

WJTA

WaterJet Technology
Association



Jet News

JUNE 1999

*Published by the
WaterJet Technology
Association
for the benefit of its
members*

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Waterjet Dishwasher



The Maytag Jetclean® Dishwasher uses 62 waterjets to clean from every direction (see figures above). Jets attack the dirty dishes from three levels: top and bottom arms distribute water throughout the dishwasher while nozzle in the central tower reaches corners and the inside of cups and glasses.

Water is circulated with a one-third horsepower pump. The jetting

water goes through two stages of filtration to prevent food particles from being deposited on the dishes.

According to a study being done by Ohio State University, dishwashers use an average of 5.8 fewer gallons of water per load than washing the same dishes by hand.

Photographs courtesy of Maytag.

**Plan now to
attend the
10th American
Waterjet Conference**

**August 14-17, 1999
JW Marriott Hotel
Houston, Texas**

See details enclosed

Waterjets At the South Pole

The Antarctic Muon Neutrino Detector and Array (AMANDA) Project is an experiment intended to look for neutrinos using clear glacial ice as the detecting medium. Light sensitive photomultiplier tubes (PMTs) are lowered in strings up to 1,100 meters long to a depth of 2,400 meters in the ice of the glacier at the South Pole.

Neutrinos are produced by high energy sources in the universe such as supernovas, black holes and pulsars. Neutrinos rarely interact with matter, so large detector arrays are required to see the occasional interaction of a neutrino with a nucleus. When a neutrino hits a proton directly, a muon (a heavy electron), is produced going the same direction. The muon produces light (Chernikov radiation) which is what the PMT sees. Cosmic rays also produce muons so a very thick filter is needed to eliminate the muons produced by cosmic rays. The AMANDA Project uses the diameter of the earth as a huge filter of cosmic rays. The AMANDA detectors face



Waterjet at the South Pole where summer temperatures are -35°C to -45°C . Photograph courtesy of Bruce Koci.

downward to detect only those neutrinos that pass through the earth from the Northern Hemisphere.

Jets of hot water are used to drill holes 60 centimeters in diameter and 2,400 meters deep

into the ice for placement of the PMTs. The temperature of the ice is -50°C at 1,000 meters. The temperature of the ice begins to warm up within 1,000 meters deep until it reaches -5°C at 2,800 meters. The holes must be within one meter of plumb at 2,400 meters. The drill uses 350 liters per minute of water pressurized to 50 bar and heated to 90°C .

More information is available from: Bruce Koci, Department of Physics, University of Wisconsin-Madison, 1150 University Avenue, Madison, WI 53706-1390, telephone: (608)262-2281, email: koci@alazarin.physics.wisc.edu

In Memoriam

Jacob (Jake) Frank

Jacob (Jake) Frank, the WaterJet Technology Association's first Pioneer Award recipient, died of cancer in April 1998 in Kansas City, Missouri. Jake received the Pioneer Award in recognition of his role in the waterjet renaissance of the 1960s and 1970s. During that period the US government funded waterjetting research as a method of rapid excavation for the military. This research, along with privately funded research on waterjet cutting of wood products, has led to the development of the thriving water jet technology of today.

Jake led the government waterjet research in rapid excavation. He also performed hydraulic mining research at the Bureau of Mines Anthracite Facility at Sugar Notch, Pennsylvania, and was the lead hydraulic mining researcher at the Twin Cities Research Center in Minneapolis, Minnesota.

Jake was a native of Syracuse, New York. He served in the US Navy in World War II. He graduated from the New Mexico School of Mines and worked as petroleum geologist in Venezuela before joining the US Bureau of Mines.

After leaving the Bureau of Mines in the 1980s Jake worked for the US Office of Surface Mining.

Jake was a joy to work with, and I am proud to call him my friend and mentor.

— George A. Savanick, Ph.D.

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WJTA 10th American Waterjet Conference
JW Marriott Hotel • Houston, Texas
August 14-17, 1999

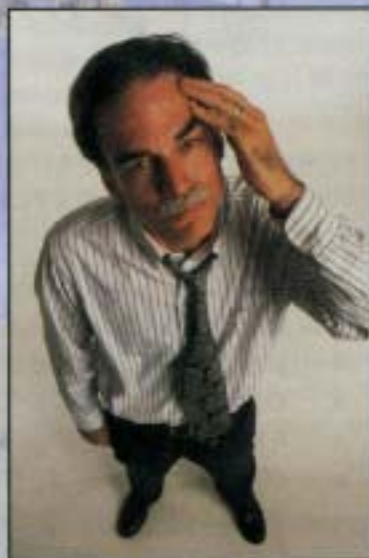
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Safety Seminar

"We are rewriting our waterjet training manual, and this experience will prove invaluable."

"The most valuable lesson I learned from this program was that unsafe conditions can be discerned at a glance."

"The thing I liked best was the interaction with the other attendees."

These are feedback comments received about the WJTA Recommended Practices Seminar presented May 1, 1999, at the Hyatt Regency O'Hare Hotel in Rosemont, Illinois. This seminar, based on the WJTA publication *Recommended Practices for the Use of Manually Operated High Pressure Waterjetting Equipment*, was presented by instructor Larry Moers to attendees from several Midwestern states.

The first in a series of six regional seminars planned by the WaterJet Technology Association, the seminar will be repeated Saturday, August 14, 1999, at the JW Marriott in Houston, Texas, in conjunction with the 10th American Waterjet Conference. The timing and location of the remaining regional seminars are yet to be determined.

The seminar featured a detailed examination of the WJTA recommended safety practices and related safety procedures mandated by the US Occupational Safety and Health Administration (OSHA). In addition, personal protective equipment and safety equipment were reviewed in detail and the group was led through a hazardous practice recognition examination. An accident investigation exercise to demonstrate how accidents can be avoided by the application of safe operating procedures rounded out the program.

The course is highly interactive, with each of the attendees participating in general discussion as well as in subgroups designed to develop specific safety skills in the waterjet field.

