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Safety Devices For Pipe And Tube Cleaning



Photographs courtesy of StoneAge, Inc.

25 Years Of Progress In WJTA

By: George A. Savanick, Ph.D., President, WJTA

■ he WaterJet Technology Association (WJTA) was formed in 1983 in order to sponsor and organize biennial conferences on waterjet technology and to develop codes of practice and safety for the waterjetting industry.

The prime movers in the formation of the WJTA were Dr. Fun-Den Wang of the Colorado School of Mines and Dr. David Summers of the University of Missouri-Rolla (now known as the Missouri University of Science and Technology).

It is no accident that two mining professors were interested in waterjet technology because waterjet technology had its genesis in one of the technological challenges of the 1850s—that is, a practical way to mine placer gold during the Gold Rush in California. Waterjet mining, usually called hydraulic mining, was developed to meet this challenge. The main tool used in hydraulic mining was a method of generating large waterjets called a hydraulic monitor.

The WJTA recognizes its roots in hydraulic mining when it gives its highest award-the Pioneer Award. The Pioneer Award winners receive a trophy comprised of a representation of a monitor cut out of brass by a computer-controlled abrasive waterjet.

Waterjets can be applied in three technologically useful ways. These are to:

- 1. Fragment solids. For example, mining and hydrodemolition.
- 2. Separate coating from solids. For example, waterjet cleaning.
- 3. Precisely cut solids. For example, abrasive jet milling.

Waterjet technology and the WJTA have advanced in all of these areas during the 25 years since the founding of the WJTA, but at different rates. Some progress has been made in the waterjet fragmentation of solids, mostly in the hydrodemolition and scarification of concrete using robotically driven waterjet machines. Progress in hydraulic mining has been slow

More impressive advances have been made

Twenty-five years ago in Rolla, MO, the WaterJet Technology Association's first board of directors was elected during the Second U.S. Water Jet Conference. Elected were: (front row. left to right) Dr. David Eddingfield, secretary; Dr. Fun-Den Wang, president; Dr. William Cooley, chairman of the board; Dr. George Savanick, board member; (back row, from left to right) Dr. David Summers, vice president; and Dr. James Riechman, board member. Robert Evans, treasurer, is not pictured.

in waterjet cleaning and cutting. Waterjets can clean surfaces because the jet pressure required to generate the force required to damage the underlying surface is often much less

than that required to remove material adhering to the surface. In addition, waterjet impact energy can be placed in places that are difficult to access. For example, in the inside of heat exchanger tubes.

The following is an example of how waterjet cleaning benefitted from early waterjetting mining research. In 1981, Pat DeBusk, then of HydroServices, visited John Wolgamott and Jerry Zink of StoneAge, Inc., and other



The Colorado School of Mines was also working on a Bureau of Mines sponsored program to develop a flexible wateriet roofbolt hole drill for use in low headroom coal mines. This research suggested to DeBusk that flexible lances could be used to clean tube bundles from the bottom up as opposed to top down. This enabled





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Safety Devices For Pipe And Tube Cleaning

By: Doug Wright, StoneAge, Inc.

7 hen cleaning pipes and tubes with waterblasting tools, there is a risk of the cleaning nozzle coming backwards out of the pipe and striking the operator with either the jets or the tool itself. It is just as likely that an injury will occur due to being struck by the cleaning head as it is to be caused by the jets themselves. This can happen suddenly and unpredictably, with the tool being rapidly propelled backward out of the pipe or tube by an unbalanced force created by a nozzle becoming plugged or a head or tip coming off, or the mechanism of hydraulicking, where the tool is forced out of the tube like a piston by water pressure building up inside the tube behind a debris dam. Also, the operator can inadvertently pull the cleaning nozzle out of the pipe or tube while still under pressure.

To protect the operator from these hazards, safety equipment known as a back-out prevention device or antiwithdrawal device should be used. This equipment consists of a bar, plate or arm that is securely attached across the opening of the pipe, that will physically stop the tool from coming back out of the pipe and striking the operator. The high pressure hose passes through an opening in this bar or plate. Two methods exist for catching the tool or hose — one type fits very closely around the hose itself and is intended to catch on the hose swage, requiring specifically sized collets for the hose being used. This type is most commonly used in tube

cleaning, because the nozzle tip may not be any larger than the hose swage itself. The other type is intended to catch on



Back-out device bolted to pipe flange with simple latch for securing hose

the tool diameter, which is much larger than the hose, allowing a looser fit and being adaptable to most applications and hose sizes.



Close fitting collet to catch hose swage for tube cleaning

The back-out prevention device is attached to the pipe end by bolting to an existing flange if one exists, or by a chain or strap type clamp that is tightened

to grip around the outside of a pipe with no flange. The arm type used for tube cleaning is clamped to the tube



Chain clamp securing back-out device to pipe without flange

bundle face, bolted to the flange or to expansion anchors placed in the tubes themselves.

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Cleaners Keep Going In The Cold

By: Jetstream of Houston

There's cold, and then there's *cold*. And it doesn't get much colder than Fort McMurray, Alberta, in Canada. In January, it averages -4°F. With a strong blow, the wind chill can drop to -30°F or even -40°F. Some days, it is too dangerous to work in the cold.

Yet on most winter days, the work goes on. And if anyone is an expert in how to operate a vacuum truck or water blaster in the cold, it's the crew of the Fort McMurray Division of Eveready Industrial Services Corp., an industrial cleaner with 20 locations in western Canada.

"Below-freezing weather takes a toll on both people and equipment," said Training Coordinator Stewart Ross. While much of Fort McMurray's actual cleaning takes place indoors, someone still needs to stay outside with the equipment.

Ross's workers wear heavy clothing with gloves and pull-downs that cover their entire face. That's usually enough, as long as they keep moving. Once they stop, they go into the heated cab to stay warm. The cabs are set up so workers can monitor operations from inside.

