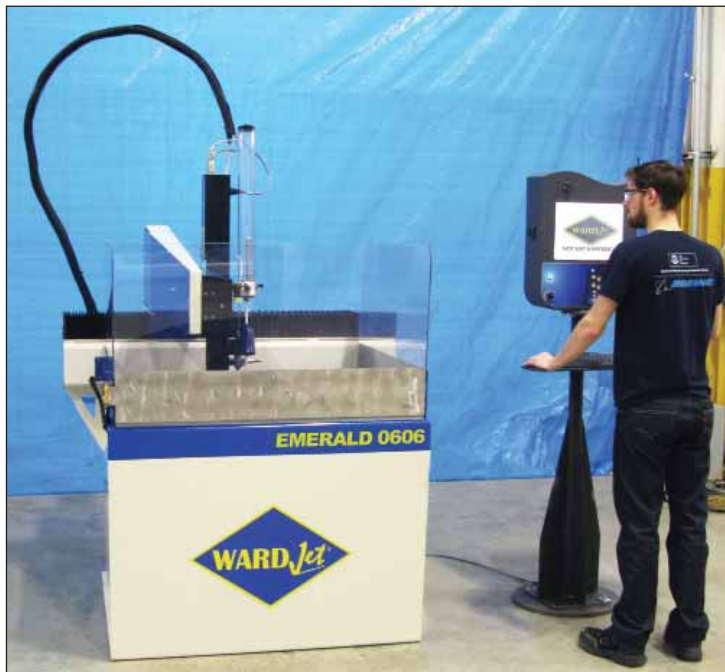


## New Small Scale Waterjet Systems



**Emerald 0606 from WardJet.**  
See article on page 2.



**Farm-Jet® from Jet Edge.**  
See article on page 2.

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## WARDJet Announces Addition of Two New Waterjets to Their Emerald Series

By: Jeff Day, WARDJet Sales Manager

With the demand for compact, high-quality waterjets increasing, WARDJet has added two more systems to their Emerald Series of waterjets - the Emerald 0606 (2' x 2') and the Emerald 0612 (2' x 4') to the waterjet industry. Featuring a smaller footprint than the current Emerald 1515 (5' x 5') or 1530 (5' x 10'), these two new systems offer simple, dependable waterjet cutting for a variety of applications.

The smallest waterjet ever manufactured by WARDJet, the Emerald 0606 was designed to offer all the quality of a large, expensive waterjet cutting system at a reduced size and cost. Everything about the Emerald 0606 was intentionally over-engineered and beefed up to provide customers with the most dependable small-scale machine on the market. "Despite its small size, the design principles utilized on our Z-Series and R-Series tanks are carried over to the Emerald 0606," explains mechanical engineer Jason Stuffel. "The same gauge of steel plate is used to construct the tank walls, and the structural members, which provide reinforcement for our Job Shop Grates, are identical to our larger machines." Because of its rigid, sturdy tank design, the Emerald 0606 is capable of handling 12" thick stainless steel just as easily as a 2" sheet of foam.

The Emerald 0606 is part of the "Green Line" of waterjets offered at WARDJet - named for their affordability despite their high quality design and fabrication. Mirroring the small-scale of the previous Emerald models, the Emerald 0606 offers a cutting envelope of 2' by 2' and 12" of Z-travel.

Emerald 0606 waterjets are unique because they are designed with ballscrew drives, but a cantilever-style arm. In order to keep the footprint small but the cutting envelope as large as possible, the Emerald 0606 waterjets were not able to reflect the exact design of the other Emerald waterjets. Stuffel adds "by designing around a short-travel, cantilever architecture, we are able to effectively balance minimizing machine footprint and number of moving parts, while maximizing cutting envelope and

(continued on page 10)



## Jet Edge Introduces Waterjet Cutting System Designed and Priced for Farm Machine Shops

Jet Edge, Inc. is introducing the FARM-JET® waterjet cutting system, a 55,000 psi waterjet cutting system designed and priced especially for the farm machine shop.

FARM-JET brings the power and versatility of ultra-high pressure waterjet cutting technology to farm machine shops for the price of a new fully loaded 1 ton 4X4 pickup truck, without requiring special electrical service.

The FARM-JET system includes a 40" x 40" (1 m x 1m) waterjet cutting table and a Jet Edge Eco-Jet PTO direct drive waterjet pump that utilizes a tractor's PTO shaft to produce 1 gpm of 55,000 psi water. The system includes one abrasivejet cutting head and a motorized Z axis with 5 inches (130 mm) of travel.



The FARM-JET system is controlled with a Windows® PC (sold separately) and uses a FlashCut Pro-Series Stepper Controller and FlashCut CNC software. It also includes IGEMS path generation software and a hand-held controller pendant for operator convenience. FARM-JET is available for 540 RPM and 1000 RPM PTO shafts and Category 1 and 2 three point hitches (tractor sold separately). It requires a 115 V 60 Hz or 230 V 50 Hz power source, fresh water source and a suitable tractor.

"The FARM-JET is the first waterjet cutting system that is designed and priced for the farm shop," said Jude Lague, Jet Edge president. "Until now, if you wanted a waterjet, it meant a six-figure investment and access to 460 volt power. Now you can own a waterjet for the price of a new truck and you can run it off standard household electric and your tractor PTO. With a waterjet system, you can create a nice source of additional revenue, and if you need a part fast, you can cut it in minutes instead of waiting for days or weeks to have it fabricated and shipped. You also can have some fun with it cutting custom tile inlays for your house or racecar parts for your dirt track team."