Larry Moers, a principle in RMS, Inc., based in Columbus, Ohio, has had nearly ten years of experience in the waterjet industry. He served as director of training at MPW Industrial Services Inc., a large Midwestern waterblast contractor.

In that capacity, Moers developed an intimate knowledge of the industry and specific safety issues with which the industry deals. Moers won the best paper award at the 1995 WJTA 8th American Waterjet Conference in Houston for his paper on high pressure waterblast training.

"An excellent program — money well spent!" was the comment of one participant as he left at the end of the program."

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Pump and Cleaner Environmental Expo

The world's largest annual convention and trade show for liquid waste management and sewer/drain cleaning professionals was held February 24-27, 1999, at the Opryland Hotel Convention Center in Nashville, Tennessee. Next year's 20th anniversary expo is slated for February 16-19, 2000.

The 19th annual Pumper & Cleaner Environmental Expo International featured 15 different educational sessions and 321 exhibitors displayed their wares in 285,000 square feet of exhibit space. The exhibit hall was open Thursday, Friday, and Saturday from 9:00 a.m. - 5:00 p.m. The 1999 event drew over 9290 attendees from 3466 companies. Attendees came from all 50 states, 10 provinces of Canada, and 42 different countries.

A new addition to this year's show was Education Day. Wednesday,

February 24 was devoted entirely to continuing education. Starting at 11:00 a.m., twelve different sessions were scheduled in a manner so an attendee was able to attend four of them. In addition to Education Day, feature seminars were offered Thursday, Friday and Saturday. Each day a different seminar started at 8:30 a.m. The Education Day sessions and feature seminars were well attended and will be expanded for next year's 20th anniversary celebration.

Items on display of interest to liquid waste management companies were: septic and industrial vacuum trucks and tankers; vacuum/pressure pumps; hose and couplings; portable toilets, trailers, sinks, chemicals, and service trucks; sludge dewatering equipment; grease separation equipment; safety equipment; and much more.

Products and services of interest to collection system operators and contractors were: pipeline rehabilitation equipment/services (including new robotic trenchless technologies); video inspection equipment; combination jetting/vacuum machines; wet/dry vacuum loaders; catch basin cleaners; high pressure waterblasting equipment; cable and bucket machines; sewer jetters and rodding machines; and much more.

To receive an informational brochure and registration information for next year's 20th anniversary expo, or a photo recap of this year's expo (while supplies last), write the sponsors of the convention: COLE Inc., PO Box 61, Three Lakes WI 54562 USA; or phone toll-free in US and Canada 800-257-7222; elsewhere 715-546-3346; fax 715-546-3786; www.pumper.com or www.cleaner.com.

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Ingersoll-Rand Names Bongani Mncwango, Marketing Manager

Ingersoll-Rand Company has named Bongani Mncwango to the position of marketing manager, Waterjet Business Unit.

In this new position, Mncwango will be responsible for developing strategic marketing programs to assure continued and profitable growth of the Waterjet Business Unit's ultra-high pressure products and components for the waterjet systems market. Waterjet systems employ water to precision cut or trim a diverse number of products, serving the industrial, aerospace, automotive, food, medical and health care, rubber and gasket, stone, marble, tile and paper industries. Mncwango also will work closely with the Waterjet Business Unit's Research and Development Group to develop new technologies and markets for the company's products.



Bongani Mncwango

Mncwango joined Ingersoll-Rand Company in 1993. He served as director of human resources for Ingersoll-Rand South Africa for three years. In 1996, he was named market development manager for the company's ARO Fluid Products Division in Bryan, Ohio. Most recently, he held the position of business development manager - Americas Aftermarket, for Ingersoll-

Rand's Construction & Mining Group in Bethlehem, PA.

Mncwango was educated in South Africa and Michigan, where he received an MBA and a bachelor's degree in business administration. He is based in Farmington Hills, Michigan.

Ingersoll-Rand Company is a major diversified industrial equipment and components manufacturer. Its product lines serve a wide range of industrial and commercial markets worldwide. The company had 1998 sales of \$8.3 billion and employs approximately 47,000 people.

For more information on Ingersoll-Rand Waterjet Business Unit, call toll-free at 1-800-826-9274. For more information on the Ingersoll-Rand Waterjet Business Unit, visit the company on the world wide web at www.ingersoll-rand.com/waterjet.

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Dirty Water Pumps

High pressure plunger pumps capable of pumping dirty water are in demand by municipal engineers as well as for environmental techniques and recycling. Until recently, many pump manufacturers recommended drinking quality water in order to guarantee safe and reliable pump performance. In many cases, despite all the advantages of the high-pressure waterjet technique this restriction excluded waterjets from certain applications.

WOMA Apparatebau GmbH, Duisburg, Germany, has developed and introduced an innovative technology for high-pressure plunger pumps that accepts water with impurities: the Abrasive Resistant Pump (ARP)-Technology.

The program based on the ARP-technology includes four pump types so far: Type 150 ARP, Type 180 ARP, Type 225 ARP, and Type 325 ARP. Performance charts for each type are available from WOMA. The pumps are capable of generating maximum operating pressures between 140 bar (2,000 psi) and 295 bar (4,300 psi). The maximum flow rates are between 115 liters per minute (30 gallons per minute) and 640 liters per minute (170 gallons per minute).

The pumps based on the ARP-technology are horizontal triplex pumps with newly developed vertically standing, cone shaped valves. All parts attacked by accelerated wear are easily accessible and can be simply removed and reinstalled.

Reliable sealing even under abrasive attack is due to the elastic behavior of the newly developed inserts on the needle valve taps. The valve seats, made from corrosion resistant steel, consist of two precisely

manufactured seat surfaces which can be used twice by tilting.