Vacuuming

While vacuuming solids is similar in warm and cold weather, liquids require some extra care. "When you're moving water below 32°F, there's always a chance of it freezing," Ross said. "So we have to take care of our equipment differently."

That starts with insulating valves. Valves are especially vulnerable because all it takes is a small amount of frigid air or water to slip past a seal, and ice will freeze the valve in position. Eveready uses two approaches to address this situation. First, workers wrap the valves and lines with insulation. That is often enough on moderately cold days. When the temperature really begins to dip, however, the company diverts antifreeze from the radiator – where it runs at a scalding 180°F – and circulates it through collars mounted on the valves.

Loading hot liquids (like boiler feedwater) in cold weather is a challenge. Vacuum trucks can handle liquids up to 180°F, well below water's boiling point but hot enough to produce water vapor. When the vapor contacts chilled metal, it forms water droplets that quickly turn to ice.

"The problem is that water vapor acts like air," said Fort McMurray Site Supervisor Rudy Ouellette. "It penetrates filters and moves into pipes and pumps. If it condenses in the vacuum system, it can freeze a pump, filter, or blower shut."

To avoid freezing, Ouellette isolates the vacuum system. First, the operator builds up a vacuum but does not suck up any material. He then turns an isolation valve that insulates the filters and vacuum system from the vacuum in the tank. Finally, he opens the intake valves, and the hose sucks up liquid for as long as the vacuum lasts.

When the vacuum loses its suction, the operator repeats the process again. After loading or unloading, the operator "freeze-dries" the system. He isolates the tank, drains the filters and vacuum system, switches to pressure, and blows all the moisture out of the vacuum system. "If you leave any moisture in there, it could form ice on the fan blade, which has really close tolerances, and freeze it shut," Ross added.



Service/Maintenance of Jetstream Units

Waterjets

While most waterjetting takes place inside a building, the rigs are almost always parked outside. The line going from the pump to the lance can run 50 or 100 feet in the cold winter air before going inside to warmer temperatures.

"It can be a bit of a challenge," Ross said. "Imagine water running in your garden hose at extreme temperatures. Once you shut it off, it freezes quite quickly."

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Cleaners Keep Going In The Cold, from page 6

The easy solution, Ross said, is to keep the water running – and don't let it stop. To dump water and prevent pressure from building up, waterjetting equipment typically includes bypasses. In cold weather, make sure those bypasses are unobstructed and can dump enough water to keep the line from freezing.

"When it comes time to shut down, even for lunch or a break, operators need to winterize the system," Ross said. "So we run glycol through the pump, hoses, and wand at low pressure to chase out all water so nothing freezes." This usually takes 5 to 10 minutes (longer for complex setups). Ross then tests the recovered glycol to ensure it can handle at least 15 degrees lower than the current temperature. Ethylene glycol used in antifreeze is toxic and requires proper disposal.

Eveready also has some rigs with heated cabinets that hold the waterjet pump and hoses. These speed shutdown because they require only partial winterization.

Even then, some operations require warm water. Rotary lances, for example, do not work well when temperatures dip below freezing. Ouellette often loads a vacuum tank with hot boiler water to keep the lance from freezing in place.

Granted, not every industrial cleaner – even those who work in cold northern states – will see the temperatures commonly faced by the crews at Fort McMurray. But at least it's good to know how to deal with cold weather issues when they occur.

WJTAListServ - A Free Service To WJTA Members

The *WJTAListServ* enables you to take advantage of prompt e-mail interaction with your colleagues. *WJTAListServ* is a **FREE** e-mail broadcast system developed by WJTA to help you communicate and network with other waterjet professionals.

Participation is limited to WJTA members in good standing. You must sign up in order to participate. To sign up for the *WJTAListServ*, contact Beth at the WJTA office by email: wjta@ wjta.org, phone: 314-241-1445, or fax: 314-241-1449.



25 Years Of Progress In WJTA, from page 2

the tube bundle cleaner to take advantage of gravity to remove cuttings. Waterjet cleaning is now used routinely in a number of process industries, especially in the petroleum industry.

Advances in waterjet cleaning also include the development of hand held jetting guns which gives the operator control of the cleaning jet, rotating jets, impulsive jets, and abrasive jets. Cleaning jets have also been automated making possible such applications as multi-tube bundle cleaning, ship hull cleaning, cleaning sewers, and paint and coating removal. Waterjet cleaning has grown into an important industrial tool.

The precise cutting of solids with waterjets is a widely accepted industrial process. Commercial systems are widely used for slitting and trimming in paper production; turning, milling and drilling of metal; food processing; automotive applications; and aerospace applications. The ability to easily manipulate a waterjet makes it possible to cut practically any configuration and the use of abrasive jets enables the cutting of practically any material. Impressive advances have been made recently in cutting circuit boards, demilitarization, and micromachining. The precise control of waterjets in difficult to access locations, for example, in the human body, has led to notable advances in surgery.

The rise of environmental awareness in recent years has led to an increased effort to control effluent from jet cutting and cleaning jobs. This, in turn, has added vacuum truck operators to the WJTA membership. The WJTA has been very active in developing safety training materials for use in the vacuum truck industry. Vacuum truck operators are presently the fastest growing segment of the WJTA membership.

WJTA serves its members by disseminating information through a number of channels. These include the periodical *Jet News*; booklets such as the safety manuals *Recommended Practices for the Use of Manually Operated High Pressure Waterjetting Equipment* and the *Recommended Practices for the Use of Industrial Vacuum Equipment*; the *Recommended Practices Safety Video/CD-ROM*; clinics; the proceedings of the waterjet conferences, and several other booklets.

The American Waterjet Conferences, the 15th of which will be held in Houston, Texas, in August 2009, have been successful. These conferences have grown from a modest beginning with the first conference to the point where they are recognized as the most influential waterjet meeting in existence. The published proceedings of these conferences relate the latest advances in waterjet technology. Waterjet equipment is exhibited during the conferences and industrial waterjet equipment is operated and demonstrated on-site.

