

# Clear Cut

Alberta fabricator's investment in 90,000 psi high pressure waterjet system— a first in Western Canada—leads to "huge savings"

By Mary Scianna

When the plant management team at Alco Industrial Equipment in Edmonton, AB, sat down to discuss changes in its fabricating operation, it wanted to cut costs, improve product quality and deliver faster turn around for its customers.

It realized those goals and more when it purchased a MultiCam 6000 dual head waterjet cutting system equipped with a KMT 90,000 psi Pro pump last fall.

When the waterjet system was installed in January 2011, Alco became the first company in Western Canada to use a high speed waterjet cutting system.

"One of the key things we evaluated was what we were farming out to other job shops," says Rod Friesen, division manager for Alco. "We had substantial product going out to different waterjet companies. When we reviewed [the costs] we found we could acquire our own waterjet system for huge savings for our company."

Alco Industrial Equipment is part of 67-year-old privately owned Alco Inc. Group of Companies. The organization operates six service, repair and manufacturing facilities in Edmonton and Red Deer, AB, and services the oil and gas, mining and power plant industries. Combined, the facilities are a "one stop shop" for customers, offering engineering, CNC machining, welding, fabricating (waterjet and plasma cutting, rolling and forming), and manufacturing of driveline products and crane servicing.

The fabrication shop services external and internal (from Alco's other divisions) customers. Prior to the in-house waterjet cutting system, Alco was out-sourcing products developed by another company division that services the oil field industry— the "Smart Roughneck" systems. Designed in-house, these are hydraulic or fully automated PLC-driven systems that eliminate the dangers involved with workers on drilling platforms.

To produce these smart roughneck systems, Alco



Rod Friesen, Alco's division manager, says the new waterjet machine offers fast cutting speeds and reduced garnet consumption: "On half inch material we're running 1.6 in. of travel speed per minute and our garnet consumption is about 4.5 lb. per minute."

Industrial Equipment first used its plasma cutting machine for part of the process, then outsourced the remaining fabricating job to local waterjet companies. Bringing the waterjet process in-house not only cut the costs of outsourcing, it improved cut quality and turn around of finished products.

"Now that we have our own waterjet system, we're cutting product in a timely fashion," says Friesen. "We can get an order on our desk on Monday and we're delivering parts on Tuesday. With the other companies [outsourced waterjet cutting services], we were dealing with one and two week delays."

Approximately 95 per cent of the material cut on the waterjet system is mild steel ranging in thickness from one quarter inch up to four and a half inches thick.

Michael Schlamp, shop foreman is impressed with the waterjet system's user-friendliness and cutting performance.

"We're doing a lot of internal work with the waterjet table with mining and process piping. We are B31.3 ASME certified [for process piping design/engineering/welding] and ISO 9001-2008 certified. The KMT/MultiCam people came in to install the system [installation was completed in two weeks] and did quite a bit of training. It's a pretty easy system to work with; the nesting program for dual heads is easy to use. You just have to watch out for torch heights. The KMT pump is also easy to use. High pressure seals are quick to replace; it takes about 45 minutes to replace them, but it's been a while since we've done that."

On one particular job, cutting two-inch thick mild steel, Alco achieved tolerances within .006 in. "And there was no machining afterwards," says Schlamp. "We're getting work done quicker and we can get the quality that we want. We're doing a lot of work for our 50th Street location. They were falling behind because our competitors [outsourced waterjet cutting shops] couldn't meet the demands."

Cutting speed and reduced garnet abrasive consumption are two other pluses, adds Friesen.

"On half inch material we're running 1.6 in. of travel speed per minute and our garnet consumption is about 4.5 lb. per minute. We changed our garnet from 80 mesh to 50 mesh, so we're now travelling faster with higher volume of garnet and higher volume of water, about 25 per cent faster with the 50 mesh."

When Alco first began looking at the possibility of bringing waterjet cutting in-house, there were several specific criteria the new waterjet cutting system had to meet. It had to have the ability to cut multiples and thicknesses up to five in. mild steel. Alco wanted a system that required minimal maintenance and an environmentally friendly closed loop water and garnet cleaning system.