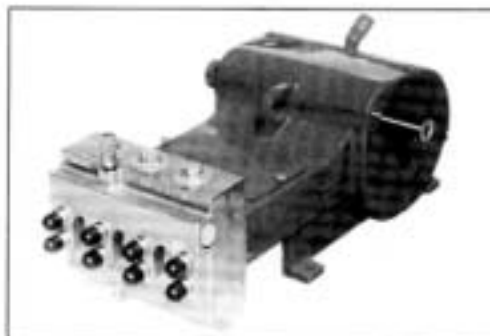
The WOMA pumps based on the ARP technology are suitable for the transport of water containing granular and fibrous solids of different size and shape. Nevertheless, for very coarse impurities, the superposition of a filter in the food supply line is required.

Permissible Limits

Temperature:	max. 45°C
Solid concentration*:	1.5% to 3%
Grain size:	50µm to 350 µm

*In mass percent, depends on the grain size.

The new ARP-technology is a big step towards the industrial acceptance of waterjet technology as an environmentally safe technique. ARP pumps are performing successfully in the following areas: sewer and pipe cleaning, textile industry, waterjet



Type 150 ARP High-Pressure Plunger Pump

assisted pile driving, jet grouting, municipal cleaning, well cleaning, sweeping and washing.

For more information, contact WOMA Apparatebau GmbH, Werthauer Str. 77-79, D-47226 Duisburg, Germany, phone: 49 2065 304 0, fax: 49 2065 304 200, internet: www.woma.de email: info@woma.de

In the US, call toll free (800)258-5530.

ABB I-R Waterjet Systems Web Site

The Wixom, Michigan-based, AAB I-R Waterjet Systems has launched a new worldwide web site on the internet. The site provides a detailed look at a leading designer and builder of waterjet cutting systems, its capabilities, its product lines and technologies, plus over 30 pages of specifications and technical data on specific products and components. Located at www.abbir.com, this site continues to evolve as more detailed product information is added.

Links within the document take the visitor to a detailed company description; all of the lines of

waterjet cutting equipment and components; current news about the company and its products; details about cutting system software; service, support and training functions. An inquiry page is also provided so visitors may receive rapid feedback on specific products and services. Links are also provided to ABB and Ingersoll-Rand web sites as well.

AAB I-R Waterjet Systems L.L.C. combines Ingersoll-Rand's high-pressure intensifier and two-dimensional waterjet cutting technology with ABB's expertise in robotics and motion equipment.

FLOW Signs \$1 Million Contract With Raytheon Aircraft

Flow International Corporation has recently been awarded two separate contracts exceeding \$1.2 million from Wichita, Kansas-based Raytheon Aircraft Company. The first system is a five-axis 3-dimensional abrasive jet machine tool for trimming Raytheon's composite fuselages. The second system is a two-dimensional system for processing a wide variety of materials for Raytheon's manufacturing needs.

"The abrasive jet technology was implemented because of its superior smooth, clean cut edge quality," said a Raytheon spokesperson. "The abrasive jet process, unlike traditional machining, eliminates the heat-affected-zone, a crucial advantage when machining composite as well as metallic materials. We selected Flow International due to their position as the technological leader in providing these very advanced systems, and their ability to provide a total solution to our manufacturing needs."

"We are extremely pleased to include Raytheon on our list of major aerospace customers," said Dick LeBlanc, FLOW's senior vice president of sales, the Americas. "The goal of our company is to continually produce state-of-the-art cells that implement our top-of-the-line machine tools with the most advanced high-pressure systems available. This provides our customers with increased productivity and efficiencies."

Welcome WJTA New Members

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Meet The Candidates For 1999-2001 WJTA Board of Directors

Tony Bessette

Tony Bessette is the vice president of Spir Star, Inc. Mr. Bessette has been involved with various facets of the waterjet industry since 1984, and he has been a member of the WJTA since 1995.

Mission: To help promote the ever increasing needs of education and safety in the waterjet industry. As the waterjet industry finds itself in an expanding market for high pressure applications, there will be an increasing need for standardized safety practices and general education. This should include not only the equipment user but the general public as well. As we see the waterjet industry expanding on a more global scale, the WJTA will become the sounding board from which procedures in safety and manufacturing are set. I would look forward with great enthusiasm at having an opportunity to relay input with these decisions, for the future of this innovative industry relies upon a strong organization as the WJTA for communication and interaction.

Nominated by: Walter De Graaf, president, Spir Star Druckschlauche GmbH, Morlenbach, Germany.

Pat DeBusk

Pat DeBusk is executive vice president of HydroChem Industrial Services, Inc., Deer Park, Texas, where he has been employed for over 35 years. Mr. DeBusk has been a WJTA member since the association was founded in 1983. He is presently on the Board of Directors, and he is the 1999 WJTA Conference chairman.

Mission: I believe the Waterjet Technology Association should continue to develop its interests and expand membership to represent the water blasting industry worldwide. By inviting dialogue from all its members, the WJTA will become a forum for technical and practical information. The association should promote integrity of equipment design, manufacture and sales. Members should regulate themselves and their industry prior to any government move in the waterjet area.

Nominated by: Dorothy Botnick, HydroChem Industrial Services, Inc., Deer Park, Texas.

Lydia M. Frenzel, PhD

Lydia M. Frenzel, PhD is the executive director of the Advisory Council. She has served on the WJTA Board of Directors since 1995. Dr. Frenzel received the Society of Protective Coatings' Technical Achievement Award for her contributions to the adoption of standards and for her educational activities in surface preparation using waterjetting and wet abrasive blasting methods.

Mission: I believe that the future of the WJTA is linked to a clear, positive, public expression of the advantages offered by the growth of the fluid jet industry. I will continue to work to enhance WJTA's reputation as the leading global association advocating the merits of the fluid jet industry by expanding our sphere of influence in other technical societies and standards organizations. The growth of the WJTA is only a tenth of that of some other societies during the last ten years. I want to reverse this trend by creating a strong program aimed at increasing technical cooperation between contractors for the purposes of fostering trade in the industry as well as improving the value of being a WJTA member.

Nominated by: Dan Bernard, president, Resto-Tech Ultra Pressure Systems Ltd., Delta, British Columbia, Canada.

