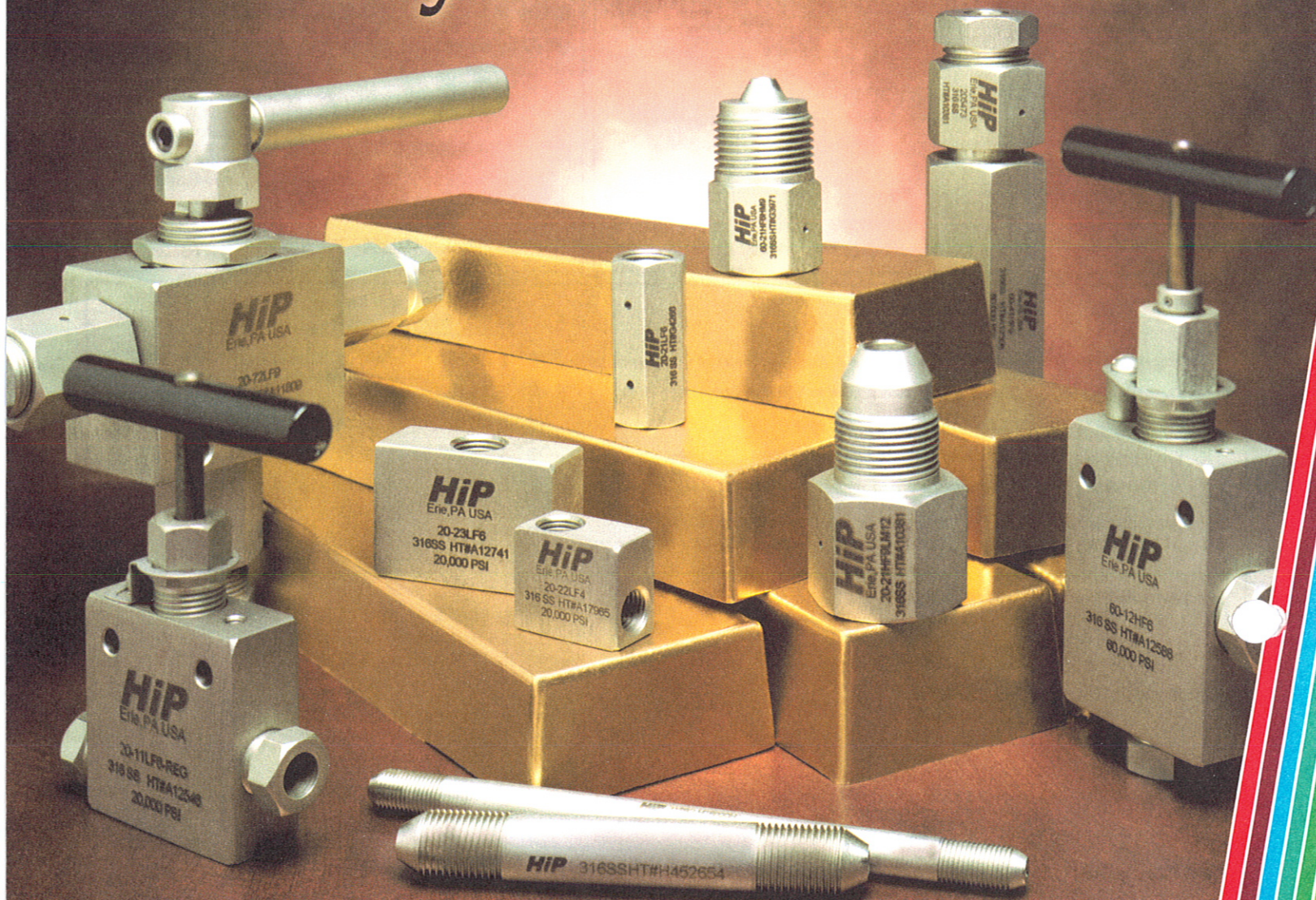


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Jet News

FEBRUARY 2003

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An Arizona Fountain

From the Center of a man-made lake, one of the "World's Highest Fountains" sends a snow-white jet stream of water 560 feet into the blue desert sky. It is the centerpiece and landmark of Fountain Hills, a community of rolling hills and spectacular mountain views located just east of Scottsdale, Arizona, thirty miles from downtown Phoenix.

The performance of The Fountain exceeds its nearest rivals. At Canberra, Australia, the Captain Cook Memorial Jet attains an operating height of 450 feet, while in Lake Geneva, Switzerland, Le Jet D'Eau has a maximum height of 435 feet, New York City's Delacourte Fountain rises 400 feet, and Pittsburgh's new Point Fountain, 500 feet.

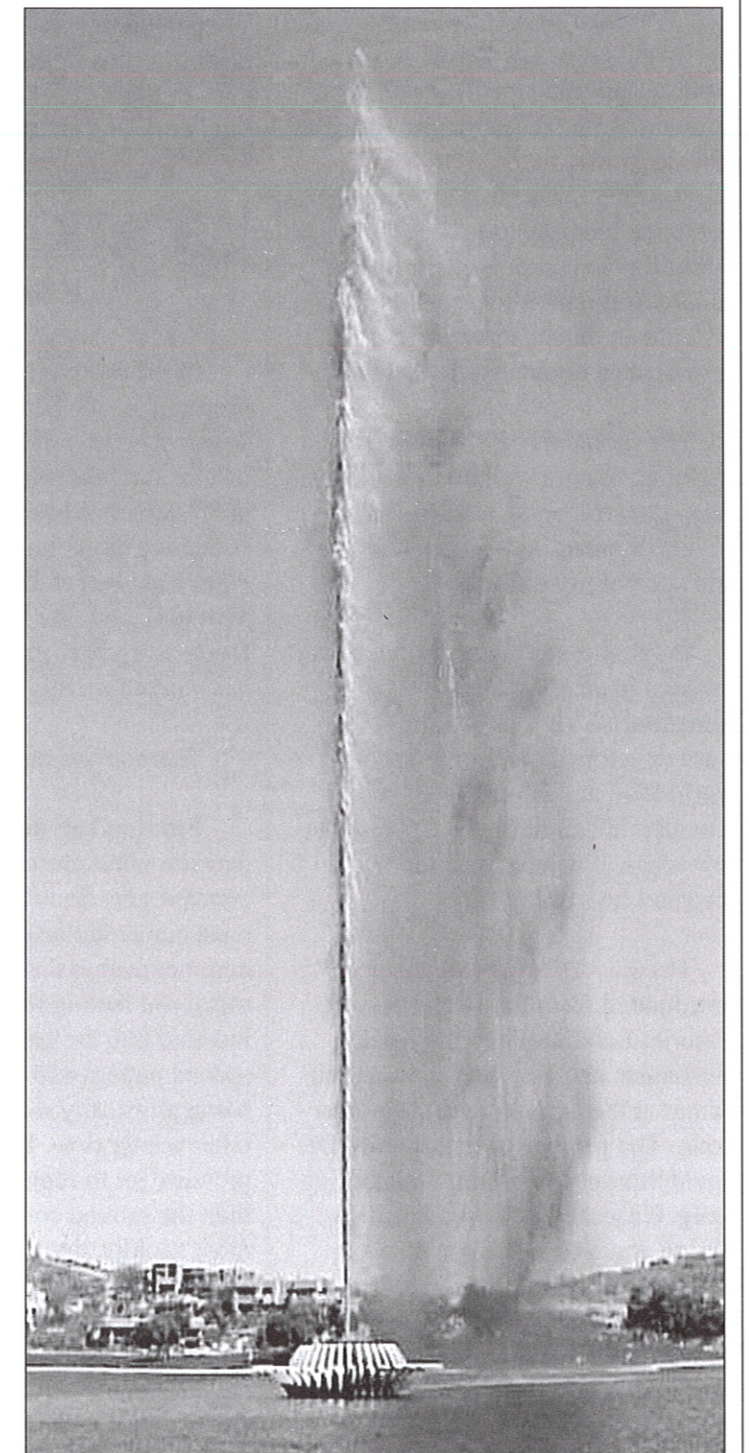
At 560 feet, being one of the "World's Highest Fountains" it is five feet taller than Notre Dame Cathedral in Paris. It reaches 110 feet higher than the Great Pyramid of Cheops in Egypt, and is more than three times as high as Old Faithful Geyser in Yellowstone Park.