(continued on page 17)



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## Richard Newton Passes Away

**R**ichard J. Newton, 54, of Abbotsford, British Columbia, passed away on October 23, 2013, following a long battle with cancer. Mr. Newton was president of Newton & Associates Health and Safety Consultants in British Columbia. Mr. Newton was a WJTA-IMCA member, and he served on the WJTA-IMCA Safety Committees for Waterjet and Industrial Vacuum Equipment.

Mr. Newton is survived by his parents Dick and Jo Newton, his sister Patricia, his wife Deanna and their children Amber and Andrew.

Our condolences to Mr. Newton's family and friends.

Donations in memory of Richard Newton may be made to Special Olympics BC, #210-3701 East Hastings Street, Burnaby, BC V5C 2H6, email: [info@specialolympics.bc.ca](mailto:info@specialolympics.bc.ca), website: [www.specialolympics.bc.ca](http://www.specialolympics.bc.ca), or to the BC Cancer Foundation, 150 – 686 West Broadway, Vancouver, BC V5Z 1G1, email: [bccinfo@bccancer.bc.ca](mailto:bccinfo@bccancer.bc.ca), website: [www.bccancerfoundation.com](http://www.bccancerfoundation.com).

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## High Pressure Hydroblasting Hose Failure and Life Cycle Analysis

By: Rick Pitman, EHST Vice President, PSC Industrial Services

**H**igh Pressure Hydroblast supply hose serves a vital function in any Hydroblasting job regardless of the application. Whether automated or manual tools are used, all personnel levels, from job designers to workers, depend on the hose to consistently and safely deliver water from the pump to the tooling application. Hoses are expected to do this while performing under harsh environments and harsh treatment by workers. In spite of their critical role there is little or no published scientific data on life expectancy, in-field failure causes or methods to protect hose integrity.

### History

Hydroblast supply hoses have traditionally been treated as a consumable item. Standard practice has been to run them until failure or near failure (in which case the reinforced steel braids are visible and broken) and then replace with a new hose. Systems for tracking the hose history from manufacture to disposal, as well as life cycles for performance, were non-existent. Anecdotal evidence revealed that everyone seems to know someone who has experienced a hose failure yet because most failures did not result in significant injuries they were not treated as a serious near loss. When significant injuries did occur they were not shared with the industrial community. This changed in September 2011 when PSC decided to share the

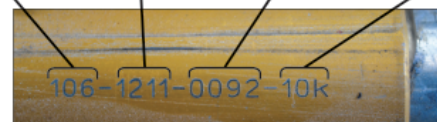
results from a fatality associated with a hose failure as well as the lack of scientific industry knowledge regarding hose performance.

PSC commissioned a first of its kind study of High Pressure Hydroblast supply hose performance in November 2011. Supply Hose is usually purchased as an independent item and – with larger companies – usually from multiple suppliers. Taking a population of 868 hoses, which were fabricated between November and December of 2011, PSC tracked the performance of each hose in order to obtain quantifiable data regarding hose performance. For control PSC chose a single distributor – GHX – for all hose purchasing and managing. Certain safety and quality control upgrades were put into place beforehand that would make the PSC hose population unique for the Hydroblast industry including but not limited to:

- Independent serial numbers for accurate hose tracking
- Installing abrasive covers for all hose types from 10K to 40K psi
- Removing hoses from the field once braids become visible
- Requiring an independent review of each hose annually to insure objectivity.

### High Pressure Hose Identification

PSC Location	Manufacture Date	Asset Number	Pressure Rating
106	1211	0092	10k



**Independent Serial Number System  
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(continued on page 12)

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## 5-Axis Programming for Waterjet Cutting

By: Alison Kulick, Marketing Specialist, WARDJet

**5**-Axis cutting is a relatively new advancement for those using waterjet technology. Although it opens up a lot of possibilities for waterjet owners, programming for 5-axis is much different than programming for 2- or 3-axis.

When cutting 5-axis, waterjet operators have to consider a number of different variables before they begin programming. For instance, the operator must review which direction to cut the part and in which order to make sure that the part can be removed from the excess material. The operator must also determine if there are any issues with alignment or fixturing since 5-axis parts often have multiple contoured surfaces. Cutting 5-axis parts also causes waterjet grates to wear through much quicker and may require custom jigs to be constructed to hold material level.

Before you get started cutting 5-axis, it is helpful to have some basic 2D cutting under your belt to help you understand the properties of waterjet cutting. You will also need access to a quality 5-axis capable waterjet. WARDJet recommends using a 5-axis cutting head with a height/crash sensor so that the cutting head is always the appropriate distance from the material being cut. Finally, you will need access to the correct post processor for your CAM software so that a CNC file can be created for your controller.

Once you are ready to begin programming a 5-axis part, start by identifying what type of angle you need – will the part have a variable angle or constant angle? A variable angle changes as the cut progresses whereas a constant angle or a fixed degree bevel is the same throughout the entire cut. Select what type of CAM software you're going to use based on the software's capabilities (see chart above). Remember, not all types of CAD/CAM software are capable of

**CAD/CAM Software Comparison**

	WARDJCAM	IGEMS	MASTERCAM	ROBOTMASTER
2D cutting	X	X	X	X
2D + bevel cut	X	X	X	X
2D + rotary	X	X	X	X
2D + fixed bevel		X	X	X
2D + transitioning bevels		X	X	X
3D + rotary		X	X	X
3D + transitioning bevels			X	X
6-axis + rotary				X

creating the same cuts. Next, program the part accordingly and check what

you are expecting to cut against the 3D mock up in the software.