(Peter) H.-T. Liu, PhD

Peter Liu, PhD, is a senior scientist at Waterjet Technology, Inc., Kent, Washington. Dr. Liu received his doctoral degree from the Fluid Mechanics Program, Civil Engineering Department, Colorado State University, in 1972. In 1973 he joined Waterjet Technology (formerly Flow Research and then Quest Integrated). Dr. Liu specializes in experimental fluid mechanics and he is experienced in project and program management. Most of Dr. Liu's recent work has been concentrated in ultra high pressure research and development.

Mission: To continue research and development in improving the state-of-the-art performance of UHP fluid jet processes for precision machining and surface preparation, with emphasis on the following issues: Process accuracy and precision (e.g., nozzle and abrasive entrainment

optimization), Mitigation of substrate damages (e.g., optimum selection of working fluid and process control), Cost effectiveness (material removal rate, maximizing abrasive acceleration); Promote development of low-cost and portable waterjet and abrasive waterjet systems for the consumer market; Expand the role of fluid jet processes for various existing industrial applications (e.g., complement UHP waterjets and abrasive waterjets with their cryogenic counterparts); Work cooperatively with WJTA members to promote new applications for the UHP fluid jet processes (e.g., underwater applications, manufacturing of components for aerospace systems and for micro-electro-mechanical systems (MEMS)).

Nominated by: Jay Zeng, senior scientist, OMAX Corporation, Auburn, Washington.

Larry Loper

Larry Loper is vice president of marketing and sales, High Pressure Equipment Company, Erie, Pennsylvania. Mr. Loper is responsible for the design and implementation of the company's marketing plan. Mr. Loper also served as technical sales coordinator for Autoclave Engineers where he provided sales support for world markets and coordinated activities for a specific product line. Mr. Loper has a bachelor's degree in chemistry and a masters degree in business administration. He is a member of the American Chemical Society, Society for Petroleum Engineers, AIChE, and the WJTA.

Mission: Larry Loper will work with the directors and membership in the further development of the organization. He will work closely with manufacturers, contractors, and component suppliers to insure the membership continues to benefit from this quality association.

Nominated by: Paul T. Bowser, president, MAXPRO Technologies, Erie, Pennsylvania.

Brian A. Roach

Brian A. Roach is the owner of Fluidyne, Fontana, California. Brian and Scott Roach founded Fluidyne in 1987 to clean wind turbine blades in California with waterjets. With

(continued on page 11)

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Stafford, Texas 77477

Parker
FluidConnectors

Meet The Candidates For 1999-2001 WJTA Board of Directors, from page 10

expansions to pressures above 25,000 psi they expanded into stripe removal on highways, rubber removal on runways, general waterjetting and hydrodemolition. Brian is a graduate of the University of Redlands, California, with degrees in chemistry and biology. Brian is also a California State Licensed Contractor. Fluidyne is a corporate member of WJTA, and a member of Kern Wind Energy Association, National Association of Corrosion Engineers, United Safety Associations, Advisory Council, American Wind Energy Associations, and the California Energy Commission.

Mission: I am interested in helping the association from a contractor's viewpoint. Safer and more comfortable working environments through tooling, equipment and education to increase productivity and ultimately profits.

Nominated by: Lydia Frenzel, PhD., Advisory Council, San Marcos, Texas.

Forrest A. Shook

Forrest A. Shook is the owner and president of NLB Corporation, Wixom, Michigan. Mr. Shook has been involved in the waterjet industry for over 30 years, and he has been a member of the WJTA since its inception.

Mission: It has been a privilege and an honor to be a part of an organization that has done so much to advance the field of waterjet technology. If I am fortunate enough to return to the board I will continue to help identify new technologies and applications that will serve to further advance the waterjet industry. In addition I will represent the end users of waterjet equipment, bringing their voice to the board meetings. As always, I will emphasize operator and environmental safety in all that we strive towards.

Nominated by: Steve Thomas, engineering manager, NLB Corporation, Wixom, Michigan.

John Wolgamott

John Wolgamott is president of StoneAge, Inc., which he and Jerry Zink founded in 1979. StoneAge has since become a leading manufacturer of waterblast tools and cleaning systems. They specialize in rotary nozzles and mechanized equipment for 5,000 to 20,000 psi.

StoneAge is a charter member of the WJTA, and John has been on the WJTA Board of Directors since its founding in 1983. He has served the board as secretary, treasurer, and currently chairman. John has co-written many waterjet research papers and has presented part of the Waterjet Applications Short Course for several years.

Mission: I believe the WJTA should act as the central clearinghouse for information and discussion regarding waterjet technology. It should play a strong role in establishing safety guidelines and keeping its members informed about new technologies and opportunities.

Nominated by: Bruce Wood, MPW Industrial Services, Inc., Hebron, Ohio.

Election Procedures

On July 2, 1999, an official ballot listing each of the above eligible nominees will be forwarded by mail to all eligible voting members of the WaterJet Technology Association. Signed and executed ballots must be mailed to the association's office no later than August 11, 1999, for tallying.

The names of newly elected board members will be announced on Sunday, August 15, 1999, at the WJTA general membership meeting held in conjunction with the 10th American Waterjet Conference in Houston, Texas.

High-Pressure 100 hp Intensifier Increases Waterjet Cutting Productivity

Ingersoll-Rand Company's Waterjet Business Unit now offers the new SL-IV 100 hp waterjet intensifier, designed to give customers improved reliability, cost-advantage and productivity gains.

New intensifier features unique to the SL-IV, include, but are not limited to:

- Auto-balancing that allows for system pressure load to be shared equally throughout the unit's operating range, helping to increase system reliability;
- Built-in diagnostic capability, including a digital pressure display, for easy system monitoring and troubleshooting;
- Improved seal technology including ceramic plungers and new StreamLIFE seals;
- A cartridge-type hydraulic seal for quick changeover of replacement parts;
- A single hydraulic pump with a single, 4-way valve;
- Improved check valves for longer life; and

- A differential pressure gauge on the unit's hydraulic filter.

The SL-IV 100 hp intensifier, a self-contained, minimum footprint unit with built-in controls and motor starter, continues Ingersoll-Rand's tradition of accessible, easy-to-maintain waterjet equipment.