A Dramatic Landmark

The Fountain is a sight to enjoy from almost every vantage point in Fountain Hills. It was conceived as a dramatic man-made attraction to accentuate the natural beauty of the surrounding desert hills and mountains. It is also symbolic of the spirit and enterprise of the people who live in this sunny, southwest region, the same spirit and enterprise that is making Fountain Hills an outstanding community for good living today and tomorrow.

Towering high above the lake, The Fountain dominates the view from The Avenue of the Fountains, a commercial thoroughfare in Fountain Hills. The center section of this palm tree-lined avenue has additional fountains, plus pools and waterfalls.

(continued on page 12)



The Fountain in Fountain Hills, Arizona. Photograph courtesy of the City of Fountain Hills, Arizona.

Landmine Destroyer Recognized By TIME Magazine

A landmine destroyer that utilizes waterjets to detect landmines was named by TIME Magazine as one of the 2002 best inventions in the home and safety category. An article announcing TIME's 2002 selections appears in the November 18, 2002, issue of TIME Magazine.

Invented by Dr. David A. Summers of the University of Missouri-Rolla, the landmine destroyer project, known as ELADIN (Eliminating Landmines by Aqueous Detection Identification and Neutralization) shoots water into a minefield and monitors sounds. The system can detect and disarm explosives without setting them off.

The problems of worldwide landmine use are well documented and many governmental, academic, and private organizations are working to find and get rid of mines.

In most cases the techniques that are used in clearing land for humanitarian reasons are similar to those developed during the Second World War, and while there is considerable money being invested in new ideas, few have become widely accepted and used.

The ELADIN project is being coordinated from the High Pressure Waterjet Laboratory of the Rock Mechanics and Explosives Research Center at the University of Missouri - Rolla. The project was started by Dr. David Summers working with Dr. Greg Galecki, Bob Fossey, Jim Blaine and Scott Parker on the waterjet parts and with Tom Herrick on the electronic detection. Robert Denier has been the graduate student most active in the development of the electronic equipment.



Landmine destroyer. Photograph courtesy of the University of Missouri-Rolla.

In the more recent parts of the program, as we have been asked to detect specific mine types rather than just locating the mine itself the signal processing has been under the collective direction of Sanjeev Agarwal, Daryl Beetner, Bob Mitchell, and Joe Stanley. Samir Dorle is another graduate student who has worked on this program.

There are three parts to the tool. Finding the mine. In the first part the mine must be detected. The concept goes back to two roots. In most humanitarian demining, the deminer probes the ground with a metal rod feeling for mines. The rod is inserted into the ground in a closely spaced pattern and the ground is thus being physically searched, and this takes a long time. If we used a high pressure jet to replace the metal rod then the ground could be probed much more rapidly since the jet of water can penetrate to depths over 8 inches (20 cm) in less than 0.014 seconds. But then how are we to know if it found anything?

Small children often play with water pistols. If they listen they will hear that the sound that the jet makes changes when it hits different things. We have found that we can tell, from the different sounds that we hear as the jet goes into the ground, what it is hitting. (We have also noticed that if you do this for a short while the operator can tell, from the way the ground moves, whether he has hit anything or not). So by feeding the sound heard by a microphone into a computer program developed by the signal processing team, we can tell what sort of object the waterjet hit.

Uncovering the mine. Once a suspected mine has been found (and with metal detectors only about 1 object in 300 or so that the detector identifies might turn out to be a dangerous mine) then the object has to be uncovered and inspected so that we can see what it is. Normally this is done by hand and may take about 20 minutes since it must be done very carefully.

With the waterjet system we use a second tool that can be located over the mine area. Three small waterjets spin around with a simple vacuum tube. (In an early model we used a common wet-dry shop vacuum for this). As the jets wash into the soil they break the soil into small particles that are pushed into the tube and sucked away. We can adjust the pressure so that there is very little force on the tool as this is done. (In one case we did not move a pebble that was sitting on a mine and which was only partially uncovered as we moved the soil). By doing this we uncover the object without moving or disturbing it so that it can be examined. It takes about a minute to

(continued on page 4)

WaterJet Technology Association's Order Form for Publications/Products

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		WJTA Member Price	Non Member Price	Shipping & Handling	
_____	Proceedings Book & CD-ROM of The 2001 WJTA American Waterjet Conference (2001)	@ \$ 130.00	\$ 155.00	\$ 8.00	= \$ _____
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A limited supply of the 6th and 7th Conference Proceedings are available for the cost of shipping (varies depending on destination). Contact WJTA for details.

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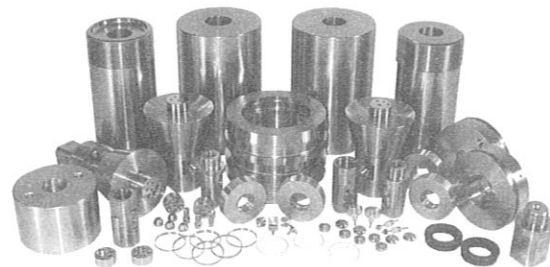
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Coverings 2003, a trade exposition for the ceramic tile, stone and floor coverings industry, Orange County Convention Center, Orlando, Florida. For more information, visit www.coverings.com or contact Coverings, 11940 U.S. Highway One, Suite 200, North Palm Beach, Florida 33408, phone: (561)776-0600 or (800)881-9400, fax: (561)776-7466, email: info@coverings.com

May 18-22, 2003

7th Pacific Rim International Conference on Water Jetting Technology, Seogwipo KAL Hotel, Jeju, Korea. Abstracts are now being accepted for the program. Contact Conference Chairman Prof. Chung-In Lee or Conference Secretary General Dr. Wan-Mo Kim, The Korean Society of Water Jet Technology, Research Institute of Energy & Resources, Seoul National University, San 56-1 Shilim-Dong, Gwanak-Gu, Seoul, 151-742, Korea, phone +82-2-880-7233, fax +82-2-873-2717, e-mail: kswjt@kojet.org, web site: www.kojet.org