(continued on page 10)

Significant Events In WJTA History

1980-1981

- David A. Summers, Ph.D., and Fun-Den Wang, Ph.D., decide to form the U.S. Water Jet Technology Association (USWJTA)
- Jacob Frank honored with the first Pioneer Award at the 1st U.S. Waterjet Conference

May 1983

- U.S. Water Jet Technology Association (USWJTA) formed at the 2nd U.S. Water Jet Conference at the University of Missouri-Rolla (now called the Missouri University of Science and Technology)
- **H.D. Stephens** honored with the second Pioneer Award

August 5, 1983

- First USWJTA Board of Directors Meeting at the Colorado School of Mines

May 25, 1985

- 3rd U.S. Waterjet Conference held at the U.S. Bureau of Mines, Pittsburgh, Pennsylvania
- William C. Cooley, Ph.D., honored with the third Pioneer Award
- The Safety Manual, *Recommended Practices for the Use of Manually Operated High Pressure Waterjetting Equipment* was approved by the USWJTA membership

April 8, 1987

- WJTA incorporated in the State of Colorado

June 1987

- The Recommended Practices for the Use of Manually Operated High Pressure Waterjetting Equipment was offered for sale to the public

August 1987

- 4th U.S. Water Jet Conference held at the University of California, Berkeley
- Norman C. Franz, Ph.D., honored with the fourth Pioneer Award

April 1988

- David A. Summers, Ph.D., heads committee to organize short course on waterjet technology

August 1988

- USWJTA association office established in St. Louis, Missouri

August 1989

- 5th American Waterjet Conference held in Toronto, Ontario, Canada
- Richard Paseman honored with the fifth Pioneer Award
- USWJTA cosponsors with University of Missouri-Rolla and the ASME Mining and Excavation Research Group the first short course on waterjet cleaning and cutting in conjunction with the 5th American Waterjet Conference

Advantage Of Hydrodemolition On The Bond Strength Of Concrete Overlay

I n the repair work of concrete bridge decks, pneumatic and hydraulic breakers are the conventional tools for surface preparation. However these tools tend to cause damage to the surrounding healthy concrete and steel reinforcement. Hydrodemolition has emerged as a newer and more effective method. Yun et al.* conducted an experimental study to demonstrate the advantage of hydrodemolition on the bond strength of VES-LMC overlay.

VES-LMC is short for Very-Early Strength Latex-Modified Concrete. It has been widely used as an overlay material for concrete bridge deck repair because of its short curing time, high durability, and high bond strength. In this experimental study, VES-LMC was used as the overlay material. The concrete for the base slab was made with ordinary Portland cement and a maximum aggregate size of 25 mm, with target strength of 39 MPa. The bond strength of the VES-LMC overlay was evaluated for these three surface conditions of the base slabs: (1) treated with a spin jet; (2) treated with a pneumatic breaker; (3)untreated.

It was found that the tensile bond strength is the highest when the base slab was treated with the spin jet (1.72 MPa). It was 28 percent higher than that of the untreated surface (1.34 MPa) and 51 percent higher than that of the breaker-treated surface (1.12 MPa).

Based on visual inspection, it was found that, in the case of the untreated surface, the dominate failure mode is interface failure. But in the case of the breaker-treated surface, the dominate failure mode is substrate failure, indicating substrate damage from the breaking energy. In the case of the jet-treated surface, there is no single dominate failure mode.

*Yun, K.K., Kim, S.K., Choi, S.Y. and Choi, P.G. (2006) Effect of hydrodemolition on the bond strength of VES-LMC overlay, Proceedings of the 8th Pacific Rim International Conference on Water Jet Technology, Qingdao, China, Oct. 10-12, Paper 37.

Reprinted by permission from *Quality Waterjet Newsletter*, August 6, 2008.



Surface preparation with Spin Jet



25 Years Of Progress In WJTA, from page 8

The periodical *Jet News*, published by WJTA six times per year, highlights the latest in waterjet techniques and new applications from around the world. WJTA has members in 35 countries in addition to the United States and Canada. Many of these members contribute articles to *Jet News*.

A major accomplishment of the WJTA has been the development of safety manuals. Historically the majority of waterjet accidents have occurred while using manually operated high pressure waterjetting equipment. In response to these accidents, WJTA published and distributed the safety manual, Recommended Practices for the Use of High Pressure Waterjetting *Equipment*. This manual outlines the safety practices that should be followed when operating manually operated waterjet equipment. This manual is a reference tool in most waterjet company safety manuals and is used as a reference in court proceedings. To date, WJTA has sold nearly 28,000 of the English language version of this booklet and 900 copies of the Spanish language version. In addition. 750 videos and 300 CD-ROMs of the content of the safety manuals have been distributed to the public.

Industrial vacuum equipment is often used in conjunction with waterjets. WJTA developed a safety manual, *Recommended Practices for the Use of Industrial Vacuum Equipment*. This manual has been published in English and Spanish and a video version is presently being produced. To date, over 3,000 of the vacuum truck *Recommended Practices* have been distributed.

WJTA has also produced a medical alert card that is carried by many

waterjet workers. This card gives advice to attending physicians regarding treatment of injuries by waterjet penetration into the human body. These accidents are rare, so many emergency room physicians have no experience with injuries caused by waterjets. To date, WJTA has distributed nearly 80,000 copies of the WJTA medical alert card, which is carried in the wallet of waterjet workers.