"The SL-IV 100 hp intensifier represents Ingersoll-Rand's latest innovation in waterjet cutting technology," said Bongani Mncwango, marketing manager, Ingersoll-Rand Company Waterjet Business Unit. "Designed for optimum reliability, effectiveness and efficiency, this ultra-high pressure pump outputs two gallons of water per minute at operating pressures of up to 55,000 psi."

For more information on Ingersoll-Rand Waterjet Business Unit's new SL-IV 100 hp waterjet intensifier, call toll-free at 1-800-826-9274. For more information on the Ingersoll-Rand Waterjet Business Unit, visit the company on the world wide web at www.ingersoll-rand.com/waterjet.

Architectural Waterjets

Creative Edge Corporation of Fairfield, Iowa, applies waterjet technology to architectural and decorative projects. Creative Edge uses computer-controlled abrasive jets (55,000 psi) to cut intricate designs in hard materials such as rock, tile and metal. The company's creations include custom floors in marble, granite and tile (figures 1, 2, 3, 4), representational art (figures 5,6), and walkways (figures 7,8).

Creative Edge has a one thousand square foot plant with 120 employees and 26 waterjet cutting systems. These systems, many with multiple cutting heads, vary in size from 36 inches x 36 inches to 14 feet x 14 feet.



Figure 1



Figure 2



Figure 3



Figure 4

(continued on page 14)

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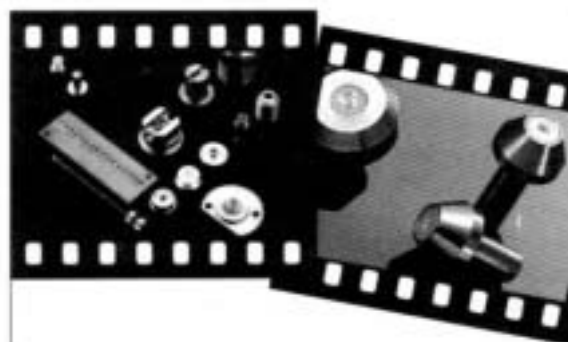
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Parker Polyflex Moves To Stafford, Texas

Parker Polyflex has announced its move to a larger facility in Stafford, Texas.

"Polyflex has seen a significant growth in business over the past few years and has now outgrown the current facility," says Bill Dougher, polyflex product sales manager. "The move will increase our plant size, which will allow us to better serve our customers."

The new mailing address will be:

**Parker Hannifin Corporation
Polyflex Operations
12840 Sugar Ridge Blvd.
Stafford, TX 77477
Phone: (281) 530-5300
Fax: (281) 530-5353**

The toll-free Polyflex number will remain the same, 1-800-446-5236.

The polyflex Operation is a unit of the Parker Fluid Connectors Group, specializing in Ultra High Pressure Hoses. The Group offers a broad line of fluid connector products in the industry, including: rubber & thermo-plastic hose, tube fittings & adapters, tubing & plastic fittings, brass fittings & valves, quick disconnects, hose couplings, check valves, expert systems, and custom couplings & fittings. It operates 52 manufacturing plants, 32 sales offices and warehouses around the world, with more than 2,500 distributors worldwide.

Parker Hannifin is a \$4.6 billion worldwide leader in the production of motion, control, instrumentation and fluid flow components and systems for hundreds of industrial and aerospace markets. For more information, visit the web site: www.parker.com

General Pump Appoints Arne Watland As Vice President

Arne L. Watland brings over 15 years of progressive key management experience in manufacturing and service-related industries to General Pump (GP). His responsibilities include directing the sales and marketing divisions to produce a more competitive advantage in the pressure wash industry, through new market penetration and product development, as well as to profitably grow the organization.

General Pump (GP), a division of G.P. Companies, Inc., is the US market leader for the distribution of IP high pressure pumps, and is based in Mendota Heights, MN. GP is supported by Noramco, another division, which manufactures a line of industry leading spray tips and accessories in support of GP's pump lines. Eagle Power Products/USFloor, another division, is a leading distributor of professional cleaning equipment for the Janitorial Supply Industry.

Watland's management experience most recently included the Sales and Marketing Manager position at Onan. He's also held positions at Transcom, Inc., Rosemount, Inc., Modicon Division of Square D, and the Reliance Electric Company.

Watland holds a bachelor's degree in aerospace engineering from Purdue University, and a master's degree in business and operations from Oakland University. Watland and his wife Jan reside in Shorewood, MN and have four children.

SUPER-WATER® — A Testimonial

Mr. Jim Price, Industrial Manufacturing Manager of Biltrite Corporation, Ripley, Mississippi writes (1):

Dear Dr. Howells:

We very much appreciate your assistance in resolving our problems with our waterjet cutters. Your recommendation that we use SUPER-WATER® proved to be exactly what we needed. By using SUPER-WATER®, we were able to cut two layered sheets (three in some instances) instead of only single sheets; and without appreciable loss in cutting speed. This had the impact of at least doubling our output per machine hour.

The quality of the cut product was also enhanced. For certain products, water spots from the untreated city water represented a quality problem in that it adversely affected the adhesives used in subsequent processes at the customer level. SUPER-WATER® eliminated this problem.

Again, thank you very much.

Sincerely,
Jim Price

"Untreated" in this context means without SUPER-WATER.

Biltrite uses a 0.1% solution of SUPER-WATER with Ingersoll-Rand intensifiers operating at 48,000-49,000 psi with a diamond nozzle (diameter 0.007-inch), at a standoff distance of 1/2-3/4-inch, for cutting nitrile-, natural- and styrene-butadiene-rubber and neoprene.

1. Quoted here verbatim and also reported in: W.G. Howells, "SUPER-WATER® provides precision cutting of rubber," *Rubber & Plastics News*, May 31, 1999. This publication also describes the cutting of shoe soles, Vistanex LM-MH, foam-, silicone- and 90 Durometer-rubber, as well as rubber gaskets, Nylatron, fiberglass acoustic panels, polystyrene and polyurethane foams. Reprints are available.