"Prior to the final selection of a waterjet cutting system, Alco reviewed three different waterjet manufacturers," recalls Friesen. "At the time, we were only considering the

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60,000 psi units. We requested information from each supplier and MultiCam/KMT were the first to provide the information package on the 90,000 psi unit."

MultiCam was also the first to visit Alco to discuss options, view the area where the waterjet would be installed "and review our parts to determine what unit would best suit our needs."

And while price and delivery also played a role in Alco's decision to go with the MultiCam/KMT waterjet system, Friesen says the supplier's commitment to service was key to the decision to invest close to \$500,000.



The MultiCam waterjet cutting system with KMT's 90,000 psi pump is helping Alco cut better quality materials at faster rates.



"We expect our ROI to be less than five years."

That's because now that the system is up and running and has proven to be a high performance cutting unit, Alco is starting to use the new equipment for outside customers.

"Our customers are asking us to provide quotes. The opportunity to provide our customers with yet another offering at a competitive price will certainly increase our sales," predicts Friesen. It also means the company can now become a one-stop shop for engineering, machining, metal fabricating and welding.

Byron Machado, KMT's area manager involved in the installation, says Alco chose to upgrade from the initial 60,000 psi waterjet system it was considering to the 90,000 psi because of the many competitive advantages it could provide the company with.

"Increased productivity (Alco was able to take a two shift operation down to one) and reduced cost per part. You are still selling the same widget for \$10 but you're cutting more widgets in the same hour for less money for each."

He adds that you use up to 40 to 50 per cent less abrasive per cut and there is no heat transfer to materials. With other technologies like plasma, oxyfuel and laser, heat is transferred to the part causing a change in the structural integrity of metals. And 90,000 psi reduces overall taper in a part when compared to 60,000 psi, explains Machado.

Asked if Alco is considering adding more waterjet equipment to its operation, Friesen says it's a little early to say for sure, but "given the opportunity, I'm sure our owner would consider a unit for our oil and gas division." **CM**

## PRODUCT REPORT

**Flow**

Flow International Corp. has released Dynamic Waterjet XD, fast and accurate bevelling for 3D and 2D waterjet cutting technology. Now the benefits of Dynamic Waterjet are available for complex multi-dimensional cutting.



By incorporating SmartStream technology, the Dynamic Waterjet mathematical models' cut speed is two to four times faster than conventional abrasive waterjets while producing parts with far higher precision.

The time to program and complete multi-

dimension parts has also been shortened. By developing FlowXpert software, parts are easily programmed with its intuitive, graphical user interface. "Having the Dynamic XD has really set us apart from other shops. We now have capabilities that nobody else has," says Josh Kubik, co-owner of Baytown Ace Machine Co. "There is a waterjet shop near here that we had used ...but what took them 1 hour and 45 minutes just takes us 45 minutes."

[www.FlowWaterjet.com](http://www.FlowWaterjet.com)

**Jet Edge**

Capable of producing complex parts out of virtually any material, the Jet Edge Mid Rail Gantry waterjet cutting machine features an exposed tank that accommodates overhead loading. It comes standard with one abrasive jet cutting head and a second cutting head can be added to increase productivity. Optional mirroring capabilities make it possible to cut part cycle time in half.

The Mid Rail Gantry is ball-screw driven

for higher accuracy. Its sturdy heavy-wall tubular steel construction eliminates vibration and increases longevity. The machine uses an industrial PC controller and can be configured so that all three axes are fully programmable (Z optional). It also features



direct-couple AC brushless digital servo motors and single or double carriages. Critical bearing components are protected with heavy metal covers with brush seals and positive air pressure. The waterjet machine is available in several sizes:

- 5 ft x 5 ft (1.5 m x 1.5 m)
- 5 ft x 13 ft (1.5 m x 3.9 m)
- 8 ft x 5 ft (2.4 m x 1.5 m)
- 8 ft x 13 ft (2.4 m x 3.9 m)
- 13 ft x 13 ft (3.9 m x 3.9 m)
- 21 ft x 5 ft (6.4 m x 1.5 m)
- 21 ft x 13 ft (6.4 m x 3.9 m)
- 24 ft x 13 ft (7.3 m x 3.9 m)

[www.jetedge.com](http://www.jetedge.com)

**Mitsubishi**

The new Suprema DX612 waterjet cutting machine from Mitsubishi is now constructed with an independent frame/tank design which separates the machine frame, ways and drive system from the work tank so machining accuracy is not affected by large or heavy workpieces. The four-sided stainless steel construction of the work tank with a full 10 mm thick steel bottom provides years of low maintenance service, claims the company.