Significant Events In WJTA History continued on page 11



Significant Events In WJTA History, from pg 8

August 1989

- USWJTA membership votes to change the association name to the Waterjet Technology Association (WJTA)

August 1991

- 6th American Waterjet Conference held in Houston, Texas
- John H. Olsen, Ph.D., honored with the sixth Pioneer Award
- WJTA introduces technical tour featuring live demonstrations of waterjetting equipment at the 6th Conference

August 1993

- 7th American Waterjet Conference held in Seattle, Washington
- Fun-Den Wang, Ph.D., honored with the seventh Pioneer Award
- First awards for best papers presented to **Richard H. Hollinger** and **R.J. Mannheimer** for *Rheological Investigation of the Abrasive Suspension Jet* and **Arthur L. Miller** and **John H. Archibald** for *Measurement of Particle Velocities in an Abrasive Jet Cutting System*
- First Service Awards presented to George A. Savanick, Ph.D., and Mohan Vijay, Ph.D.; First Safety Awards presented to David A. Summers, Ph.D., and NLB Corporation; First Technology Awards presented to Mohamed Hashish, Ph.D., Autoclave Engineers, and Hammelman Corporation

- WJTA celebrates 10th Anniversary on a cruise in Puget Sound

August 1995

- 8th American Waterjet Conference held in Houston, Texas
- George Rankin honored with the eighth Pioneer Award
- Service Award presented to **Thomas J. Labus**; Safety Award presented to **Autoclave Engineers**; Technology Award presented to **Thomas J. Kim, Ph.D.**

March 1996

- First WJTA Waterblasting Seminar, **Stepping Up From A Pressure Cleaner**, is held at the Liquid Waste Haulers Show in Nashville, Tennessee

August 1997

- 9th American Waterjet Conference held in Houston, Texas
- David A. Summers, Ph.D., honored with the ninth Pioneer Award

- Service Award presented to Andrew F. Conn, Ph.D.; Technology Award presented to Hartmut Louis, Dr.-Ing.

May 1999

- First WJTA Recommended Practices Safety Seminar held in Rosemont, Illinois

August 1999

- 10th American Waterjet Conference held in Houston, Texas
- **Mohamed Hashish, Ph.D.**, honored with the tenth Pioneer Award
- Service Award presented to John Wolgamott; Safety Award presented to Bruce Wood; Technology Award presented to Ryoji Kobayashi, Ph.D.

December 2000

- WJTA Medical Alert Card first circulated to WJTA members

August 2001

- 11th American Waterjet Conference held in Minneapolis, Minnesota
- George A. Savanick, Ph.D., honored with the eleventh Pioneer Award
- Technology Award presented to Richard Ward

August 2003

- 12th American Waterjet Conference held in Houston, Texas
- Pat DeBusk honored with the twelfth Pioneer Award
- Service Award presented to **Mohamed Hashish, Ph.D.**; Technology Award presented to **Ernest S. Geskin, Ph.D.**
- WJTA celebrates 20th Anniversary

August 2005

- 13th American Waterjet Conference held in Houston, Texas
- Hartmut Louis, Dr.-Ing., honored with the thirteenth Pioneer Award
- Service Award presented to NLB Corporation; Safety Award presented to TurtleSkin WaterArmor by Warwick Mills; Technology Award presented to Jay Zeng, Ph.D.

August 2007

- 14th American Waterjet Conference held in Houston, Texas
- Forrest Shook honored with the fourteenth Pioneer Award
- Service Award presented to Jetstream of Houston, LLP, and Super Products LLC; Safety Award presented to 2007 WJTA Vacuum Equipment Safety Committee; Technology Award presented to Mamidala Ramulu, Ph.D.
- WJTA safety manual, *Recommended Practices for the Use of Industrial Vacuum Equipment*, introduced to the general public

June 2008

 First WJTA seminar on industrial vacuum equipment held in Houston, Texas







2009 American WJTA Conference and Expo

Tuesday-Thursday, August 18-20, 2009 Marriott Houston Westchase, 2900 Briarpark Drive, Houston, Texas 77042

- Live, Onsite Demonstrations of a variety of waterjet applications (including cleaning, paint/coating removal, concrete preparation and testing of the effectiveness of safety equipment) and industrial vacuum/air moving operations.
- **Waterjet Expo** featuring displays of waterjetting equipment, systems and supplies and industrial vacuum/air moving vehicles.
- Waterjet Boot Camp—Industry experts offer information and suggestions on ways to help contractors buy smart, improve efficiency and generate profitable new business.
- Pre-Conference Workshops
 - Waterjet Technology Basics and Beyond
 - Vacuum Equipment Safety Seminar
- **Emerging Technology, New Applications**—Hear some of the world's foremost engineers and researchers share new developments in applications, mechanics, equipment, and procedures.

The **WJTA Conference and Expo** is unique in that the program is dedicated to high pressure waterjet technology and related industries. If you are involved in high pressure waterjetting for cleaning, surface preparation, industrial vacuuming/ air moving for industrial cleanup/recovery, waterblasting or cutting, or if you are interested in finding out more about the industry, the **WJTA Conference and Expo** is an ideal resource for information and an excellent meeting for networking with other professionals in the field.

Hotel Reservations at the Marriott Houston Westchase. The Marriott Houston Westchase, 2900 Briarpark Drive, Houston, Texas 77042, is the central location for the WJTA Conference and Expo activities. The Marriott is a **smoke-free** facility. For reservations, call toll-free **800-452-5110** or contact the Marriott directly at **713-978-7400**. Be sure to identify yourself as attending the WaterJet Technology Association Conference to receive the special group rates of **\$149 single/double occupancy.** August 2, 2009, is the deadline for guaranteed room availability. Reservations received after August 2, 2009, will be confirmed on a space available basis. Rooms may still be available after August 2, but not necessarily at the rates listed above.

Visit www.wjta.org for Conference information or contact: WJTA, 906 Olive Street, Suite 1200, St. Louis, MO 63101-1448 Phone: 314-241-1445, Fax: 314-241-1449, Email: wja@wjta.org

Terydon Announces New Website

rydon, Inc., manufacturer of specialty waterjetting and waterblasting accessories, has announced its new website, www.terydon.com.

Terydon Inc. specializes in ultrahigh systems and tooling designed per customer request, as well as manufactures a well-established line of dependable and versatile waterjetting accessories. Terydon has created a number of costeffective designs that have not only resolved unique challenges in previously unapproachable situations, but have developed into well-respected standards for the waterjetting industry. From hand-held to automated, surface prep and vac assisted to tank/stack/ pipe cleaning systems, heat exchanger and abrasive cutting waterjet systems, find out how Terydon Inc. meets your own specific needs.