A companion paper by W.G. Howells et al., presented at the International Composites EXPO 99, Cincinnati, May 10, 1999, extends the description of applications of SUPER-WATER to granite, concrete, mild steel, plate glass, yellow brass, lead, aluminum, titanium, 304 L stainless steel, tungsten, Inconel, carbides, and Baccarat crystal.

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PO Box 9264**

Berkeley, CA 94709

Telephone: (510)526-6272

Fax: (510)KAL-BERK (525-2375)

Website: <http://www.berkchem.qpg.com>

Architectural Waterjets, from page 12



Figure 5



Figure 6



Figure 7



Figure 8

A Safe, Innovative Way to Use Multiple Water-Jetting Guns.

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Robot Repairs Damaged Concrete Water Channel

Specialist German hydrodemolition contractor Krüger Wasserhochdrucktechnik, using its Conjet Robot 360 high pressure waterjet machine, has successfully assisted in the very unusual and tricky repair to a steep, new cooling water feed channel at the country's Boxberg coal-fired power station. The robot, suspended from a winch anchored at the top of the 45% inclined curved channel, systematically removed a layer of reinforced, water resistant concrete from the entire surface which had been badly damaged by an unexpected and very sharp frost during casting.

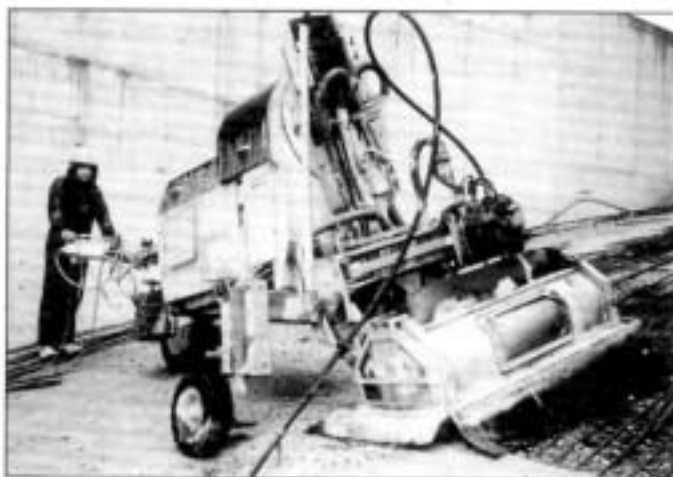
Krüger Wasserhochdrucktechnik, working for the power station joint venture main contractor Hochtief and Bilfinger & Berger (HBB), was able to quickly adapt its Robot 360 and suspend it to operate on the steep channel. The robot only took two weeks to selectively remove the frost-damaged concrete, allowing the joint venture contractor to return and complete the repair with a fresh concrete overlay. "HBB had their doubts and didn't believe it was possible for us to remove the damaged concrete from the steep channel with our hydrodemolition robot," said Krüger Wasserhochdrucktechnik managing director Herr Krüger. "But it worked very well and did an excellent job. They were very happy with it."

The steep, flat-bottomed channel, designed to take water from the base of the power station's cooling water tower back down into the pump house for recycling, is just 21 meters long. It is 25 meters wide at the inlet and gradually tapers down in a steep, shallow curve to 18 meters at the discharge. The 45% sloping channel is a heavily reinforced 1.5 meter thick base and HBB intended casting

the complete channel base in one continuous pour. But as the contractor was nearing the end of the pour the air temperature suddenly and unexpectedly dropped to -8°C. HBB had no option but to continue and complete the casting. But the combination of the rapid fall in temperature and very strong biting winds caused extensive frost damage to a depth of 40 millimeters over the channel's entire concrete surface.

The damaged concrete was too weak to withstand the flow of water so HBB, working for client and power station owner Arge Rohbau Boxberg, had to remove the spoiled layer prior to placing a complete new overlay. The client insisted that concrete had to be removed to a depth of 25 millimeters below the upper layer of reinforcement to achieve a good bond with the existing healthy concrete. To ensure that the minimum required gap below the reinforcement was achieved the depth of concrete to be cut out was set at 120 millimeters.

The main contractor subcontracted the specialist concrete removal work to Krüger Wasserhochdrucktechnik. "Hydrodemolition was specified for removing the damaged concrete on this repair contract," said Krüger. "It takes off only the damaged concrete either above or below the rebar and provides a rough, clean surface to give a good bonding with the new concrete. The hydrodemolition technique doesn't cause any micro cracks in the sound concrete left behind and leaves all the rebars intact and cleaned. This is



unlike pneumatic breakers, which can hit and vibrate the rebar and do a lot of extra damage by breaking the bond between the reinforcement and good concrete."

Before Krüger Wasserhochdrucktechnik could set the robot to work the company had to arrange to secure and support the machine on the damaged inclined surface during concrete removal. For this the company anchored a winch at the top and in the center of the channel with a steel rope running down and fixed to the robot. This simple suspension system enabled the self-propelled robot, pivoting on the anchored rope, to make traversing radial cuts across the concrete channel. After each pass the robot was lowered on the winch to make the next adjacent cut with the cycle repeated to the channel bottom.

The remotely operated computer controlled Robot 360 was pre-set to selectively remove concrete to below the reinforcement using a jet of high pressure water exiting from a special nozzle at supersonic speed and forcing its way into the concrete's porous surface. The water creates an hydraulic over pressure in the concrete

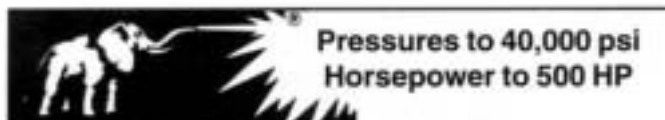
(continued on page 18)

40,000 PSI Rotary Flex-Lancers

After several years of manufacturing conventional (10,000 to 20,000 PSI WP) Rotary Flex-Lancers and Line Cleaners, Jetting Systems now has a 40,000 PSI Rotary Line Cleaner in operation in the Gulf Coast and two 40,000 PSI Rotary Flex-Lance machines in Dubai, United Arab Emirates (UAE).