(continued on page 23)

## Waterjet Holding, Inc. Completes Acquisition of Flow


**W**aterjet Holdings, Inc., an entity affiliated with American Industrial Partners (AIP), completed the acquisition of Flow International Corporation on January 31, 2014. The investment in Flow was made out of American Industrial Partners Capital Fund V, LP a \$717.5 million fund that closed in December 2011. Under the terms of the merger agreement, Waterjet Holdings, Inc. acquired all of the outstanding shares of Flow common stock for \$4.05 per share in cash. Terms of the acquisition were first announced on September 25, 2013.

The completion of this acquisition follows the approval of Flow shareholders at a special meeting held on December 20, 2013, as well as all necessary regulatory approvals and other customary closing conditions. Shares of Flow stock were expected to cease trading by the close of business January 31, 2014.

"AIP is very excited to partner with Flow's management team and

help continue to grow the Company. Flow's market leading products, sizeable aftermarket sales, global presence, and favorable end market dynamics result in a unique opportunity to continue to grow the use of waterjet cutting to the benefit of an expanding universe of Flow customers," says Eric Baroyan of AIP.

"We look forward to continuing to advance the technology of waterjet cutting and expanding into high volume manufacturing applications for this exciting and rapidly evolving cutting method and are extremely pleased to be partnering with the American Industrial Partners team," says David Savage, CEO of Waterjet Holdings, Inc. "We intend to further invest in our business and build on our long-standing customer relationships and market leading products to further grow the share of waterjet cutting within the broader machine tool cutting industry."



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- Articles specific to any specialty area
- Career and student focused features

*Jet News* also welcomes letters to the editor and guest editorials.

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## WARDJet Announces Addition of Two New Waterjets to Their Emerald Series, from page 2

maintaining overall stiffness.” Despite the minor difference in design, the Emerald 0606 offers the same accuracy and dependability of all “Green Line” waterjets.

Although the Emerald 0606 is small enough to fit in a corner of your workshop, customers will not miss out on any of the features of the large waterjets that take up an entire room. “The electronic hardware of the motion system, the machine controller, and software used to drive the Emerald 0606 are identical to what is provided on our much larger systems” remarks Stuffel. “Also, the same technical support, CAD/CAM, productivity tools, and other software features are available on every system we make, regardless of machine size.” Support from WARDJet technicians is even

available remotely, directly to your controller when you need it. WARDJet is dedicated to producing high quality waterjets, no matter what the footprint.

The Emerald 0612 offers double the cutting envelope – 2' by 4' – but offers similar features. The cantilever-style arm is ballscrew driven, the tank is beefed up to offer extra support, and the overall footprint is small. However, the Emerald 0612 does offer the advantage of indexing sheets of unlimited length from front to back. As a result, standard 4' by 8' sheets of material up to 2" thick can be cut with greater convenience. Stuffel explains the concept behind the Emerald 0612, saying “while the Emerald 0606 was designed around being the smallest system possible, the Emerald 0612 is

intended to yield the smallest footprint with the greatest amount of flexibility. The ability to feed sheet under the fixed axis of the cantilever, allows for a much broader range of material sizes to be cut, despite the machine’s small size.” Easy to use controller and software for the Emerald 0612 are the same as other larger waterjet cutting systems and customers can expect the same outstanding service and support from the WARDJet team.

The Emerald 0606 and 0612 provide ideal waterjet solutions for hobbyists, small job shops, and universities.

Contact WARDJet sales at 330-677-9100 or [sales@wardjet.com](mailto:sales@wardjet.com) and visit [www.wardjet.com/emerald](http://www.wardjet.com/emerald) for more information. ■

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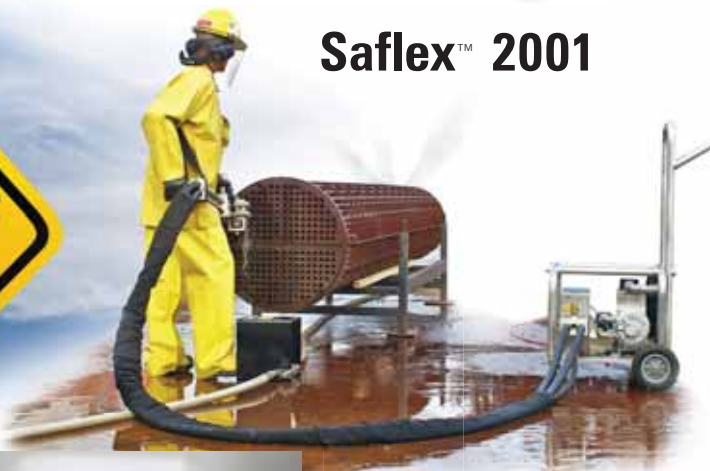
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## High Pressure Hydroblasting Hose Failure and Life Cycle Analysis, from page 4