The gantry style movement system travels the extra rigid box constructed X axis bridge on a set of LM guides driven by dual Mitsubishi Brushless AC servo motors and high-pitch 40 mm double anchored ball screws for unmatched positioning accuracy. A 20 in. "I" beam construction provides frame stability with a machined top surface that mounts the LM guides for the X axis bridge. High speed rapid positioning of up to 787 ipm, made possible through the low backlash planetary gearbox, reduces positioning time between cutting profiles.

Laser compensation of all machine axes

provides a high degree of positioning accuracy. Machine accuracy with compensation is within  $\pm 0.002$  in. per 36 in. length.



An auto-lubrication system provides automatic way and ball screw greasing/self cleaning that takes the hand work out of machine lubrication. Table slat registration rails can be adjusted to provide a flat mounting surface for the galvanized table slats, providing a flat working surface.

Dual layer protection ensures proper focus tube height and collision detection. A programmable touch probe checks workpiece height in several different modes, from manual to continuous,

maintaining the proper focus tube to workpiece distance. The collision detection ring stops all machine movement in X, Y, and Z, should a collision occur preventing any damage.

Four axis intelligent taper control (ITC) provides full 360° taper control by adding a one or two degree mechanical tilt to the cutting head, compensating for the jet getting wider as it exits the focus tube. This provides improved part wall straightness of  $\pm 0.001$ " per 1/2" of workpiece thickness. The software automatically generates the ITC program by just one click.

The machine is equipped with a KMT high pressure intensifier pump, the S-50, a 50 hp pump providing 60,000 psi of water traveling up to MACH 2 with 1.09 gpm of water consumption through a maximum orifice size of 0.013 in.

An abrasive removal system uses a 300 gpm water circulating system in the work tank that suspends the exhausted abrasive and pumping it through a cyclone system that separates the water

and returns it to the tank. The used abrasive is collected in a filter bag lined hopper for easy disposal.

[www.mitsubishi-world.com](http://www.mitsubishi-world.com)

#### MultiCam

The MultiCam 3000 series waterjet cutting systems features a user friendly interface and a KMT Intensifier pump. The machines are affordable, easy-to-use, production cutting solutions for manufacturers that



want the ability to cut a wide variety of materials. The use of high pressure waterjet machining also offers unique

## PRODUCT REPORT

advantages over other cutting technologies allowing the user to cut highly accurate parts with excellent finish and no heat affected edge.

All 3000 series waterjet machining systems are manufactured using high tolerance, large scale CNC metalworking machines and are verified with certified laser calibration equipment.

[www.multicam.com](http://www.multicam.com)

**OMAX**

OMAX Corp.'s new EnduroMax direct drive waterjet pump provides double the operating life of previous pumps, says the company, and allows faster part processing, lower operating costs and easier maintenance.

The new pump maximizes machine uptime with its 1,000-hour operating range between required pump rebuilds when run at 55,000 psi (3,800 bar). However, the new pump can also run continuously at 60,000 psi (4,100 bar). OMAX achieved increased pump operating life by significantly upgrading the design of the seals in the EnduroMax. Seals are the elements of a pump that wear out the quickest, forcing shops to rebuild pumps more frequently. By improving the design of the seals, the pump's operating life increases and maintenance time is reduced.



OMAX built the EnduroMax pump to run much more efficiently as compared with intensifier pump designs. The pump operates at 85 per cent efficiency, as opposed to the 60 to 70 per cent range of intensifier pumps. The pump also delivers more horsepower to the nozzle, while using less electricity than intensifier pumps.

The combination of 60,000 psi operation and 85 per cent efficiency allows OMAX machines using the new pump to process parts faster. All models deliver 60,000 psi and are offered in various horsepower ratings. The available models are the 3060 (30 hp), 4060 (40 hp), and 5060 (50 hp).

[www.omas.com](http://www.omas.com)