These units enhance the cleaning ability of tubular products by achieving nozzle rotation for complete internal coverage. This unique design permits the operator to vary both the rotation and feed speeds independently without stopping to make mechanical adjustments. This design also rotates the hose in the same direction in both the extend and retract modes without requiring mechanical adjustments.

For additional information, contact Kent Maddie or JD Frye at Jetting Systems & Accessories, Inc., 800-580-JETT. For customer opinions, you can contact James Schaffer at CH Heist, Bridge City, TX or Mike Biddle of Powerflo Rentals, Dubai, UAE.



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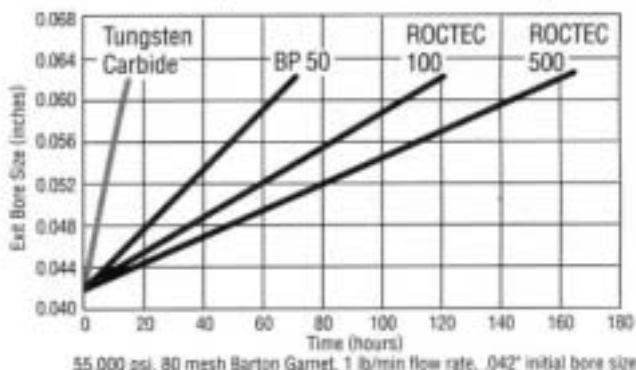
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Now there are 3 "best" choices for AWJ nozzles.

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Not all AWJ projects demand the very longest wearing nozzle, but all require one that wears slowly and concentrically for predictable cutting precision. Of course, longer life is always better.

That's why we've added the BP 50 nozzle to our family. The BP 50 AWJ nozzles were developed in response to industry requests for a lower cost nozzle for short runs, prototyping, and multiple daily setups. They are also ideal for operator training or when new system setups make breakage a concern.

As with longer life ROCTEC® 100 and longest life ROCTEC 500 nozzles, the BP 50 wears concentrically and with great predictability...while providing several times longer service than tungsten carbide.

The result? Now you have more ways to achieve lowest total operating costs. Because all three Boride nozzles increase cutting speed, reduce system downtime for nozzle changeouts, and maintain cutting precision, predictability, and consistency longer.

As always, the BP 50 and ROCTEC AWJ nozzles are available exclusively from your AWJ equipment manufacturer. For technical assistance, call us at 800-662-2131 or 231-946-2100 or fax 800-662-2132 or 231-946-3025. www.boride.com



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Abrasive Recycling System

Within the first week of the Waterjet Abrasive Recycling Dispenser's (WARD 24) release to consumers, actual test results on eight different companies' abrasive revealed that savings of 70% on abrasive purchases are achievable. Certain circumstances allow for even greater savings.

A sieve analysis of recycled abrasive which started as 50 mesh, shows 68% of abrasive to be over 80 mesh, and 89% over 100 mesh. In effect, this means the first time the abrasive was used, the actual cost was only a fraction of the initial cost as most of it can be reused again and again and again.

The abrasive could have a life of several recycles, each application being different.

Recycled Abrasive For Sale

Some companies are installing optional grading screens, allowing operators to separate out different mesh sizes from the sludge. If a 120 screen is installed on the WARD 24, 120 mesh could be separated out from the sludge. (The WARD 24 is supplied with a 100 mesh screen, but each operator will receive a 120 mesh screen within a few weeks of purchase for trial purposes to determine the increased recovery achievable). For companies who have no use for this size mesh, EasiJet is sourcing buyers, allowing operators to 'sell' their recycled, washed, dried and screened abrasive at discount pricing. It is possible to screen and separate out finer mesh if desired, such as 150 mesh.

"We have made every effort to be inservative in all estimates and claims, even though we have results

from several test sites over the last year. What we are seeing is confirmation of all we have worked for, with excellent results from a wide range of waterjet operators, each having their own specific applications and each using different abrasive suppliers," says Richard Ward, President of EasiJet, the sole distributor of the WARD 24.

Instant Results

Live testing of clients' abrasive began on May 9, 1999. Prospective buyers were asked to send abrasive sludge to EasiJet's facilities in Tallmadge, Ohio. The sealed containers of abrasive were then opened in the presence of the company representative and tested. The instant results and responses of those witnessing the abrasive removal and recycling of the sludge culminated in four on-the-spot purchase orders, and four recommendations to management where owners were not present. An additional eighteen companies are awaiting testing of their sludge.

"It's a no brainer!" was a common remark of those witnessing the operation of the WARD 24.


Although the recommended rate of recovery is 2 pounds per minute of dried abrasive, greater results have been achieved. Sludge is removed from the tank at a

faster rate with all particles smaller than 100 mesh becoming a waste product.


But not for long! EasiJet expects to release a 'brick/block' option that could be used to make interlocking paving bricks from the remaining sludge. Preliminary testing revolves around ascertaining the effect of minuscule corrosive particles within the brick. It is expected that this will not be an issue, and the particles will not have the ability to expand and cause cracking. An optional magnetic separator could be specified if desired to remove magnetic particles and waste.

Additional options to remove valuable materials and alloys from the sludge can be supplied upon request.

(continued on page 18)



SLASHING ABRASIVE WATERJET OPERATING COSTS!



To date, all abrasive has been thrown away, but with the WARD 24 it is possible to recycle and reuse this abrasive. As a result, the drastically lower prices of waterjet cutting allow waterjet to be a more competitive player in the cutting industry.

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phone: 330 633-7698 fax: 330 633-7670 email: ward24@easijet.com
www.easijet.com

Robot Repairs Damaged Concrete Water Channel, from page 15

which breaks away when this pressure rises above the tensile strength of the concrete. Water at a pressure of 850 bar and flow of 156 liters per minute was fed through a flexible hose to the Conjet Robot's nozzle from a diesel driven, high pressure Hammelmann HDP 332 pump housed in a silenced 20-foot-long ISO container.