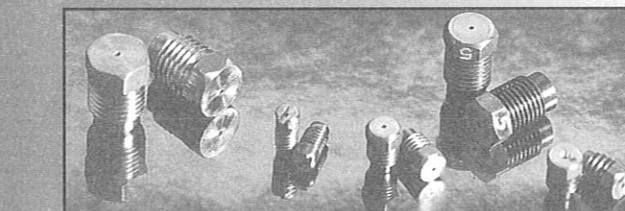
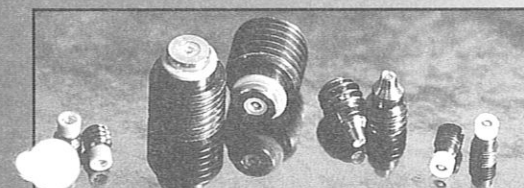
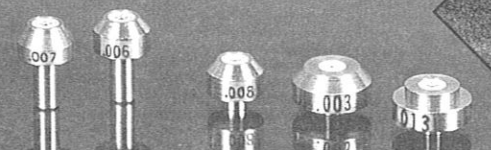
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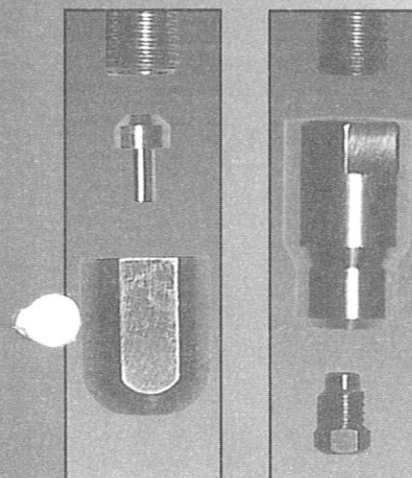
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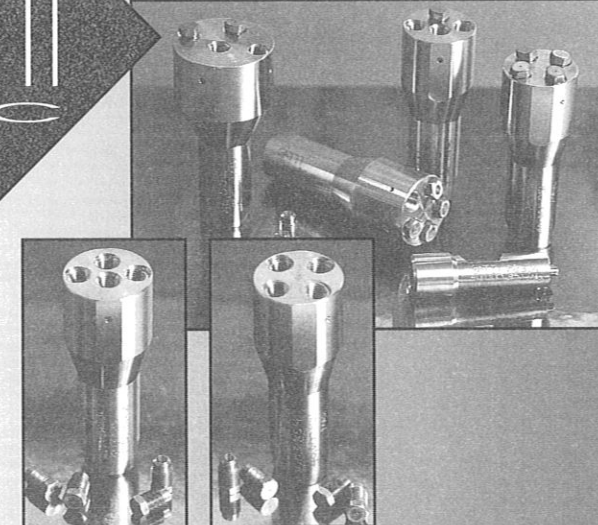
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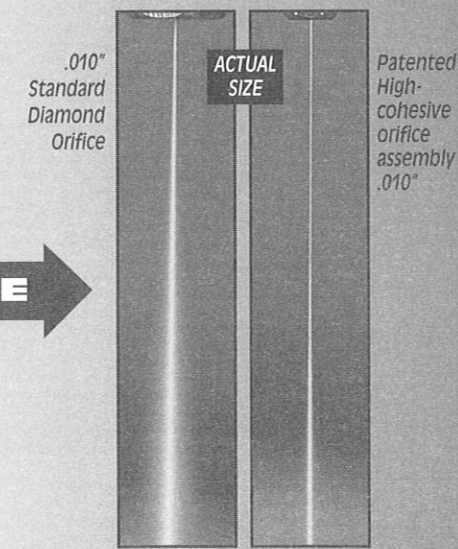
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Landmine Destroyer Recognized By TIME Magazine, from page 2

uncover the mine, depending on how deep it is and how big. Usually we only want to uncover part of the mine and make a gap alongside it so that we can lower our cutting tool into place.

We think this is a fairly safe procedure, but because others might not, we have made the tools so that this can be done from a distance so that everyone is well clear in case the mine goes off.

Disarming the mine. The most common way of getting rid of mines is to blow them up where they are. However, sometimes this is not the best answer. (They might be near something that might be badly damaged, such as a bridge). So we

have designed a third tool. This is also fed from the same high pressure water pump as the other two tools, but in this case a small amount of sand is mixed in with the water (about one pound of sand per gallon of water).

The resulting abrasive slurry jet will cut through just about anything it is likely to find. At a speed of about an inch and a half a minute it will cut through more than an inch of steel and most mines are not that solid. Because of the way the jet cuts it will cut through the explosive and can cut through the fuse without setting it off (we have done this). If done properly, it can be done without disturbing the mine, and the best way to do that is to automate this part of the process. So

the third tool has some remotely controlled motors that move the jet so that it cuts through the mine, destroying the fuse and, if needed, washing all the explosive out of the mine. The disabled mine can then be removed.

Congratulations to Dr. Summers and his colleagues at the University of Missouri-Rolla.

For more information regarding ELADIN, visit eladin.UMR.edu.

Article reprinted by permission from the University of Missouri-Rolla web site: www.eladin.UMR.edu/main.html.

A New Hose

SPiR STAR, Inc., manufacturer of high pressure hydraulic hose, now offers the new 5/6H Ultra hose. Built for punishment, the Ultra series has seen rigorous field testing in addition to demanding in-house trials. The results from these tests have proven this to be a product superior to anything like it before. With six spiral layers of wire, this robust hose has the muscle to handle the velocities and pressures that are capable of destroying most hoses. For the most demanding jobs, the new 5/6H Ultra will be the answer for your high pressure problem.

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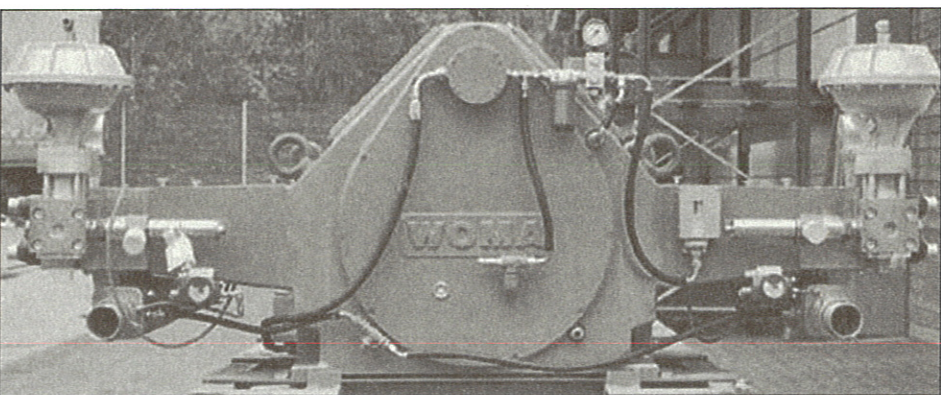
Attention: WJTA International Members

Effective January 1, 2003, the WJTA increased dues for individual and corporate members with mailing addresses outside the U.S., Canada, and Mexico by \$20 for individuals and \$60 for corporations. The dues increase is to cover the higher postage costs for mailing WJTA publications to international mailing addresses.

Repeated increases in postage have resulted in significant charges for mailing the *Jet News* and the annual *WJTA Membership Directory*. U.S. Air Mail is our preferred choice for forwarding publications to WJTA's international members because it is quick and dependable. Other less expensive delivery classes are available, but often result in a two to three week delivery time, and pieces may be lost in transit.

We appreciate your continued support and membership. If you have any questions, please contact the WJTA office.

WOMA Introduces New Boxer-Series Pumps



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WOMA has introduced its new Boxer-Series pumps to the high-pressure, high-volume pump market. It is well accepted that in many cleaning and surface preparation applications production increases as volumetric flow rates increase.

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	8,100	197

For more information on this or any other WOMA products please contact your local WOMA office or contact WOMA Corporation, PO Box 6793, Edison, NJ 08818, phone: (800)258-5530, fax: (732)417-0015, email: womacorp@bellatlantic.net, or visit www.womacorp.us.

The WJTA Recommended Practices Safety Video is now available on CDROM. See the order form on page 19 for details.

