

# Streamlining Waterjet Efficiencies



Constantly evolving technologies give operators more control of their waterjet processes

BY NOELLE STAPINSKY



OMAX's Intelli-Max is a complete software package for waterjet cutting that incorporates a series of functions to monitor and control cutting processes and help improve production efficiencies.

In the motorsport world, it's not the fastest driver, but the best driver that's going to win the race. And this concept lends itself well to waterjet cutting processes—knowing when to cut faster on those commonline straight edges and how to dial the speed back a few notches to get those smooth corners or beveled edges.

Waterjet cutting technology has certainly been around for a long time and employed in many fabrication shops because of its extreme flexibility and capabilities for handling a large variety of material types and thicknesses. But it also had a reputation for being noisy, dirty and costly.

Some shops are using underwater cutting techniques to reduce noise, potential rust and contamination

around the workplace area. However the true progress and innovation for increased efficiencies is in the software that's driving these machines.

## AUTOMATION THAT CLICKS

“It all starts with the software, believe it or not,” says Stephen Bruner, VP of marketing for OMAX. “The software can make a big difference in waterjet cutting because it effectively can reduce or eliminate the time it takes to program parts or tooling. That's really the key to efficiency on the front end.”

Deron Roberts, service and parts director for Jet Edge Waterjet Systems, agrees. “The software has become much more user friendly. Automated features give operators the ability to import parts and automate nesting.

Additionally, with material tracking, you can choose a sheet and nest several of one part or multiple parts of different shapes, and save any remnants of that sheet to use later, reducing material waste.”

Advancements in waterjet software also optimize the speed of cutting. “As parts become more intricate and require more turns or convoluted shapes, the software has evolved to the point that it will slowdown to address those requirements on the corners and speed up when there's an opportunity for a straight line cut,” says John Caron, waterjet marketing manager for Hypertherm.

For fabricators and job shops that deal with multiple CAD files from customers, converting those

files to something that the waterjet software can read is often a timely and expensive process. A file filter can be applied to quickly convert files or drawings to the waterjet's specifications. OMAX's Intelli-Max software eliminates the need to purchase file filters, says Bruner.

"OMAX software supports over 90 CAD and image file types that can be imported directly into our Layout software, which is our CAD and tool path program.

Intelli-Max, OMAX's complete software package, includes programs such as Layout, Make and Intelli-Visor. "You can import a file and Layout is responsible for taking that image or drawing and converting that into a tool path," says Bruner. "Make actually controls the machine, telling it where to go by combining the tool path instructions from Layout with an algorithm that uses data like material and thicknesses. And it automatically determines the most efficient and fastest way to cut the part."

Some shops have unique processes that require multi-head waterjet cutting. "With multi-head cutting and software, you have the ability to control more heads, and control the spacing dynamically between the heads," says Roberts. "As you're cutting that nest, you can actually change the distance between the cutting heads. This feature allows you to have fewer set up interruptions. Ideally you want to nest multiple parts and multiple customer orders to decrease material handling and increase productivity. Multi-head cutting can give you a competitive advantage with waterjet.

"Even against a plasma or laser ... because we can put multiple waterjet

heads on, it can double, triple or quadruple production cycle time. Adding a five cutting head provides even more possibilities; we can actually cut a hole and do a top and bottom bevel all at the same time. We're able to do that all in one setup once the material is on the bed," says Roberts.



Jet Edge has a CAM software package offered on a floating network license to give fabricators the opportunity to use it in multiple locations in a facility.

Jet Edge Waterjet Systems' CAD/CAM software package is offered on a floating network license so it can be used at multiple locations in a facility.

### SMOOTH OPERATION

Like any machine, preventative maintenance is key in avoiding any costly repairs or unnecessary downtime. The break/fix mentality is rapidly being recognized as more costly than adhering to a predictive maintenance schedule. And the industry is addressing this issue with increased visibility and improvements in component parts.

Software also plays an integral

roll in monitoring your waterjet's components and seal life. OMAX's Intelli-Visor uses built-in sensors to provide machine and accessory status as well as predictive maintenance programs that help increase efficiency and decrease downtime.

