

## MAZAK HELPS A SUCCESSFUL JOB SHOP SURVIVE TOUGHENING AEROSPACE DEMANDS



*View of the Mazak Vortex 1400 5-axis, dual-pallet VMC being set up.*

*Left: Hansen Engineering president Jody Lay, right, and Mark Richards, CNC programming manager, discuss production requirements for a Boeing 777 stretch-formed ring (shown) machined on the Mazak Vortex 1400 (in background).*

Aerospace has made dramatic transformations to keep competitive, and they've passed these wrenching changes on to their contract machining suppliers. As Jody Lay, president and CEO of Hansen Engineering Company notes, "Customers say to us 'change with us or you're out.' We've changed and we're in."

It has been a struggle for the company to adapt, but one way they've done it is with Mazak machine tools.

"Certainly survival of the fittest describes what has been happening in the aerospace industry," says Lay. "In nature when the environment changes, species members change with it, or they die out. It's the same in business and especially in the aerospace industry. During the past ten or twelve years, the changes in the aerospace business environment have been drastic, with the result that a lot of companies originally serving the industry no longer exist."

### Toughening Survival Requirements

Hansen Engineering of Harbor City, CA was founded in 1962 as an aerospace job shop. Lay's father became a partner early on. Jody Lay joined the company in 1978 and is now majority stockholder. His father and two brothers own the rest.

"In the good ol' days materials were more readily available," Lay recalls. "Plus, I don't think the pressure was quite as great as it is

now. My personal memory is that back then survival in the aerospace industry was easier."

So what happened to change the environment?

"In a nutshell? Competition," Lay says. "Where Boeing and other American companies previously had virtual monopolies in the industry, today there is Airbus and other European competitors. To survive, Boeing and the others have had to evolve. They've had to tighten the rules governing the way they play the game. And, of course, they have passed those rules down the line to their first and second tier suppliers. Their message has been plain. Change with us or you're out. We've changed and we're in."

But what are the new aerospace rules?

"They're really pretty simple," says Lay. "The primes want out of the machining business altogether. They want their suppliers to provide bigger, more complex monolithic parts, because they want to slash assembly costs. They want higher precision, smoother finishes, faster deliveries and, of course, constantly reducing prices. If you can meet those demands, play by those rules, you can stay in the aerospace game. Otherwise you'd be better off to find another game.

"Just like everyone else in the industry, we've been on a roller coaster ride," he says. "Our sales peaked at one point at nearly \$22 million. In 2004 I wasn't sure we would make

it. Today, we're doing great. At present we have 54 employees working in a 39,000 square-foot facility producing medium-sized aluminum and titanium parts mostly for Tier 1 subcontractors. We've survived the worst of the aerospace evolution, and right now we're looking forward to significant growth."



*Mazak Vortex 815 is set up to run a part at Hansen Engineering. The machine is a dual pallet system with a 5-axis, 50-hp, 10,000 rpm spindle. It is equipped with a 60-tool magazine and is operated by a Fanuc 15i controller. Work envelope is 120"x31.89"x24" XYZ.*

### Going Mazak

How has Hansen evolved to meet the new demands? He says, "You have to have the right equipment."

When Lay took over the reins at Hansen, he inherited a shop running Cincinnati mills and a lot of Mazak 3-axis vertical machining centers.

"We had been a Mazak shop for years," he

remarks, “and we’re still a Mazak shop. Mazak has always treated us very well. We’ve had good service from them when we needed it. Though truth is we really haven’t needed much help. The machines have been extremely reliable. Even the old ones still hold their tolerance.”

In those days, Hansen Engineering, like most other shops, had a one-man, one-machine approach.

“That was the nature of machining back then,” Lay explains. “But with the increased demand for higher productivity and lower prices, I knew we needed more advanced technology if we wanted to survive. So, about six years ago I bought a Mazak dual-pallet Vortex 815 5-axis vertical machining center. I liked what that machine did for us so much, that I bought another Mazak Vortex, this time a 1400. They’re both 50-hp, 10,000-rpm machines. The 815 has 120" by 31" by 24" X, Y, Z travel. The 1400 is bigger with 165" by 55" by 24" travel. Pallets are 60" by 160" on the 1400 and both machines have 60-tool magazines, which has been plenty for us so far. The main advantage of the pallet machines has been an increase in productivity and quality. We’re still operating these machines with the one-man, one-machine approach, but it’s amazing what those machines can do.”

### Palletized Productivity

Hansen uses the Mazak Vortex machines to produce large aluminum and titanium aircraft parts; things like struts, bulkheads, and structural members.

“I love those twin-pallet machines,” Lay says, “mainly because our productivity has just about doubled on every job we put on them. For instance, instead of running a part in an hour, they run in half an hour or 40 minutes. Or, say a job took 10 or 12 hours before, now it takes only five or six hours, and that’s just cycle time. Setups are something else altogether. If a part takes an hour to run on a non-palletized machine, you’ll be lucky to run five parts in ten hours, because of all the setup time. We’re lucky to get 50% run-time efficiency. With the palletized machines, though, while one pallet is running, the operator is loading the other one. That way we get a lot more spindle running time with an efficiency of 75% or more. That’s the real beauty of the pallet machines.”

Hansen runs two 12-hour shifts and produces a lot of parts on the Vortex machines.

### New Project, New Mazak

Hansen recently received a contract to produce a hefty batch of large titanium parts, including bulkheads for Boeing’s newest airplane, the 787 Dreamliner.

“We start with 300 pounds of titanium and cut them down to 70-pound monolithic structures,” he says. “This project will require us to take a different approach, because machining titanium is slower than aluminum.”

So far Hansen has not been able to use its Vortex machines to run lights out.

“That’s because our cycle times are too short,” he explains. “But titanium takes longer to run, so we’ve bought a Mazak Integrex 1060 V8-II e-machine with a 120-tool magazine and 12 pallets. It gives us powerful new capabilities, plus the ability to run lights out.”

“The e-machine is not cheap,” he adds, “but that’s because it’s virtually a complete manufacturing system all in one package. With the Integrex 1060 I’m getting a combination of information and manufacturing technology that’s kind of mind boggling. The 1060 is an advanced multi-tasking machine that will let us produce complete products in one set up, including turning, milling, boring, drilling, etc. We expect this machine to give us a big jump on the competition. We almost can’t wait until it gets here.”

### Wait and Hurry Up

Lay says that right now in the aerospace industry, delivery schedules are dictated by the availability of materials.

“Lead time for titanium right now is 100 weeks,” he says. “That’s if you buy in-

contract. We recently paid more than half a million dollars for titanium out of contract which normally would have cost only \$140,000 in contract. But our customer needed their parts, and they were willing to pay, so we bought the material and made the parts.”

With material lead times so far out, planning and the ability to produce parts quickly once the material arrives becomes critically important.

“It’s a matter of waiting for material, then hurrying up to produce the parts,” Lay says. “That’s why I’m happy that we’ve concentrated on having the most advanced technology available.”

Lay recently had proof that he’s doing things right.

“We’ve evolved with the industry, and we have more than survived. We’re winning. We recently were named a silver supplier to a Boeing company,” he says. “That means we had a quality acceptance rating of 99.8%. That’s what our Mazaks do for us. I love it.”

*Closeup view of a titanium structural part being machined on a Mazak Vortex 815 at Hansen Engineering.*



*Hansen Engineering considers itself a Mazak shop. Shown here are two Mazatech Ultra550 horizontal machining centers.*

*The company also operates a Mazak H-15, an H-800, both horizontals, an SV-25 and two V-655s.*