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new Mid Rail Gantry Waterjet System featuring an 8 x 13-foot work envelope with an exposed tank that easily accommodates overhead loading. It comes standard with one abrasivejet cutting head; a second

Waterjet System

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and can be configured so that all

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Jet Edge Introduces New Mid Rail Gantry

8 x 13-foot Waterjet Table Features **Exposed Tank for Easy Overhead** Loading

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Conference and Expo August 18-20, 2009 Announcement and **Call for Papers**

2009 American WJTA

See page 21

Ya están disponibles Las Prácticas Recomendadas Para el Uso de Equipo Industrial de Succión al Vacio

The Spanish translation of the *Recommended Practices for the Use of Industrial Vacuum Equipment*, ideal for Spanish-speaking employees and customers, is now available.



Topics include injury potential, seeking medical attention, damage, explosion

hazards, types of trucks, getting started, pre-job preparations, working safely, job completion, loading/ off-loading, equipment maintenance, and regulations and certifications.

The Spanish and English *Recommended Practices for the Use of Industrial Vacuum Equipment* are available for:

WJTA	Nonmember
Member	

1-10 copies	\$ 7.00	\$ 12.00
11-99 copies	\$ 6.00	\$ 10.00
100 or more copies	\$ 5.00	\$ 8.00

plus shipping and handling. To place an order, see the WJTA order form for publications/products on page 27 or contact the WJTA office.

KMT Waterjet Systems Introduces The Streamline[™] PRO 90,000 PSI/6.200 bar Ultra High Pressure Pump

K MT Waterjet Systems Inc., manufacturer of high pressure, precision pumps and components for waterjet cutting systems, has introduced the next generation of waterjet pumps, an ultra high pressure (UHP) 90,000 PSI/6.200 bar pump.

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KMT Streamline PRO Pump

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increased operating benefits of the Streamline[™] PRO pump will provide a reduction to the long-term capital expenditure.

The precision accurate Streamline[™] PRO pump is the most advanced KMT waterjet system delivering maximum power and performance. For more information about KMT Waterjet Systems, go to www. kmtwaterjet.com or call 800-826-9274.

StoneAge Sabertooth Dual Hose Reel

S toneAge, Inc., has introduced the Sabertooth Dual Hose Reel for cleaning large vertical tube bundles. Combined with the Banshee rotary blast nozzle, the Sabertooth is much easier, faster, and safer than hand lancing.

The operator controls the powered hose reel, which does the physical work. One man can clean two tubes faster than two men working manually. The Sabertooth eliminates the tangle of hose and back-breaking work of hose lifting and twisting and allows for high-pressure cleaning both going down and back up.

For more information, visit www.stoneagetools.com.



October 2008

Maxpro Technologies Now Offers Autofrettage Heavy Wall High Pressure Tubing

A utofrettage is the process of subjecting the internal bore of tubing to a pressure sufficiently high enough to plastically deform the bore, resulting in putting the inner wall into compression, providing a residual compressive stress once the pressure is released. Autofrettage produces improved fatigue life of the tube, important in production waterjet cutting applications, thus reducing down time.

Maxpro's stock of high pressure tubing, valves and fittings are available for fast shipment from inventory. With this new capability to autofrettage tubing, customers can continue to expect the high level of service and quick turnaround that Maxpro Technologies is known for.

Maxpro Technologies is the North American distributor of Maximator high pressure valves and fittings as well as power products including liquid pumps, gas boosters and air amplifiers. Maxpro also designs and manufactures various pressure systems utilizing these Maximator power products as the main power source.

For more information, visit www.maxprotech.com, or contact: MAXPRO Technologies, 7728 Klier Drive South, Fairview, PA 16415, Phone 814-474-9191, Fax 814-474-9391.

The *Jet News* is published by the WaterJet Technology Association (WJTA) and is a benefit of membership in the Association.

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TurtleSkin WaterJet Protection



Superior UHP water jet protection. WaterArmor is tested and proven to stop injuries at flow rates as high as 11 gpm at 20,000 psi and 5.5 gpm at 40,000 psi.

Rugged, patented material is lightweight and flexible. Adjustable, modular design for comfort and increased productivity. Each panel moves independently, allowing for greater flexibility and ease of use.

Conjet Invests €1M In Major Expansion

C onjet AB, a specialist in the design and manufacture of remotely operated highpressure waterjetting hydrodemolition machines, is expanding its headquarters manufacturing facilities at Haninge, 20km south of Sweden's capital Stockholm. Conjet has committed investment capital of €1M for the building of these new facilities, which is in direct response to the continuing and growing worldwide demand for its products and services, ensuring that Conjet AB stays at the forefront of the world's hydrodemolition equipment industry.

Conjet is extending its equipment assembly building to cope with the increasing business. The new extension will more than double the assembly area and houses a much larger parts stock holding section. "The new 1000m² extension, which we started in March and expect to be complete by October 2008, is needed to cater for the increasing demand worldwide for our hydrodemolition equipment. The extra space will enable us to boost our capacity and considerably reduce our assembly times with the same number of employees and fulfil the needs of the future," says Conjet AB President Carl Stromdahl.

Conjet currently offers an extensive range of remotely operated computer controlled hydrodemolition equipment, including a range of Robots and Jetframes together with tailor made hydrodemolition units, which can connect to Conjet Powerpacks or other high pressure water pumps. The company is currently working on several developments to further extend the product range.

For further information, visit www.conjet.com.



Conjet is investing €1M extending its headquarters manufacturing facilities, which will boost capacity and reduce assembly times.



The expansion will more than double the assembly area and is in direct response to the continuing and growing worldwide demand for its hydrodemolition services and products, such as the latest Conjet 364 Robot.