The nozzle, set at a predetermined angle of attack to the concrete, is mounted on an oscillating cassette. This is attached to a traversing cradle running back and forth along a feed beam which is mounted on the robot's standard arm. When the cradle reaches the end of its travel the nozzle swivels over to maintain the same angle which enables the jet to operate with a sweeping action to cut away concrete behind reinforcement. With this system Krüger Wasserhochdrucktechnik was able to set its Robot 360 to selectively remove concrete at the rate of 0.35m³ per hour and expose the top layer of reinforcement. The unusual job took just two weeks before HBB returned to place the new water resistant concrete overlay and finish the water feed channel.

For more information, contact Lars-Göran Nilsson, Conjet AB, PO Box 507, S-136 25 Haninge, Sweden, phone: +46-8-741-3940, fax: +46-8-741-3960, email: conjet@conjet.se, internet: www.conjet.com

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

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Abrasive Recycling System, from page 17

Minimal Installation

It is estimated recycled abrasive could be produced within 2 hours of the WARD 24 arriving at the loading dock of a company.

The system is very simple, easy to operate and is the size of your desk! It can be placed on wheels, and moved around a plant easily for those with multiple systems. From the time the abrasive removal suction nozzle is activated, it takes about 3 minutes until dry, ready to use abrasive is produced.

The principle of the system is completely opposite to all technology used to date. Present systems typically have to work hard at keeping the abrasive in suspension, the abrasive then being separated out as the suspended solids are passed either through a settling tank or cyclone of some sort. However, the WARD 24 works best when buried under at least 12" of abrasive.

Hence, there is no need to even install suction nozzles on the base of the tank, although this is recommended. It is initially possible to simply insert the nozzles down into the abrasive from the surface. This again makes the WARD 24 a highly versatile and mobile system for any operator.

It may only be necessary to operate the WARD 24 every few days to keep up with the production of sludge.

Cutting Speed Of Recycled Abrasive

The cutting speed and efficiency of recycled abrasive will vary from application to application. It is a fact, smaller mesh abrasive cuts slower in thicker materials. Once abrasive is

recycled several times it will become smaller. However, a point of equilibrium between new and recycled abrasive should be attained where the amount of recycled abrasive can be predicted.

In reality, finer abrasive cuts slower, although this is only noticed when 'pushing' cutting speeds to the maximum. Research shows 95% of all waterjet cutting demands a medium quality cut where the abrasive is not working at full capacity. Under these circumstances there is no noticeable difference in cutting speed or quality of cut using recycled abrasive.

It will be necessary to add new abrasive to the tank from time to time. This should be done on jobs where the larger new abrasive would be pushed to the limit, ensuring the maximum overall efficiency is maintained at all times.

Recycling Wet Blasting Material

EasiJet can supply custom systems for recycling of abrasive for other applications such as blast abrasive used for cleaning ships, storage tanks, heat exchangers, paint removal, specialized alloy removal, etc.

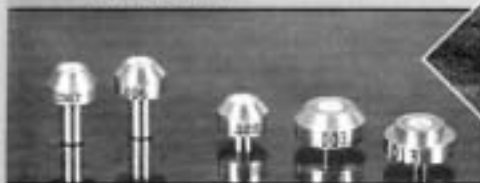
Until now, all operators have accepted that used abrasive has no value and cannot be used again. The WARD 24, while shattering operating costs, is proving this fallacy wrong, offering operators substantial savings. These savings can be translated into additional profits or lower pricing for end users.

EasiJet may be contacted at 330 633-7698, fax 330 633-7670; www.easijet.com; e-mail ward24@easijet.com

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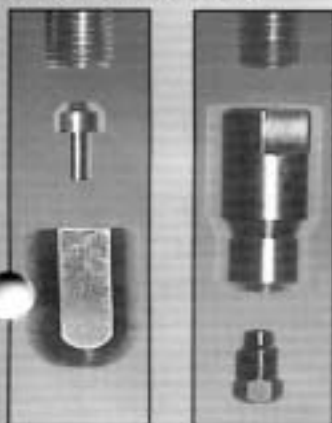
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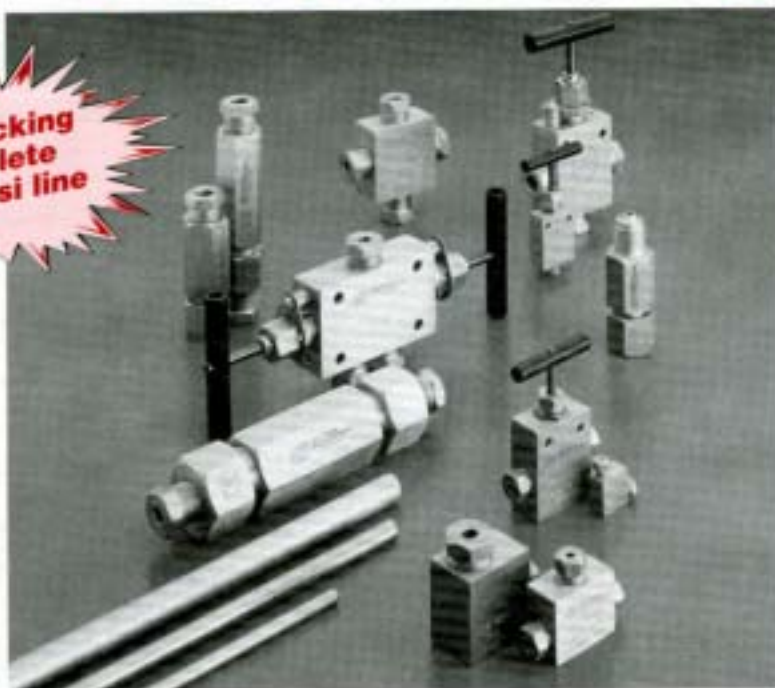
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We stock an extensive line of valves, fittings and tubing in pressures ranging from 10,000 psi to 150,000 psi to satisfy your waterjet application. In addition, our technical staff is available to answer questions and custom design a solution to your problem.

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