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Nominations Open For WJTA Board Of Directors

"Nominations for the WaterJet Technology Association (WJTA) Board of Directors are now open," says Dr. Andrew Conn, secretary of the WaterJet Technology Association.

"The WaterJet Technology Association needs dedicated directors to lead the members as the WJTA grows," says Dr. Conn, who is also chairman of the Committee on Nomination. "The duties of the directors are truly challenging and rewarding."

The terms of office of Craig Anderson, Pat DeBusk, Lydia Frenzel, Larry Loper, Forrest Shook and John Wolgamott will expire in August 2003. Therefore, nominations are sought for six (6) board members, each to serve a four-year term of office beginning August 16, 2003.

The WJTA bylaws provide that no more than one of the elected board members may be from the same company or organization. Therefore, board members may not be nominated from the same company or organization that are already represented on the board by individuals whose terms expire in 2005. These companies or organizations include: George A. Savanick, Ph.D., Andrew F. Conn, Ph.D., Onyx Industrial Services (Randy Kruger), JETECH, Inc. (G.J. DeSantis), University of Missouri-Rolla (David Summers, Ph.D.), and Flow International Corporation (Mohamed Hashish, Ph.D.).

According to the WJTA bylaws, any WJTA member in good standing (2003 membership dues paid) may submit a nomination(s). Nominees must also be WJTA members in good standing. The deadline for making nominations is **March 18, 2003**. Your nomination(s) should reach the WJTA office no later than **March 18, 2003**. To submit a nomination(s), complete the Nomination Form and return to:

Chairman, Committee On Nomination
WaterJet Technology Association
917 Locust Street, Suite 1100
St. Louis, MO 63101-1419
Phone (314)241-1445
Fax (314)241-1449

Remember, nominations must be received no later than March 18, 2003.

Nominations/Elections Procedures

In accordance with the bylaws of the WaterJet Technology Association, revised in 2002, nominations and elections to the Board of Directors include the following procedures:

- At least two calls for nominations to the board of directors will be published in the *Jet News*. The first call for nominations appears in this issue. **Nominations will be accepted through March 18, 2003.**
- An official ballot listing the eligible nominees and a brief biographical sketch for each individual will then be forwarded by mail to all eligible voting members of the Association on May 18, 2003. **Signed and executed, ballots must be mailed to the Association's office for tallying by July 3, 2003.**
- The names of newly elected board members will be announced in the *Jet News* and on the WJTA web site.

Only eligible members of the WaterJet Technology Association may submit a nomination and nominees must be eligible members of the WaterJet Technology Association.

WJTA Nomination Form

Name Of Nominee _____ Title _____

Address _____

City _____ State _____

Country _____ Postal Code _____

Telephone

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Attach biographical information with a brief statement of your nominee's mission and vision for WJTA.

Name Of Nominator _____ Title _____

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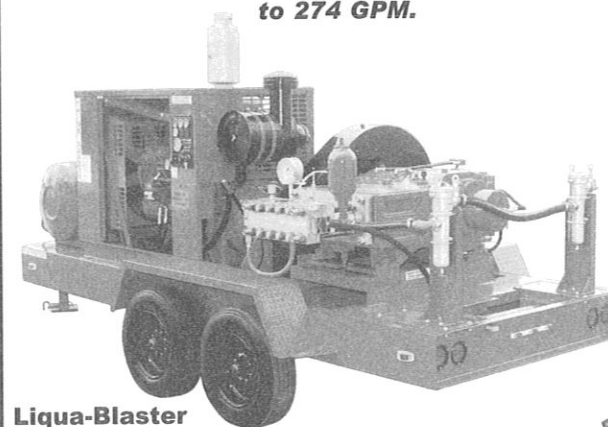
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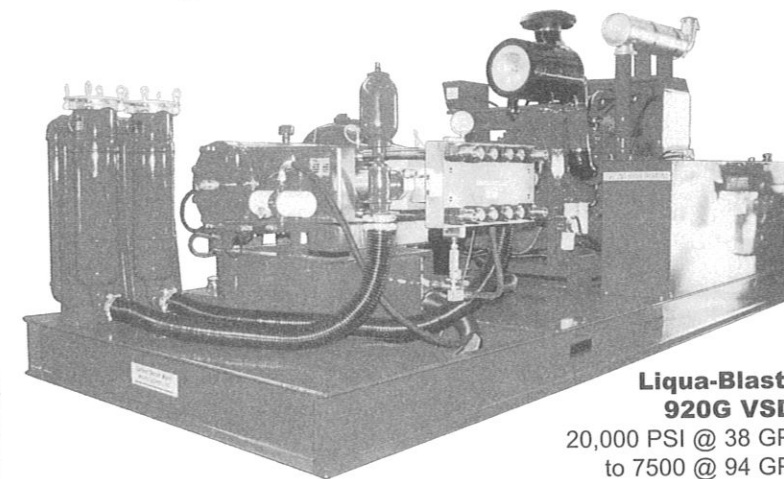
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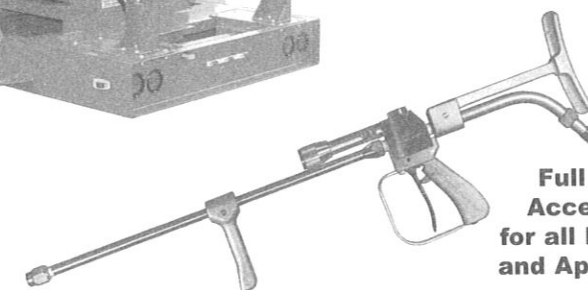
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People In The News

News From Flow International Corporation

The Board of Directors of **Flow International Corporation** has appointed **Stephen R. Light** as president and CEO of the company. Light's appointment was effective January 3, 2003. Since 2000, Light has been president and CEO of Omniquip, a leading manufacturer of light construction equipment and North America's largest producer of telescopic material handlers. Light has over 30 years of domestic and international capital goods manufacturing experience including 10 years with Emerson Electric Company and 17 years with various divisions of General Electric Company. His product experience encompasses high tech medical imaging and electronic devices and complex engineered systems.

"Stephen is an outstanding executive, and we are excited that we have attracted a CEO of his caliber," says **Kathy Munro**, chairman of the board. "We believe Stephen brings the execution skills the company needs to fully exploit our technology. His success in corporate turnarounds has been based on rigorous management of corporate resources, operational cost reductions, and a strategy focused on customer needs and market expansion."

Light adds, "I am delighted to join Flow International and look forward to instilling operational excellence across the key processes of this company."

In other developments, **Rick Fox**, age 55, was appointed to FLOW's Board of Directors. Mr. Fox brings more than 30 years of financial expertise including extensive experience in both domestic and international corporate finance, operations, and mergers and acquisitions. He has served as president and COO of CyberSafe Corporation; as CFO and a member of the Board of Directors of Wall Data, Inc; and as a senior vice president at PACCAR where he was actively involved in management of the European operations. Prior to these positions, he was at Ernst & Young for 28 years where he focused on the manufacturing sector and last served as managing partner of the Seattle office. In particular, his manufacturing and technology background is expected to benefit FLOW. Among his other duties, Mr. Fox will serve as the chairman of Flow's Audit Committee.

"We could not be more pleased to have someone of Rick Fox's caliber join the board," states Kathy Munro. "Rick is one of the most respected financial names in Seattle. He brings outstanding experience, which will be immediately valuable to the company."