A process was designed so that all pressure related failures during the first year received a Non-Conformance Review (NCR) allowing each failure to be recorded and tracked. (Other NCR's such as visible braids and separated abrasive covers are not covered in these results as they were removed from service before pressure failure). As might be expected the majority of pressure related failures resulted from issues which could be corrected by the end user. For example, investigations revealed that tension failures were caused by employees pulling on the hose ends during hose and tool movement which caused too much stress to be placed on the ends. A Shared Learning to the organization helped educate the workforce on the need to insure that hoses are held at a point that helps distribute and support weight more evenly during movement. A smaller but still significant number of NCRs resulted during the hose assembly process. For each NCR, PSC's Mechanical Integrity (MI) owner was

able to isolate the cause, work practice or assembly method to correct the hazard. If it was a potential manufacturer or distributor issue the MI lead could quarantine other hoses from the same batch while investigation results were pending. By forming a working partnership with the hose distributor during the investigation process, both PSC and GHX were able to identify trends and implement company-wide improvements that simply would not be possible without a complete tracking and investigating system. As a result of this program PSC has realized a 50% reduction every six months on **all** pressure and visible inspection hose NCR's since January 2012.

Pressure	Issued	PSI NCR	NCR %
10K	669	6	1%
20K	160	14	9%
40K	39	12	31%
Total	868	32	4%

**Number of Pressure related  
Non-Conformance Reviews (NCR)  
first 12 months.**

Cause	Number	%
Crimp	8	25%
Tension	6	19%
Job Setup	4	13%
Bend	3	9%
Fatigue	3	9%
Torque	3	9%
Mfg	2	6%
Crush	1	3%
Fitting	1	3%
Unknown	1	3%

**Pressure Related NCR  
Causes first 12 months.**

### How long should a high pressure Hydroblast supply hose last?

The traditional answer within the industry supply chain is **one million cycles of pressuring on and then pressuring off**. No known scientific data exists to support this measurement. Historically hose manufacturers and distributors advise that a hose will fail from the outside long before the inside due to the constant friction from vibration between the hose and the ground making such a measurement unnecessary. Accordingly there has not been a universally recognized standard regarding when a hose should be pulled from service. While tires, for example, can be measured by miles or tread depth no such method exists for measuring the number of pressure cycles for Hydroblast hose. To be cautious PSC initially implemented a three year life cycle for supply hoses based on potential maximum usage from date of hose receipt to a maximum target life of 500,000 cycles. In 2013 the Hose Safety Institute (of which PSC is a member) of the Association of Hose and Assembly Distributors working in conjunction with the WJTA Hydroblast Safety Committee

(continued on page 14)

## Write for Us, from page 8

### Preparing the Manuscript

Articles should be approximately 1,000-1,500 words long and submitted via email as a Word document. Illustrations, photographs, graphics and charts are encouraged to complement the article. All accompanying materials should be labeled to provide appropriate originator credit. Suggested captions are required.

Degrees and accreditations, professional titles and current position should be included. All statements based on published findings should be referenced appropriately. References should be listed numerically within the text and at the end of the article. Articles not meeting submission criteria may be returned for reformatting at the editor's discretion.

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## High Pressure Hydroblasting Hose Failure and Life Cycle Analysis, from page 12

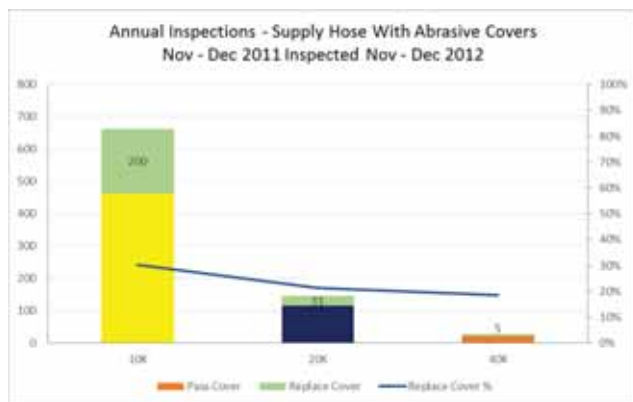
agreed on a recommended life limit of four years after hose receipt which would correspond to a maximum target life of 667,000 cycles for a safety factor of 33% from the traditional million cycle guideline.

### Independent Test Results – Year One

After 12 months of service the entire original test group was sent to an independent site for analysis. Results showed that abrasive covers were worn through and needed replacing in 27% of the hoses. However, in each case the actual outer rubber or plastic covering of the hose was protected and, upon passing a visual inspection and pressure test, was fitted with a new cover and certified to be returned to service. Without the abrasive cover in place, the outer cover of the hose would have become worn to the point of exposing braids and significantly shortening the expected life of the hose. It is possible that with the addition of protective covers for all hose pressures the industry may reach the point where hoses have the opportunity to reach maximum hose life before being worn down by external friction. With abrasive covers costing a fraction of a replacement hose there is a quick return on investment for installing covers.



Example of worn abrasive cover with intact rubber hose exterior at one year recertification test.



Abrasive hose covers replaced at 12 months

(continued on page 16)

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## High Pressure Hydroblasting Hose Failure and Life Cycle Analysis, from page 14

As part of the recertification process hoses must pass a visual inspection and pressure test.

Visual Inspection Guidelines – Any of the following would result in a failed test and the hose being removed from service.