And Jet Edge's Roberts points out that the quality of components used for waterjet cutting systems have improved. "The accuracy of maintaining a stream and the longevity of those components has been greatly improved, so you have less change in your kerf as you're cutting and less adjustments. And you can set up your control system to compensate as the kerf grows."

### THE CONSUMABLES

In the past, water handling was a big issue. But that has since been addressed with closed loop water recycling technology such as Hypertherm's Accustream, a reverse osmosis system that lowers operating costs by purifying and reusing water and aiding with water quality issues.

But what is top of mind today, in terms of consumables, are supply issues with the primary abrasives customers are using. For abrasive waterjet cutting, there are basically two types of garnet that are most commonly used: alluvial, which is similar to beach sand; and hard rock that's actually crushed garnet. "The hard rock is going to be more aggressive and allow you to cut faster and give you less taper versus an alluvial," says Roberts. "But there's a cost difference associated."

Understanding what you're cutting and what abrasive is best, is key. For instance, if you're cutting a thinner material, you will get a better edge finish and better value with alluvial for

how much that garnet costs. And hard rock will give a better edge finish on thicker materials.

“As a part of the software, you can customize the database and have the ability to change the amount of abrasive used,” says Roberts. “The software has several different materials, all the variables and your nozzle sizes. As you start cutting something, you can adjust those variables and save that data for the future.”

To save money with waterjet cutting, Roberts advises, “to fine tune the process to make sure you’re using the correct orifice nozzle and abrasive combination for the material you’re cutting. A lot of people don’t. They try to use the same set up for multiple different materials. You can do that, but sometimes you’re better off to switch your abrasive levels to save money that way.”

Another operating cost is in the disposal of the spent garnet. The traditional methods of manually shoveling it out or hiring a third party to remove it from the tank, means downtime for that cutting system.

“We offer a solids removal system that operates at the bottom of the tank, which is controlled by the software,” says Bruner. “It pulls the spent garnet off the bottom and bags it for disposal. This system virtually eliminates machine downtime associated with other removal methods. Many customers and prospects ask about recycling garnet. It’s possible but isn’t the right solution for many customers.

We’re often asked what to do with spent garnet. One of our suggestion is talking to local construction supply companies to see if there’s an opportunity to offset your disposal costs by selling the used abrasive.”

Hypertherm has developed EcoSift, a system that captures, recycles and reuses spent abrasive. “One of the things we’re seeing more requests on and what we’re trying to address with this new product is the ability to

on what their cutting pressure is, about half of their garnet can be reused when you consider the fact that recycled abrasive can itself be recycled...and so on,” says Caron. “One of the striking things that we discovered is that the recycled garnet cuts every bit as effective as the virgin material. The virgin garnet is typically more rounded in nature but when you run it through the cutting head it breaks down. While the used garnet particles might be a bit smaller, they’re sharper because they’ve been fractured. We find that customers using recycled abrasive will find their cutting quality and speed are essentially the same.”

For fabricators with existing waterjet systems, many of these software packages are compatible with legacy machines. For newcomers to the market, the first thing suppliers will ask is what kind of material and thicknesses will you be cutting? Will you be using it for R&D or is it for a 24/7 production? This will help

determine the right waterjet table and pump that will meet your needs. But above all, the software that will drive it is a critical consideration. Bruner says, “if you don’t have a good software package you’re going to struggle. It’s the one element that is going to make a difference in quality and efficiency.” SMT



Hypertherm's EcoSift captures, recycles and reuses spent abrasive.

recycle the abrasive,” says Caron.

With the EcoSift, if a fabricator is running one hundred pounds of abrasive through the machine, for example, about 30 to 35 per cent of that is recovered. It uses a diaphragm pump to remove the used garnet from the table, heats up the spent garnet to segregate any particles that are too small to reuse and filters them away. The reusable particles are separated into a sack that can be fed back into the front end of the waterjet system.

“That recovered garnet gets mixed in with the virgin material. Depending

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