Mike O'Brien, chief financial officer, has left the company to take a similar position with a Seattle-based medical device company. Mr. O'Brien assumed the CFO responsibilities in September 2001 from **Stephen Reichenbach**, who accepted the CFO position of the company's wholly owned subsidiary,

Avure Technologies. Mr. Reichenbach, who was FLOW's CFO from 1996-2001, will assume the position of acting CFO and is working closely with Mr. O'Brien to ensure a smooth transition. Mr. Reichenbach will also continue in his role with Avure.

For more information, visit www.flowcorp.com.

James D. Philpott Appointed COO of Rampart Hydro Services

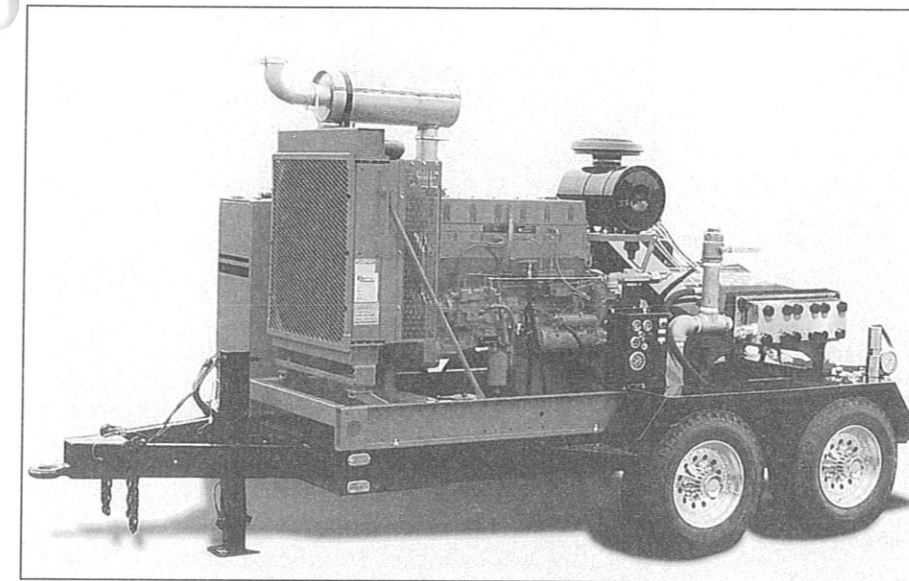
Rampart Hydro Services has appointed **James D. Philpott** as the company's new chief operating officer (COO).

Mr. Philpott was formerly a senior consulting engineer with PPG Industries International in Brazil and, prior to that, senior consulting engineer for PPG Industries in Allison Park, Pennsylvania. He brings to the position 36 years of engineering experience and significant background in plant design and construction. He holds a BS degree in engineering from the University of Missouri-Rolla and an MBA from Gannon University.

As Rampart's new COO, his responsibilities will include management of equipment, technical training programs and operations.

For more information, visit www.rampart-hydro.com or call (412)262-4511.

New NLB Pump Cuts Fluid End Conversion To 20 Minutes



NLB 225 Series Convertible Waterjet Pump Unit

The new 225 Series waterjet pump units from NLB Corp. can be converted in just 20 minutes to operate at pressures of 10,000, 12,000, 20,000 or 24,000 psi (690 to 1,680 bar). These exceptionally versatile units offer users a wide range of pressures, flows and horsepower to match to their jobs.

The 225 Series has a unique, swing-out fluid end to allow easy access for changing the plungers and related components, which are all provided in NLB's quick-change conversion kit. These are the first pumps to offer convertibility without requiring a manifold or gauge change.

The NLB 225 Series pumps can be ordered with a 200, 230 or 275 HP diesel engine (149, 172 or 205 kW).

Flows can range from 10 to 38 GPM (38 to 142 LPM).

Like all NLB pumps, these new models are designed for long life and low operating costs. They feature a slow-running triplex design that minimizes wear, with hard-coated valves and plungers. Corrosion-resistant stainless steel, rather than carbon steel, is used throughout the pump.

NLB manufactures a full line of quality waterjetting systems and accessories for contractor and industrial uses. These include surface preparation, paint removal, tank cleaning, concrete hydrodemolition, concrete and pipe cutting, and more. For more information, visit www.nlbcorp.com or call: (248)624-5555 or fax (248)624-0908.

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

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For Sale

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Waterjet Cutting Courses Offered

RICHEL, Inc., a full service waterjet consulting and engineering group in Kent, Ohio, is offering its 35th and 36th Waterjet Cutting Techniques Courses, Sunday through Tuesday, March 2-4 and again on May 18-20. These courses are designed to provide rigorous hands-on training in waterjet cutting as well as a foundation in the basic principles of waterjet technology, operation, and practice including comparison of waterjet with laser, plasma and oxy-fuel.

The presentation is supported with video, computer generated interactive displays, CAD/CAM and controller demonstrations and will provide information on abrasive recycling. This is not just a seminar; it's an opportunity to scan, program and cut parts, rebuild cutting heads and intensifier pumps, and run a waterjet.

Training will be held at **RICHEL**, Inc., 4485 Crystal Parkway, Suite 100, Kent, Ohio (south of Cleveland). To enroll and obtain more information please call (330)677-9100, fax: (330)677-9121; email to richel@richel.com; or visit www.richel.com.

Ward 2 Recycling Systems Continue To Cut Operating Costs

WARDJet, Inc., offers two recycling systems, the WARD 1 for large users and the new WARD 2 for smaller waterjet companies not previously able to utilize or justify the larger WARD unit. The WARD 2 is simple and convenient and sells for a fraction of the cost of the larger model. Plug the WARD 2 into a 110v outlet, connect an air and water hose and removal and recycling starts.

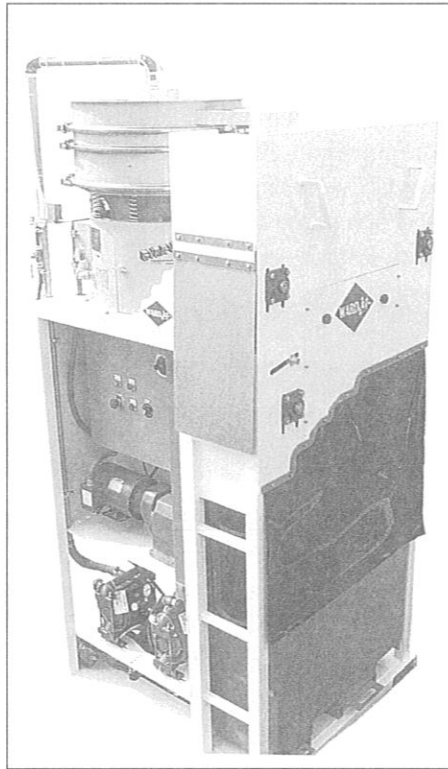
The WARD 2 is 42 x 42 inches and can be mounted with wheels to be moved easily around on a shop floor for use with multiple waterjets, even at different geographic locations. Another feature is the option to produce two different grades of recycled abrasive at the same time allowing the owner to recover a much greater percentage of abrasive.

Expanding Into The European Market

With sales approaching 100 of the proven and tested WARD 1 and newly launched compact WARD 2 units and one to two systems shipped and installed per week, WARDJet, Inc. based in Kent, Ohio, has started manufacture of the units in Europe to meet the rapid increase in demand for the WARD systems in Europe and the UK.

"We have been able to use the best of both sides of the Atlantic in maintaining excellent pricing of the WARD units in Europe by supplying several components from the USA, while sourcing others in Europe," says Richard Ward, CEO of WARDJet, Inc.