- Leaks at the hose fittings or in the hose.
- Damaged, separated or pulled back covers
- Cracked, damaged, deformed or badly corroded fittings.
- Other signs of significant deterioration such as blisters.
- Visible wires.
- Dents, twists, or kinks
- Discoloration of color coded hose cover
- Thread and seat connections

Excluding cover replacements, 4% of the test hoses failed visual inspection and were removed from service at one year.

### Pressure Test Guidelines:

New hoses and hoses for re-certification should be pressure tested

- Between 1.2 and 1.5 times maximum allowable working pressure
- Minimum of 30 seconds up to a maximum of three minutes

Of those hoses that passed visual inspection, 7% failed pressure testing and were removed from service. Full results are captured below.

Pressure	Pass	Cover	PSI	Visual	Total
10K	389	200	46	28	663
20K	98	31	11	6	146
40k	20	5	1	1	27
Total	507	236	58	35	836

### 12 Month Independent Test Results

#### Key Terms:

**Pass:** Passed visual and pressure test. Returned to service.

**Cover:** Abrasive cover replaced. Then passed visual and pressure test. Returned to service.

**PSI:** Failed pressure test. Discarded.

**Visual:** Failed visual test. Discarded.

### Conclusion:

It feels as if scientific data on High Pressure Hydroblast hose has grown relatively little since Frank Ofeldt created his first 'High Pressure Jenny' in 1927. However, pressures are much higher and the risk is much greater today. There is still much to be learned regarding hose performance, hose life expectancy, in-field failure causes and methods to protect hose integrity. By studying every hose, and learning how and why it failed, the industry not only learns to prevent hose failures, the industry also helps protect the workers who have the potential to be harmed when a hose fails. ■

## 2014 WJTA-IMCA Expo Preliminary Schedule

### Monday, October 13

Setup for Exhibits and Live Demonstrations

### Tuesday, October 14

8:00 a.m.-10:30 a.m.

Live Demonstrations

10:30 a.m.-5:00 p.m.

Exhibit Hall Open

10:30 a.m.-3:00 p.m.

Boot Camp

3:00 p.m.-5:00 p.m.

Reception in Exhibit Hall



### Wednesday, October 15

8:00 a.m.-10:30 a.m.

Live Demonstrations

10:30 a.m.-1:00 p.m.

Exhibit Hall Open

**Jet Edge Introduces  
Waterjet Cutting  
System Designed and  
Priced for Farm  
Machine Shops,** from page 2

Jet Edge, Inc. will introduce both the new FARM-JET and TACH-JET® waterjet systems at the Triumph of Agriculture Exposition, March 12-13 at Omaha's CenturyLink Center.

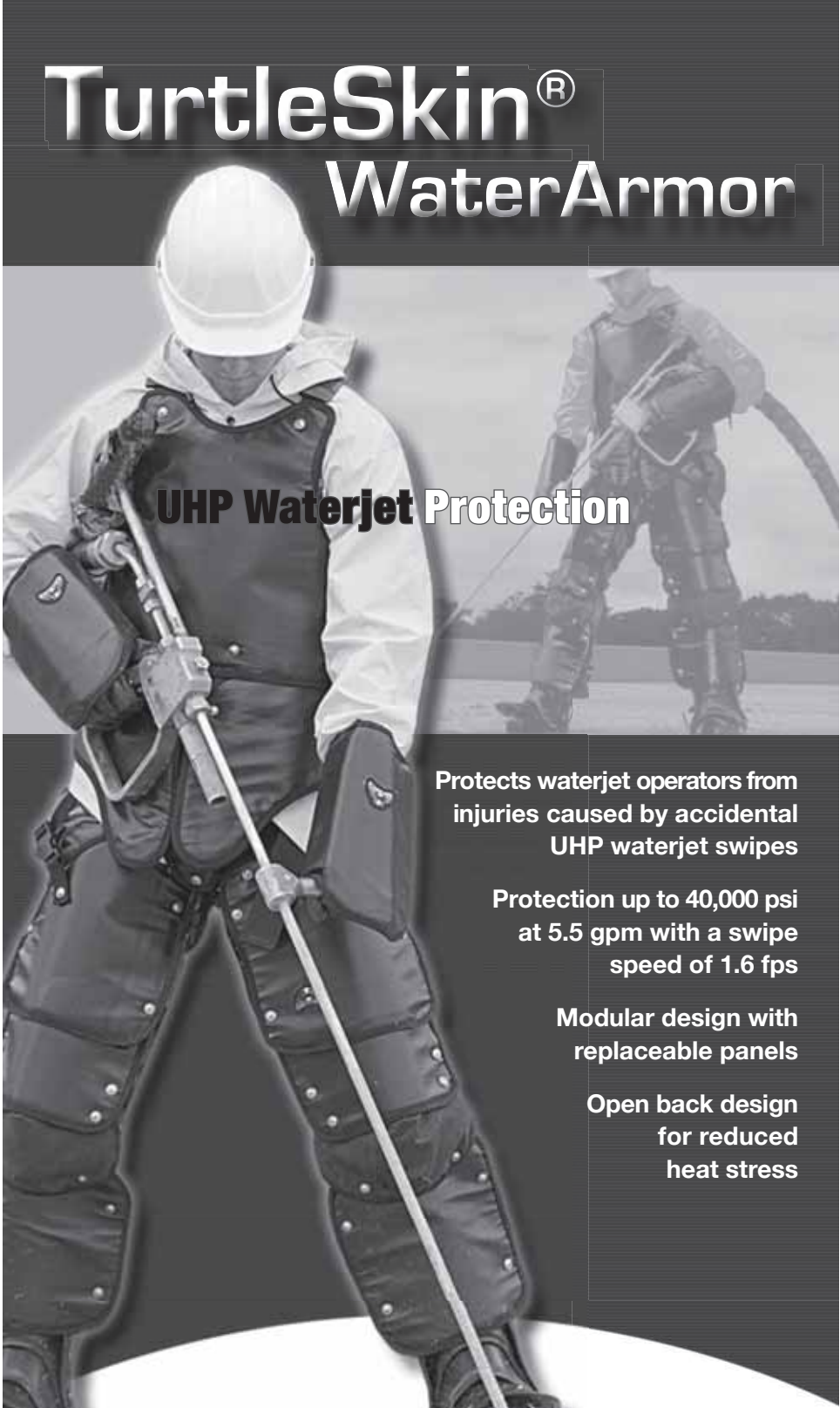
The TACH-JET includes a 40" x 40" waterjet cutting table and a Jet Edge Eco-Jet TACH direct drive waterjet pump that converts a tractor or skid steer's hydraulic power into 1 gpm of 55,000 psi water. The system includes one abrasivejet cutting head and a motorized Z axis with 5 inches (130 mm) of travel.