Safety Committee Solicits Comments On Improvements To Recommended Practices

The WJTA Safety Committee hereby solicits comments regarding improvements to the publication, Recommended Practices for the Use of Manually Operated High Pressure Waterjetting Equipment. While Recommended Practices is reviewed periodically at the biennial conferences of the WaterJet Technology Association, your comments and suggestions for improving the publication are invited and welcome anytime.

Please address your comments and suggestions to: Safety Committee, c/o WJTA, 906 Olive Street, Suite 1200, St. Louis, MO 63101-1448, phone: (314)241-1445, fax: (314)241-1449, e-mail: wjta@wjta.org, web site: www.wjta.org.

New NLB 3-D Tank Cleaning Heads Improve Uptime

T wo new NLB 3750 3-D tank cleaning heads from NLB Corp. feature a redesigned hub assembly that triples the seal life of previous models and greatly simplifies seal replacement, reducing downtime. Both deliver the 3-D cleaning action made popular by previous NLB models, with rotating high-pressure waterjet nozzles mounted on a revolving head to maximize interior coverage in tanks and reactors.

The NLB 3750-85 operates at from 4,000 to 13,000 psi (275 to 900 bar) with a flow rate of 80 gpm (302 lpm). The NLB 3750-110 operates at from 4,000 to 8,000 psi (275 to 550 bar) and 110 gpm (416 lpm). Both have stainless steel bodies for durability and ease of cleaning.

High-pressure waterjets remove chemical and resin build-up from

tanks and reactors faster and more thoroughly than manual methods,

while eliminating the need for anyone to enter a confined space. They are environmentallyfriendly, since they use nothing but water.

NLB offers a range of 3-D

tank cleaning heads from 3,000 to 20,000 psi (210 to 1,400 bar), with a variety of arms, telescopic lances and related accessories to suit a variety of applications. For more information, visit www.nlbcorp.com.

NLB3750

Safety Devices For Pipe And Tube Cleaning, from page 4

These devices are not designed to stop a tool that turns around in a pipe — other means should be taken

to ensure that this does not happen, such as using a stinger behind the tool to create a straight rigid length at least 1.5 times the inside diameter of the pipe being cleaned. The full face



Jointed arm backout device for tube cleaning, clamped to flange of bundle

plate type of back-out preventer offers some protection from a reversing tool, but the full face is primarily intended to deflect debris and water exiting the pipe. These should be mounted with a gap between the end of the pipe and the plate to allow room for material to escape as the pipe is cleaned. The design for tube cleaning may include a shroud for the nozzle to be pulled back into, allowing complete cleaning of the tube while protecting the operator from the jets. No matter what equipment or method is used for pipe and tube cleaning, a dump valve that will automatically relieve the water

pressure when released should always be used, and controlled by the

by the person nearest the exit of the r



Plate type with strap for securing to flangeless pipe

exit of the pipe being cleaned.



ARD Robotics, Inc., a new company under the leadership of Richard Ward, Tallmadge, Ohio, manufactures intuitive multi-axis servo control packages. Complete bolt-on packages with motors, cabling, distributed I/O, custom user interfaces, detailed data tracking, internet connectivity, and e-mail notification are available.



WARD Robotics_X-Series Controller

Controllers are intuitive, friendly, and attractive, yet can still be loaded with the features, including consumable tracking, time estimation, easy setup, automatic e-mail notification, detailed data logging and sorting, and easy remote diagnostics and tech support.

For more information, contact Ben Adams, 330-677-9100; sales@ wardrobotics.com, www.wardrobotics. com.



Flow International Corporation To Begin Work On The Airbus Contract

F low International Corporation NASDAQ: FLOW), developer and manufacturer of industrial waterjet machines for cutting and cleaning applications announced that it has received purchase orders for four systems under the recently awarded contract to exclusively supply Airbus with Composite Machining Center (CMC) abrasive waterjet and routing machine tool systems to support the production of its upcoming A-350XWB. The purchase orders were for a CMC to machine the keel beam section in Nantes, France, a CMC to machine the cockpit section 11 and 12 in Meaulte, France, a CMC to machine forward fuselage panels section 13 and 14 in Nordenham, Germany, and a CMC to machine forward fuselage panel section 19 in Illescas, Spain. The total value of the four purchase orders exceeds \$13 million in revenue and is now in Flow's backlog. These purchase

orders represent a portion of the total Airbus contract that is expected to exceed \$30 million. It is expected that the balance of the machines for the contract will enter into backlog by late summer 2008. All systems under the contract are expected to be built and installed over the next one to two years.

For more information, visit www. flowcorp.com.

Companion Video for the English *Recommended Practices For Industrial Vacuum Equipment* Under Development

The Vacuum Equipment Safety Committee of WJTA is developing a companion video on CD-ROM and VHS for the English Recommended Practices for Industrial Vacuum Equipment. The video will be in English and will offer a visual depiction of major topics in the Recommended Practices manual, including types of equipment, applications, safe operations, hazards and controls, static electricity, degree of vacuum, vacuum breaker, burns, overhead obstructions, high voltage electrical hazards, chemical hazards, fires and explosions, job setup, protective gear, inspections, material handling, hoses and fittings, and job completion.

Special thanks to CEDA International Corporation, Guzzler/ Vactor, and Super Products LLC for contributing time, equipment and expertise to the creation of this important safety video. Filming is underway in three locations. The finished product will be released in February 2009. Pre-release orders are being accepted. Prices are:

	WJTA Member	Nonmember			
1-4 copies	\$49.95 each	\$99.95 each			
5-10 copies	\$39.95 each	\$89.95 each			
11 or more copies	\$29.95 each	\$79.95 each			

plus shipping and handling. To place a pre-release order, see the WJTA order form for publications/products on page 27 or contact the WJTA office.

Recommended Practices for Manually Operated High Pressure Waterjetting Equipment

WJTA also offers the *Recommended Practices for the Use of High Pressure Waterjetting Equipment* in English and Spanish. Topics include suggestions for personnel qualifications, operator training, and procedures for the proper operation of manually operated high pressure waterjet equipment used by the construction, maintenance, repair, cleaning and demolition industries.