WARD units have been sold in the USA now for over four years, leading recycling technology worldwide, with customers such as Lockheed Martin



(WARD 1), General Motors (WARD 1), ABB (a WARD 1 and a WARD 2), Castle Metals (four WARD 1 units), Raytheon Aircraft (WARD 2), C & D Aerospace (WARD 1), the United States Army and Navy (WARD 1 units) and scores of smaller companies throughout the United States and Canada.

WARDJet started selling into Europe in 1999, using airfreight to deliver the WARD units. However, as demand has soared along with WARDJet's reputation of producing and supplying systems that are easy to use and reliable while producing an excellent recycled abrasive, the need became clear that production of the WARD units needed to be local to Europe for European sales.

WARDJet chose the town of Rotkreutz, just outside Lucerne, Switzerland to be its production base for Europe. "We wanted to have a location that was central to Europe in

an industrial area where we could outsource some of the components such as the frame," says Ward. The factory is only thirty minutes from Zurich, which is easy to fly into from anywhere in Europe and other areas of the world.

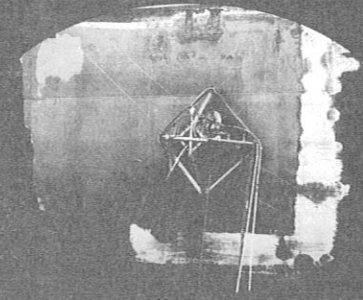
WARDJet also has a WARD 1 in operation at a job shop in Zurich about ten minutes from the airport, making it easy to see a system in operation for prospective clients.

With sales expected to exceed 150 units worldwide for 2003 alone, it does seem that waterjet operators are at last taking the time to notice that the savings generated from recycling are so great that, without recycling, they could be putting their very future of their companies at risk.

"Recycling has allowed WARD owners to increase their profit margin more than any single contract ever could, with some WARD owners quoting recovery rates over 80%, and many 75%. These savings in turn have allowed companies to expand further or reduce their rates in the face of competition, or simply to make more money," says Ward.

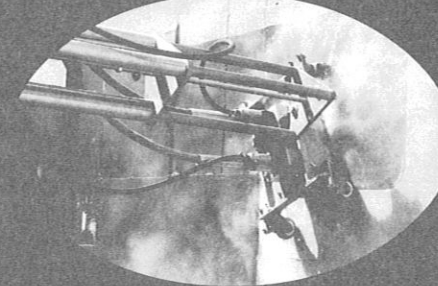
The bottom line is that Gale Orem is probably right in saying, "This is the closest I have come to printing money." As a WARD 2 owner he predicts that he will be able to maintain his present waterjet production rate and not purchase any new abrasive for eighteen months by simply recycling the waste sludge he has stored for two years.

For more information, visit www.wardjet.com; email to: sales@wardjet.com, call 330-677-9100 or fax 330-677-9121.



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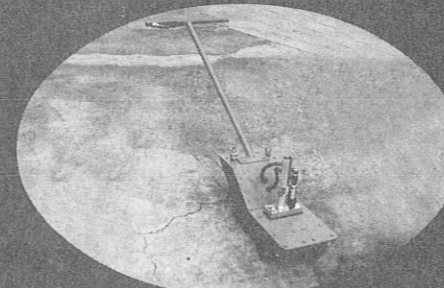
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Hydrodemolition On Bridges In Stockholm

Swedish demolition contractor Waterjet is currently using two HV450 Aquacutter hydrodemolition robots from Aquajet Systems on a prestigious bridge repair project in Stockholm; the two units are both over 10 years old and have been in continual use for most of that time, providing proof of their efficient longevity.

Two HV450 Aquacutter hydrodemolition robots are currently being used to remove all damaged concrete from the deck of the old Tranebergs Bridge in Stockholm.

This project in the Swedish capital of Stockholm, will eventually consist of three separate bridges – two road bridges and one rail bridge – replacing the existing 60-year-old combined road and rail structure.

Starting to the south of the existing crossing, two new bridges with spans of 181m are currently being erected. One of these has recently been completed and now serves as a dedicated rail crossing. The other new bridge, which is still under construction, will act as one of two road bridges.

The original bridge is currently being renovated, and will eventually serve as the other road crossing. This structure has been divided in half, with one side being renovated while the other is in use by road and pedestrian traffic.

Once complete, all three bridges will have spans of 181m over water, and including ramps will have total lengths of 580m.

At their highest point the bridges will be 30m above water level, allowing ships of 26m height to pass beneath.

(continued on page 10)

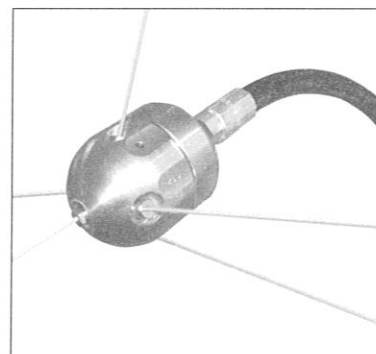


Aquacutter hydrodemolition robot removing concrete inside a protective shroud.

Cleaning Around Four-Inch Elbows

StoneAge's Badger 2D pipe cleaning tool is revolutionary in two ways. First, its compact design makes it possible to negotiate 4-inch elbows. Secondly, its new multi-disc viscous fluid governor (patent applied) makes its compact features possible. Customers have been using the Badger since summertime, with great results. One customer ran the nozzle through eight consecutive elbows, until his hose was stuck. Fortunately, he was able to get the equipment out.

Success stories include pulp plant green liquor lines in the Southeast, and 5-6 inch ID drains in a big hydroelectric dam in the Northwest. At the hydroelectric project, the tool was operated at 11-13 Kpsi, and 22 gpm, cleaning at a rate of 4 feet per minute. Job logs indicated mineral scale, sand, rocks, grout, plastic film, nuts, bolts, burlap, and cigarette butts were flushed out.



The Badger 2D pipe cleaning tool will handle up to 30 gpm and 15 Kpsi. But since it is necessary to use 3/8-inch hose for its flexibility, we often jet for lower flows to achieve maximum jetting power. High flows have higher friction losses and thus, in some cases, can deliver less pressure than lower flows at high pressures.

Article reprinted by permission from *Newsblast*, December 2002, published by StoneAge, phone: (970)259-2869, fax: (970)259-2868, web site: www.stoneagetools.com.

TurtleSkin WaterArmor Offers New Arm Protection For Pressures Up To 40,000 PSI

Warwick Mills' new gauntlet protection of TurtleSkin WaterArmor has been tested and approved for CE Marking certification to protect operators from accidental swipes of water pressures as high as 40,000 psi. WaterArmor's protective garments have received several patents for their flexible layered system, which includes aramid fiber, known for its high strength in ballistic vests.

The new arm protection will provide forearm coverage from the elbow to the hand knuckles. "When the WaterArmor gaiters started saving a lot of toes, we began getting calls asking us to make something for their arms, too," says engineer and designer, Charlie Howland at Warwick. The wrap-around component is easily attached with a locking fastener and glove clip attachment so that one size can fit all. Operators will be able to purchase the new arm protection separately from the TurtleSkin WaterArmor torso, chaps and gaiters currently sold.

The Health and Safety Executive (HSE) of the United Kingdom has recently announced the mandatory required use of safety suits or Personal Protective Equipment (PPE) for ultra-high-pressure (UHP) water jetting applications. TurtleSkin WaterArmor from Warwick offers a twelve-panel suit including gaiters, chaps, vest, and arm protection that meet all the requirements specifically outlined by the HSE.