TACH-JET is controlled with a Windows PC (sold separately) and uses a FlashCut Pro-Series Stepper Controller and FlashCut CNC software. It also includes IGEMS path generation software and a handheld controller pendant for operator convenience. It requires a hydraulic power unit capable of a minimum output of 50 HP (tractor or skid steer sold separately), a 115 V 60 Hz or 230 V 50 Hz power source, and fresh water source.

Find out more about FARM-JET and TACH-JET at [www.jetedge.com](http://www.jetedge.com), or call 1-800-JET-EDGE (538-3343) or 763-497-8700.

*Jet News* is published by the WaterJet Technology Association (WJTA)-Industrial & Municipal Cleaning Association (IMCA) and is a benefit of membership in the Association.

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# DERC PLC Controlled Air Preheater Cleaner

**D**ERC Salotech has developed a new DERC PLC controlled air preheater cleaner. It cleans a round air preheater with high pressure waterjets. The system is practical and effective with a modular PLC controlled X-Car.

## DERC PLC Controlled Air Preheater Cleaner

The DERC PLC air preheater cleaner cleans the air preheater with high pressure waterjets. It uses a high pressure 6-jet manifold which moves over an aluminum rail. Both time and forward steps can be programmed by the operator. This achieves a perfect cleaning of the air preheater. The air preheater cleaner and the high pressure unit are remotely controlled. The unit is equipped with switches for automatic reverse.



**DERC PLC Controlled Air Preheater Cleaner**

## Nozzle Manifolds

The standard unit has a 6-jet manifold. For other applications other nozzle manifolds or rotating swivel assemblies can be installed.



**6-Jet Manifold**

## PLC Controlled X-Car

With the DERC PLC controlled air preheater cleaner DERC Salotech uses the DERC PLC controlled X-Car. With this X-Car the operator controls the X-movements. Both time and forward steps can be programmed for perfect positioning and cleaning. The X-Car positions the waterjets with a high precision and is adjustable in millimeters.



**PLC Panel with Touch Screen**

## Tell Us Your Cleaning Challenge

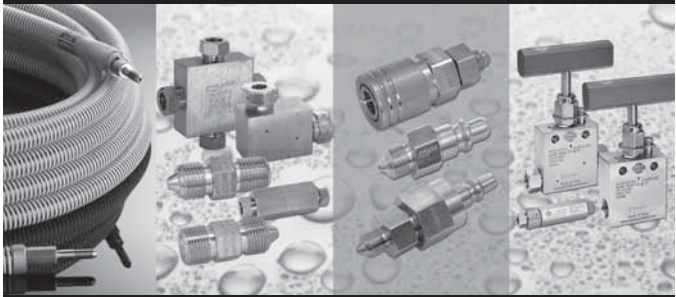

The DERC Modular X-Y Frames, equipped with a remote or PLC controlled X-car and the right set of tools, offers maximum flexibility, effectiveness and safety, including innovative technical features. Tell us your cleaning challenge and we'll be able to present you a variety of very practical and impressive solutions.



**Remote Control**

## For More Information

DERC Salotech supplies innovative solutions for waterjetting professionals. For more information, visit [www.salotech.nl](http://www.salotech.nl), call +31 (0)186 621484 or e-mail: [info@salotech.nl](mailto:info@salotech.nl).





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StoneAge TR 200 Tank Cleaning Head



## DERC Hose Feeder

The DERC Hose Feeder is the semi-automatic solution for a safer and more ergonomic way of cleaning pipes (lines) with high pressure. The hose feeder system replaces the manual handling of a 1/2", 3/8" or a 3/4" rubber hose with a safer mechanic solution. The hose feeder is a very safe solution for the operator because of the distance between the hose feeder and the operator.



## DERC Tank Cleaning Positioning Device

The DERC Tank Cleaning Positioning Device is an innovative system for cleaning reactors, tanks and vessels in situ and during production process with the use of an effective high pressure tank cleaning head StoneAge TR 130. The entire process is PLC controlled and can be started in your control room.



## DERC Abrasive Cutting System

The DERC Abrasive Cutting System is an innovative cold cutting system with a high pressure abrasive cutting nozzle. With this system you have the solution for industrial tank and pipe cutting issues. Additional accessories or custom made solutions are possible.