The Recommended Practices Safety Video, available in CD-ROM or VHS, is the companion video to the Recommended Practices for the Use of Manually Operated High Pressure Waterjetting Equipment. The video is a visual depiction of the major topics in the Recommended Practices.

To place an order, see the WJTA order form for publications/products on page 27 or contact the WJTA office.

Federal Signal Expands Services At FS Solutions Center In Leeds, Alabama

F ederal Signal Environmental Solutions Group has announced that the FS Solutions center in Leeds, Alabama, now offers Jetstream waterblast unit rentals, parts and accessories and training to better serve industrial cleaning contractors, plant customers and other industry professionals. The addition of renting Jetstream waterblasters at the Leeds center allows industrial cleaning customers to get waterblast equipment and parts locally and have equipment serviced either on site or in the field.

"The industrial cleaning landscape has changed in the past two years, and FS Solutions is changing right along with it to meet the needs of our customers," said Bryce Mulligan, rental manager for FS Solutions. "Our contractor customers are now pursuing cleaning projects outside their local geographic areas, sometimes requiring them to travel over long distances. They are also working on short-term or seasonal contracts that might require waterblast rentals. No matter where they go, or how long the project takes, our customers need a solutions provider, like FS Solutions, that can support all their waterblasting needs."

Located in the suburbs of Birmingham, Alabama, the FS Solutions center stocks high performance parts and accessories for Federal Signal's Guzzler, Vactor and Jetstream brands – as well as other makes and models of waterblasters and vacuum loaders – and also offers used equipment sales and service and refurbishing and major component rebuilding services.

To help local customers with their waterblast rental needs, the Leeds center is staffed by knowledgeable employees with significant waterblasting experience. "Renting Jetstream waterblast units allows the customer to try before they buy," Mulligan said. "We offer a rent-toown program that allows the customer to apply a portion of the rental fees towards paying down the purchase price."

(continued on page 23)



Flow Ranked #40 in Deloitte's Technology Fast 50 Program for Washington State

F low International Corporation (NASDAQ: FLOW), developer and manufacturer of ultrahigh-pressure (UHP) waterjet technology, has been named to Deloitte's prestigious Technology Fast 50 Program for Washington State, a ranking of the 50 fastest growing technology, media, telecommunications, and life sciences companies in the region by Deloitte & Touche USA LLP, one of the nation's leading professional services organizations. Rankings are based on the percentage revenue growth over five years from 2003–2007.

Flow's CEO Charley Brown credits increasing acceptance of ultrahigh-pressure waterjet cutting technology, demand for waterjet cutting of composites in the aerospace industry, and Flow's leadership and technological expertise in bringing 87,000 psi waterjet cutting to market with the company's 78 percent revenue growth from 2003–2007. Flow's revenue increase resulted in its ranking in the Technology Fast 50 for Washington State.

"We are pleased to be recognized by Deloitte for our hard work and resulting growth of waterjet cutting technology," said Brown. "Our growth over the past four years is testament to Flow's leadership position in the marketplace."

To qualify for the Technology Fast 50, companies must have had operating revenues of at least \$50,000 in 2003 and \$5,000,000 in 2007, be headquartered in North America, and be a company that owns proprietary technology or proprietary intellectual property that contributes to a significant portion of the company's operating revenues; or devotes a significant proportion of revenues to the research and development of technology. Using other companies' technology or intellectual property in a unique way does not qualify.

Companies from the regional Technology Fast 50 programs in the United States and Canada are automatically entered in Deloitte's Technology Fast 500 program, which ranks North America's top 500 fastest growing technology, media, telecommunications and life sciences companies.

For more information, visit www. flowcorp.com.



with the 325 Series, NLB again meets customer needs, bringing convertible water jet technology and quick-change fluid ends to quintuplex pumps. We now offer 22 convertible models, the most in the industry, with an unbeatable range of pressures, flows and horsepower.

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12405D	50	12,000				
10405D	60	10,000				
8405D	74	8,000				
Model 365 (365 HP)						
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20365D	27	20,000				
15365D	34	15,000				
12365D	42	12,000				
10365D	51	10,000				
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2009 American WJTA Conference And Expo

August 18-20, 2009

Marriott Houston Westchase Hotel • Houston, Texas, USA

Announcement and Call for Papers

Impressive progress and a fast-growing understanding of the diversified applications of waterjet technology are generating a growing excitement in the industry. New techniques and applications are being developed and current ones are being improved. Waterjet technology, now being used in nearly all types of industry — manufacturing, mining, construction, concrete, stone, aerospace, engineering, oil and gas, power plants, process, and medical industries — continues to expand at a rapid pace.

The **2009 American WJTA Conference And Expo** will focus, from a practical and scientific viewpoint, on the most up-to-date advances in waterjetting equipment, techniques, and applications. The areas to be addressed include, but are not limited to:

- Abrasives, Water, and the Environment
- Advanced Industrial Applications
- Advances In High Pressure Technology and Equipment
- Automotive and Aerospace Applications
- Cleaning and Coating Removal
- Components and Systems
- Construction and Non-Manufacturing Applications
- Contractor Applications and Processes
- Demilitarization, including Removal of Land Mines (Demining)
- Drilling Applications
- Excavation, Tunneling, and Mining Applications

- Hydrodemolition
- Hydroexcavation
- Jet Mechanics and Visualization
- Jet-Material Interaction
- Manufacturing Processes
- Market and Future Needs
- Novel Jets and Applications
- Process Modeling and Control Studies
- Rock Cutting
- Safety, Training, and Environmental Protection
- Vacuum Equipment

Commercial and academic authors are encouraged to submit titles and abstracts for consideration. To submit an abstract(s), please complete the abstract submission form on the back of this sheet, attach a copy of your abstract(s), and forward to the attention of the Conference Coordinator at the WaterJet Technology Association. An electronic submission form can be found on the WJTA web site at www.wjta.org. The deadline date for submission of abstracts is December 31, 2008.