TurtleSkin WaterArmor's patented system protects operators from accidental swipes from waterjet pressures up to 40,000 psi (pounds/square inch) or 2800 bar. Suit components are sold separately allowing operators to buy only the

garments they need. In the event of an accidental swipe or damage to an individual panel, single panels are easily replaced piece by piece; this economical approach means operators do not have to repurchase an entire suit. Each garment has adjustable straps, so that one size fits all operators.

The new WaterArmor arm protector is being distributed by several pump manufacturers, including WOMA, Hammelmann, NLB, Jetstream, Aqua-Dyne, FLOW, Gardner Denver and Environmental Products & Accessories. For information, contact the manufacturer at (603) 878-1565 or visit www.waterarmor.com.

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The Fountain utilizes recirculated and reclaimed water from the 28-acre lake at its base, water that is also used to irrigate the surrounding park. At its present schedule of operation, the annual water evaporation factor is less than the amount required to irrigate an acre of cotton in a year.

Facts on The Fountain’s Operation

Pumps (600 HP) located in a specially designed pumphouse on the lakeshore draw water from the lake and deliver it through an 18-inch diameter pipeline to the nozzle of The Fountain. At full operation, water pressure at the nozzle is 375 pounds per square inch flowing at a rate of 7,000 gallons per minute. This gives a velocity of 68.5 feet per second and puts more than eight tons of water (approx. 2,000 gallons) in the air above the nozzle.

The Nozzle - Heart of The Fountain’s Phenomenal Performance

The uniquely engineered nozzle weighs nearly 2,000 pounds. It is mounted on a concrete base structure at the approximate center of the lake. Water is directed through its three sections to produce a flow with power that results in the great height the water column can reach.

Designed and built in Zurich, Switzerland, at the famed Institute for Hydraulic Research, the nozzle received extensive testing before being placed in its home at Fountain Hills. Its location was selected with full regard for average prevailing wind direction and speed.

Operation

The Fountain operates 15 times a day, as weather and wind velocity permit, on a schedule of 15 minutes

operation every hour on the hour between 10 a.m. and 9 p.m. seven days a week.

Brilliant Night Illumination

At night The Fountain becomes a jet of gold and white against the starry desert sky when lighted. Golden spotlights situated in the base of the jetspray send glowing illumination up the first 300 feet of the column where it blends with a contrasting silver - white light on the upper portion. This light comes from powerful mercury vapor lamps located along the lakeshore.

The striking effect of lights and spray make The Fountain an inspiring “night sight” to see at Fountain Hills.

The Fountain-A Thing of Beauty
The developer of Fountain Hills constructed The Fountain and surrounding lake to create a thematic centerpiece for a community designed for beauty throughout.

Since The Fountain first went into operation in 1971, it has been visited by thousands of people in all walks of life from all over the country. Almost without exception, it has been a source of acclaim for its aesthetic values most of all.

Visit www.fountainhillschamber.com for more information.

Fountain text excerpted from www.fountainhillschamber.com/fountain.php.

WaterArmor EU, from page 9

standard to use in certification of waterjetting gear. The meeting this past December at Centexbel was a step in that direction. The group of international representatives worked towards creating a standardized testing protocol that realistically simulates the various types of water-jetting conditions that operators face.

In order to achieve an accurate, reproducible test method, the task group evaluated a complete set of testing variables including nozzle type, swipe speed, water pressure, flow, and back thrust or recoil. The group also discussed the size of the sample, the method in which the sample will be held down, the type of human tissue simulant to be used as backing, and the standoff distance between nozzle and sample. The backing must be solid enough not to fluctuate under the pressure of the jet stream, but soft enough to simulate human flesh. In addition to a

membrane to witness backside trauma, two types of foam backing were considered: one to simulate the soft tissue of a torso and one to test the harder tissue of a shin or thigh. Nozzle types were discussed at length, determining a highly efficient nozzle is extremely important to the integrity of the test. The standoff between the jet nozzle and sample will be set at a specific distance and the waterjet stream will scan across the sample at a fixed rate with a pressure and flow strong enough to reproduce the high recoil or thrust that operators encounter. The task group’s work in setting a uniform test method will help waterjet operators better understand the level of protection provided by their PPE and establish an universal standard of personal safety.

For information, visit www.waterarmor.com or call (603)878-1565.

New EU Safety Standard For Waterjet Personal Protective Equipment Proposed

New levels of protection for suits re being evaluated

The European Union (EU) is working toward creating a general standard for protective suits in the high-pressure waterjet industry. On December 12, 2002, experts representing manufacturers and test houses from France, Germany, Sweden, and Belgium, as well an observer from the United States, met in Brussels, Belgium. The host of the meeting was the Notified Body Centexbel, coordinated by Mr. Fred Foubert. The group worked towards developing a standard method of testing that could be used throughout Europe to evaluate Personal Protection Equipment (PPE) used by operators in the waterjet industry. There is currently no uniform standard

of protection levels for the waterjet industry. Three tiers of protection were discussed using energy criteria.

An alternative to traditional sandblasting, waterjetting is used for removal of surface coatings, cleaning and cutting in the marine, chemical, and offshore industries. Operators use handheld guns or lances at pressures as high as 2800 bar. By using water, contaminants can be filtered out, reducing the cost of hazardous waste disposal, as opposed to contaminated sand, which can be expensive and ecologically unsound. Although waterjetting is highly efficient for demolition and resurfacing, such high flow rates pose a substantial risk to operators. Waterjetting accident rates and severity are exceedingly high for commercial operations. In addition to

fatalities, injuries sustained can result in amputation or severe infection due to the amount of contaminated water being carried into soft tissue. Despite the high risk of injury, operators do not universally wear PPE. Last May, the Health and Safety Executive (HSE) of the United Kingdom announced the mandatory requirement of PPE in all ultra high pressure waterjetting applications. Other countries are reviewing their standards in light of the English approach to waterjetting safety.

There are currently two manufacturers of PPE with CE marking: US-based TurtleSkin WaterArmor and Swedish-based TST. At present, there is no uniform test

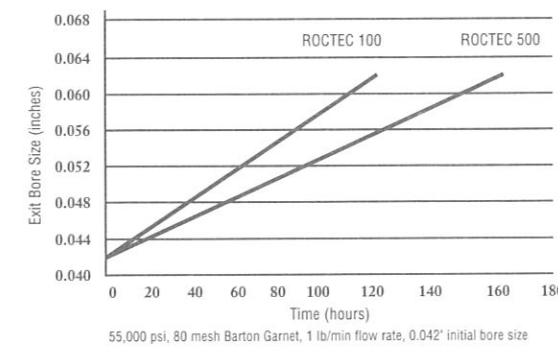
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Rampart Hydro Services Uses UHP Hydrocleaning At Pittsburgh Airport

Rampart Hydro Services has been contracted to remove 270,000 square feet of deteriorated paint from Runway 10R/28L at the Pittsburgh International Airport using ultra-high pressure (UHP) hydrocleaning, a method which completely removes pavement markings with no damage to the underlying surface.

After years of repeated re-marking, the paint has built up on the concrete runway. In order to achieve adhesion of the new markings, airport management decided to use UHP hydrocleaning to remove 100% of the paint in preparation for repainting. Other methods are ineffective in doing this job: Neither chemicals nor

shotblasting can remove all the paint, and grinding damages the surface.

Susan Morvay, operations manager of Rampart, notes that the visibility of the center line is especially important.

Rampart Hydro Services' runway Division provides UHP hydrocleaning for removal of rubber deposits and paint from runways, and for the removal of many common contaminants, such as fuel and grease residue from other airport areas.