**Design, manufacturing of nozzles, accesories and systems**

## Jetstream Hydrostatic Test Valve Delivers Precise Hand-Adjustable Pressure Control

**J**etstream of Houston, LLP has introduced the Jetstream HTV hydrostatic test valve for pressure testing of oilfield and pipeyard pipes, blow-out preventers and other vessels. This new valve allows an operator to easily control the test pressure without “feathering” the clutch, thereby boosting productivity and ensuring a longer clutch life.

“Operators working in harsh conditions and demanding environments will appreciate the improved control, productivity, safety and durability features of the Jetstream HTV,” says Richard Scruggs, product manager at Jetstream. “With the new valve, pressures can be controlled up to 20,000 psi through the use of precise hand-adjustable pressure setting with



the fill lever. This product delivers outstanding results in applications few hydrostatic test valves can match.”

Featuring an exclusive, heavy-duty internal check valve design that automatically holds downstream pressure upon releasing the lever, the Jetstream

HTV requires no external foot valve. Multiple auxiliary outlet ports allow for chart recorder or data collection. Operators can depressurize with only a ¼-turn on the bypass valve.

“Field-repairable cartridges provide easy maintenance and service, while reducing downtime and costs,” Scruggs says. “The operator is up and running in a fraction of the time, with no need to send out for repair or wait for replacements.”

The Jetstream HTV is available through Jetstream and nine FS Solutions locations across the United States, and through a network of Jetstream dealers worldwide. For more information about the Jetstream HTV, please call 800/231-8192, or visit [www.waterblast.com](http://www.waterblast.com).

## StoneAge Releases Concrete Hydro-Demolition Unit

**S**toneAge has announced the release of the Blackhawk BHK-100 hydrodemolition unit. The Blackhawk is designed to be fitted to your choice of implement (skid steer, telehandler, etc.) and can be used in vertical and horizontal applications. All the controls are integrated into the hydraulics of the implement, giving the operator independent control of rotation and traverse speeds to match the variable removal rates of concrete.

Hydrodemolition has many benefits when compared to traditional jack hammer removal. The Blackhawk system does not damage rebar or negatively affect the integrity of remaining concrete.

The waterjet can be precision placed for accurate removal and the resulting surface texture provides better adhesion for bonding new concrete.

For more information, visit [www.stoneagetools.com/blackhawk](http://www.stoneagetools.com/blackhawk) or call (970)259-2869.



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# Hughes Pumps Gears Up the Investment

**H**ughes Pumps has recently completed the installation of a Mazak 6800 Horizontal Machining Centre (HMC) at the company's UK production facility to increase Hughes' manufacturing capacity and reduce delivery times.

The installation of this state-of-the-art Mazak equipment, already extensively used at the Formula 1 McLaren Technology Centre in the UK, represents the largest machine tool investment in Hughes' history. The HMC includes an 8,000 rpm high torque, 37 kW spindle that will machine through the toughest of stainless steel and duplex materials, a six-pallet changer, each with 1,500 kg capacity and a 160 tool magazine that allows



the machine to run 24/7 and unmanned during night shifts.

Hughes Pumps MD Phil Cranford says that with increasing demand for the company's pumps in recent years this significant investment was neces-

sary in order for the company to stay on track with its growth plan.

"The Mazak HMC is 12 m (39 ft 4 1/2 in) long x 6 m (19 ft 8 in) wide, weighs in the region of 30 tonnes and has replaced around 10 smaller manual machines. As well as being able to run 24/7 and increase output through running additional hours, such is the power and efficiency of the machine that manufacturing times for the largest pump crankcases have been reduced by 66% and pump-heads by 55%. The company is now in a position to meet significantly tighter deliver times.

Hughes is already looking ahead at its next CNC machine tool investment

(continued on page 25)



## HIGH & ULTRA HIGH PRESSURE

Hughes Pumps' flange mounting option makes the pumps very simple to install and more compact than other like-for-like units, but still powerful enough for the most arduous water-jetting applications. Pumps available in 10K, 20K and 40K PSI.

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HPS650

## Idrojet Announces New Aerial Hydraulic Tube Bundle Extractor Line

**I**drojet and partner Kidextractor Limited has developed a new line of stronger aerial extractors called the KIDeineman line. Key features of the new line include:

- Increased size of extractor frame for a stronger machine;
- Larger width of the frame extractor for easier operations;
- Octagonal bundle-shaped arch for easier use;
- Double speed winch pulling/pushing with a double shaft and double inside winch motors; and
- Stronger front side extension pieces.

Also available is the new Autojet FX2 – Air, a new dual flex-lance internal cleaning robot for cleaning heat exchanger tubes.

Idrojet is offering special sale pricing on this new equipment through April 2014.



Idrojet also has available a rental fleet of aerial extractors, high pressure water pumps, and straddle carriers for transport of bundles.

For more information, visit [www.idrojet.com](http://www.idrojet.com), [www.kidextractor.net](http://www.kidextractor.net) or email [fabio.idrojet@hotmail.it](mailto:fabio.idrojet@hotmail.it).