An Abstract Review Committee consisting of five referees will review the abstracts. Authors will be advised by **February 27, 2009**, regarding the decision of the Abstract Review Committee.

The 2009 American WJTA Conference And Expo is organized by the **WaterJet Technology Association**. The WaterJet Technology Association looks forward to providing this forum and to your involvement and participation.

Authors - Please Note

- Papers must be original. Papers must not have been published elsewhere or be pending publication.
- Publication Fee. A nonrefundable publication fee (equal to the price of a member Full Conference registration) is required. This publication fee will be waived if at least one author registers (Full or Combo) for the WJTA Conference. (Authors must pay the applicable member or nonmember price.) Also, one registration is good for multiple papers. The deadline date for receipt of your final paper will be May 4, 2009. The publication fee or payment for a Full or Combo registration is due no later than June 15, 2009. Your paper will NOT be included in the *Proceedings* if the publication fee or registration fee is not paid by this date.
- Papers and presentations must be in English. Papers should be no longer than 15 printed pages. A "Paper Guide" containing directions for submitting papers will be forwarded to you after your abstract is accepted. Papers that do not follow the "Guide" will be returned to the author(s) for correction(s) or charged a fee for revisions made by the WaterJet Technology Association office.
- Papers should be free of commercialism.
- Papers should be submitted as a Word file and a PDF file.

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Abstract Submission Form

For each paper to be submitted for consideration, please complete this form, attach a copy of the abstract, and mail or fax to WJTA by December 31, 2008. An electronic submission form can be found on the WJTA web site at www.wjta.org. Authors will be advised by February 27, 2009, regarding the decision of the Abstract Review Committee.

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*August 18 is reserved for the short course(s).

Mail completed form and abstract, NO LATER THAN DECEMBER 31, 2008, to: Conference Coordinator, 2009 WJTA American Waterjet Conference, WaterJet Technology Association, 906 Olive Street, Suite 1200, St. Louis, MO 63101-1448, USA, telephone: (314)241-1445, fax: (314)241-1449, email: wjta@wjta.org, web site: www.wjta.org

Jet Edge Appoints New South Central Regional Sales Manager

J et Edge, Inc., has appointed Tony Valencic as its new South Central regional sales manager.

Valencic is responsible for sales of Jet Edge waterjet systems in Texas, Colorado, New Mexico, Kansas, Oklahoma, Missouri, Arkansas and Louisiana. He brings to Jet Edge more than 30 years



Tony Valencic

of experience in machine tool sales, including previous experience selling precision waterjet cutting systems, tooling systems and machining centers.

Valencic is a graduate of Cleveland State University. He is based in Dallas and can be contacted at 612-751-3842 or tonyv@jetedge.com.

Federal Signal Expands Services At FS Solutions Center, from page 19

A customer looking for an extra waterblaster for a short-term project can choose from a full line of Jetstream units – from 170- to 300-horsepower units. Customers can pick up the rental units directly from the Leeds office or FS Solutions will deliver the rental unit directly to the job site.

"FS Solutions is committed to creating long-term partnerships with our customers by offering reliable and dependable products, parts, services and solutions they need to run their equipment more profitably," Mulligan said. "We also provide our customers with the training they need to develop a better understanding of pressure versus flow and to find the best nozzles for different materials and applications so they can operate their equipment safely and be more efficient on the job."

FS Solutions centers are located in Houston, Texas; Leeds, Alabama; Long Beach, California; Streator, Illinois; and Toledo, Ohio. For more information about products and services available from the FS Solutions centers or to find the nearest location, call 800/627-3171 ext. 298, or visit www.fssolutionsgroup.com.



New 40K-psi Direct Drive Pump For Water Blasting

ualJet, distributor for OH Precision (Taiwan), has introduced the 40K-psi triplex direct drive pumps, UH-210, for water blasting, surface preparation, and concrete demolition applications.

With this addition, QualJet now carries direct drive pumps in 100, 160, 200, 300, and 450 hp. OHP pumps are built on the same technology that has been used for the UHP water cutting industry. The same high-pressure seals that endure 60K psi are now "soothed" with 40K psi pressure. The lifetime of the seal set averages more than 500 hours and other key components last over 2000 hours. The UH-210 pump

operates at 205 hp and with a flow rate of 7 gpm at a pump speed of 490 rpm. The bare pump weight is 990 lbs.

For more information, please contact Qualiet at (866)782-5538 or info@qualjet.com.



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Power Zone Equipment, Inc. Bo Ward Aaron Hackerott Don Toews 46920 County Road E Center, CO 81125 Phone: (719)754-1981

Fax: (719)754-1982

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(continued on page 26)



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WJTA Welcomes New Members, from pg. 25

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BuTech 100 East Graham Place Burbank, CA 91502 Phone: (818)843-4000 Fax: (818)841-4291

Alain Verville

Paprima Industries, Inc. 75 Guthrie Dorval (Montreal), QC H9P 2P1 Canada Phone: (514)422-9555 Fax: (514)422-9777

Corporate Individuals

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CEDA-REACTOR LTD. 2130 121 Avenue NE Edmonton AB T6S 1B1 Canada Phone: (780)377-4312 Fax: (780)472-6812

Dyana Morton

EBBCO Inc 51536 Industrial Drive P.O. Box 729 New Baltimore, MI 48047 Phone: (586)716-5151 Fax: (586)716-4949

Jim Schweitzer

GapVax, Inc 9614 Vouvray Drive Baton Rouge, LA 70817 Phone: (713)201-2634 Fax: (225)753-4658

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J. Grant Eccleston

ECCO-Vac 266 Spanish River Drive Espanola, ON P5E 1A3 Canada Phone: (705)869-8789 Fax: (705)869-5588

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Evan Thornton

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The WJTA leadership requests that members respect the contact information of fellow members and not use that information for the dissemination of spam or junk email. Membership information is not meant to be circulated beyond the WJTA membership.



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