Rampart Hydro Services also provides UHP hydrodemolition on bridge decks, parking garages, dams and spillways, tunnels, wastewater treatment facilities and bridge substructures.

For more information, call (412)262-4511 or visit: www.rampart-hydro.com.

Safety Committee Solicits Comments On Improvements To Recommended Practices

The WJTA Safety Committee solicits comments regarding improvements to the publication, *Recommended Practices for the Use of Manually Operated High Pressure Waterjetting Equipment*. While the 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, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1419, fax: (314)241-1449, e-mail: wjta@wjta.org, web site: www.wjta.org.

Gardner Denver Introduces New Rental Fleet Program

Gardner Denver Water Jetting Systems has announced the start of its new waterjetting rental program. Waterjet machines are now available from any of seven rental outlets strategically located in the United States.

Equipment available ranges from the smallest 10,000 PSI at 10 GPM 110DT machine, up to and including the Liqa-Blaster Model 920GVSDS (operating from 20,000 PSI at 38 GPM to 7,500 PSI at 94 GPM) and the popular Liqa-Blaster 1010VSDS (operating from 10,000 PSI at 73 GPM to 6,500 PSI at 120 GPM) and the 836DT (36,000 PSI at 12 GPM).

Visit www.waterjetting.com or call (800)231-3628 for information.

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Retrofitting Plasma, Oxy-Fuel And Routers To Waterjet Systems

RICHEL, Inc., now offers adding waterjet capabilities to existing plasma, oxy-fuel or router systems. RICHEL engineers are experienced in all aspects of such retrofits with installation and training available all

for under \$25,000 (subject to equipment availability).

Contact RICHEL by phone: (330)677-9100, fax: (330)677-9121, email to richel@richel.com or visit www.richel.com.

Hydrodemolition On Bridges In Stockholm, from page 8

Each of the bridge arches will be 9m wide, with the road crossings consisting of two lanes, and rail bridge carrying two tracks.

Main contractor PEAB has sub-contracted hydrodemolition expert Waterjet to remove all damaged concrete from the old road bridge deck. Working in conjunction with main demolition contractor Tunga Lyft, the company is removing damaged concrete from 30 columns each measuring 9 x 1 x 1m, with removal depths varying from 160mm to a maximum of 600mm.

Waterjet is employing two HV450 Aquacutter hydrodemolition robots from Aquajet Systems for all concrete removal duties. This also involves removing the old bridge's side supports, to make way for new columns to be erected. Here approximately 30mm of old and damaged concrete was removed down to the original rebars, which were cleaned of any rust or residue, leaving a good bonding surface for the new concrete.

The two HV450 Aquacutters have been in service with Waterjet since 1985 and 1989 respectively, and according to the operators have always worked extremely well.

Waterjet says the two HV450 Aquacutter robots normally work 10

months out of every year, and with regular services have always worked well.

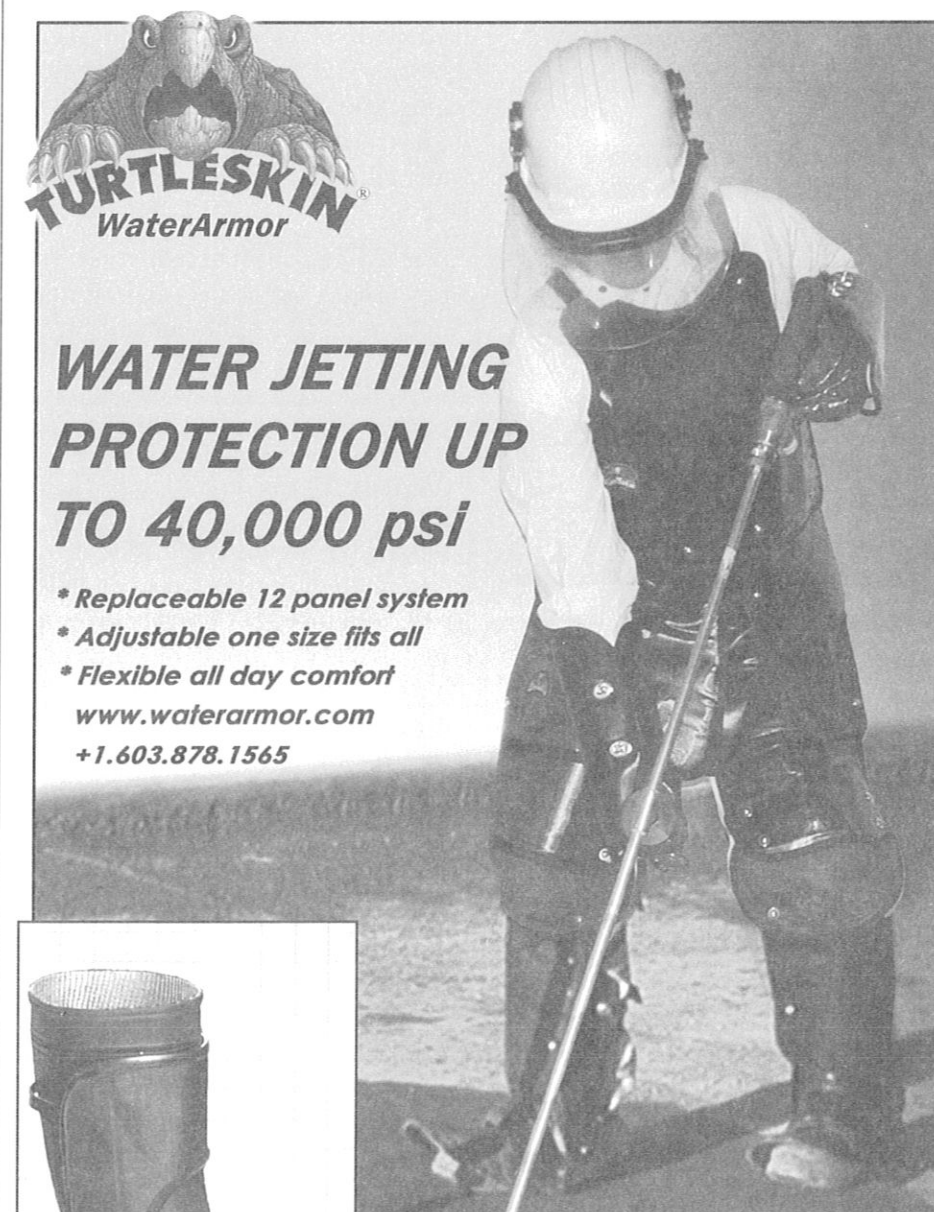
Working from different ends of the bridge, the two robots will complete their concrete removal in eight weeks. Leaving behind cleaned rebars and a perfect bonding surface devoid of any degraded or soft concrete, the two units will have each removed approximately 9m³ of concrete per week.

According to an operator, both units are working with a nozzle angle of 20° to undercut and remove concrete from beneath the rebars.

Both HV450 robots are electric powered units and are each connected to on-site 187 litre high-pressure water pumps.

Because the repair work is taking place in close proximity to pedestrian and road traffic, both HV450 robots are working inside protective shrouds, which stop any water or concrete debris from escaping.

For more information, contact Stefan Hilmerisson, Aquajet Systems AB, Brunnsvägen, SE-570 15 Holsbybrunn, Sweden, phone: +46(0)383 508 01, Fax: +46(0)383 507 3, email: aquajet@aquajet.se



When this TurtleSkin WaterArmor gaiter saved an operator from injury at 36,000 psi, only this toe panel needed to be replaced.

Proven Protection