## Multicam Appoints Mike Boyte as Manufacturing Manager

**M**ike Boyte has been appointed manufacturing manager at MultiCam, Inc. He has over 20 years of manufacturing and quality control experience in industries related to factory automation. In 2008, Mike received his MBA from Texas A&M University. In addition, he is a certified Lean Six Sigma Black Belt and will continue to lead MultiCam's efforts in lean manufacturing which were implemented in 2012. In his new position, Mike will report to Tony McGrew, director of operations.



**Mike Boyte**

For more information, visit [www.multicam.com](http://www.multicam.com).

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## 5-Axis Programming for Waterjet Cutting, from pg. 6

Be aware that if you are doing fixed bevel cuts, the angle that you are entering in the software is typically measured as "X" degrees away from the vertical. You should always consider the order of cutting when programming for 5-axis to ensure the part remains secure to the material for as long as possible. Keep in mind that these decisions will need to be evaluated depending on the part you are cutting. Once you are satisfied with the program and the 3D rendering, create the CNC file with the correct post processor for the software and controller you are using.

When you are preparing to cut the part program on the waterjet, keep in mind the cutting envelope. Dry run the program at the correct height and in the area of the table you are planning to use to make sure that the waterjet won't fault anywhere when it is cutting. Adjust the program if you are getting a fault or error before you turn on the high pressure stream. If you are cutting multiple 5-axis parts, make sure there is plenty of space between them to account for the severe cutting angles. Once you are satisfied with the dry run of the part program, make sure that any clamps are placed out of the way of the angled stream while still holding the material securely in place. Confirm that the waterjet's abrasive hose reaches as far as necessary and that you are in the correct safety mode. Refer to the WARD-Jet-supplied 5-axis safety chart to ensure the well-being of any waterjet operators.

WARDJet recommends safety barriers when using the waterjet under any circumstances but if you are cutting at an angle of 50 degrees or greater, they are required before operating the waterjet. According to the 5-axis safety chart, any "red level" 5-axis cutting must be called in to WARDJet and the machine will be remotely unlocked after safety is emphasized and all precautions are met. Don't forget that grates are often used up at a much faster rate when cutting with 5-axis instead of 2-axis, so please consider where the material is clamped and cut on the grates prior to operating the machine.

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## Hughes Pumps Gears Up the Investment, from page 21

of a similar magnitude to automate the manufacture of crankshafts and gears.”

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## Comments Solicited on Improvements to Recommended Practices

Comments are solicited regarding improvements to the WJTA-IMCA publications, Recommended Practices for the Use of High Pressure Waterjetting Equipment and Recommended Practices for the Use of Industrial Vacuum Equipment. While both publications are reviewed periodically at the WJTA-IMCA conferences and throughout the year, your comments and suggestions for improving the publications are invited and welcome anytime.

Please address your comments and suggestions to: WJTA-IMCA, 906 Olive Street, Suite 1200, St. Louis, MO 63101-1448, phone: (314)241-1445, fax: (314) 241-1449, email: [wjta-imca@wjta.org](mailto:wjta-imca@wjta.org). Please specify which publication you are commenting on.



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## Guzzcavator™ Combination Vacuum Loader and Excavator

**G**uzzler Manufacturing has introduced the Guzzcavator™, a multi-purpose vacuum truck that combines the performance of the Guzzler CL vacuum loader and the Vactor HXX™ Hydroexcavator.

Guzzler will display the new Guzzcavator multi-purpose vacuum truck at the company's exhibit (Booth #5038) at the 2014 Pumper & Cleaner Environmental Expo International, held February 24-27 in Indianapolis.

"With feedback from our industrial cleaning professional customers, Guzzler developed a powerful machine that is 100-percent industrial vacuum truck and 100-percent vacuum excavator," says Ben Schmitt, product manager at Guzzler Manufacturing. "The versatility of this machine allows industrial cleaning contractors to offer their customers additional services, creating new income avenues that can result in an improved bottom line."

The multi-purpose Guzzcavator maintains Guzzler's legendary industrial vacuum performance and filtration, combined with the powerful hydroexcavation capabilities of the market-leading Vactor HXX Hydroexcavator.

In addition to handling a variety of wet/dry industrial cleaning applications (such as cleaning and recovering solids and dry bulk powders, liquids, slurries and thick sludge), the Guzz-

cavator vacuum truck can also perform vacuum excavation work including potholing, slot trenching, water valve box repair, locating existing fiber optic lines, cables and other utilities, and oil and gas field support.

When hydroexcavation is required the Guzzcavator blasts away soil with jets of up to 20 gallons of water per minute, at pressures up to 2,500 psi, depending on the pump selection, variable water pressure adjustment and nozzle tip configuration. The truck's 1,300-gallon stainless steel water tank provides up to seven hours of continuous operation between refills.

The multi-flow water pump allows water pressure adjustment with the push of a button for digging in various conditions. Rated at between 10 and 20 gpm at 2,500 psi, the water system is powered by a hydraulically operated triplex piston water pump. The water pump can be mounted in an optional heated cabinet for protection against cold weather conditions. The option-



al water heater – 400,000 BTU/hr or 800,000 BTU/hr – is also available for hydroexcavation applications in cold weather or sticky clay soil conditions.

The Guzzcavator is equipped with a standard 5-ft telescoping boom with 270-degree rotation, providing more than 21 feet of reach from the center of the truck. The 8-in inside diameter hose allows easy passage of large or thick material. An optional extendable boom is also available.

For more information, visit [www.guzzler.com](http://www.guzzler.com) or call 1/800-627-3171.

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