of the same material, so each has its own special barstock.

Each part number, with tolerances, dimensions, materials, and tools, is in the computer. When an operator checks a part, the gage he uses is connected to the computer, and the data taken from the measurement is automatically downloaded and analyzed. The computer then prompts the operator and signals him if the process is in control, is drifting, or if a tool is wearing or needs to be changed.

"The system does what an operator would do in analyzing SPC charts," Barrie says. "To give you an idea how sensitive the system is, when we do change a tool and then gage the first part, the computer will say, 'Stop running. The process has changed.' We then have to override the system and tell it that we've changed a tool. Then, and only then, will we be able to proceed." ●