Waterjet Additive Makes Demilitarization Of Munitions Safer
High School Student's Research Pays Off

Ana Navarro, Minnetonka High School student, working on an Ingersoll-Rand Pump.

There are hazards associated with allowing aluminum powder, such as that associated with waterjet cutting of aluminum, to accumulate in wet masses. Aluminum powder reacts strongly and exothermally with water to produce hydrogen. Accumulated heat can result in a steam explosion and the hydrogen may also explode. Such explosions have destroyed buildings in the pyrotechnic industry. The recognition of this phenomenon is vital in the demilitarization industry where high pressure waterjets are used to remove old aluminized explosives.

(continued on page 13)
Conjet Robot Restores Stockholm's Skanstulls Bridge

A Conjet Robot high pressure water jetting hydrodemolition machine is playing a key role in the repair and strengthening to the deck of the major Skanstulls Bridge in Stockholm, Sweden. Contractor NCC Waterjet, working as the specialist hydrodemolition subcontractor for the bridge renovation main contractor PEAB Öst AB, is successfully using one of its seven Conjet Robots on its approximate Skr3.5M hydrodemolition contract to selectively remove only the damaged concrete from the deck prior to strengthening with a much thicker reinforced concrete overlay.

"I much prefer the Conjet hydrodemolition technique to other methods," says PEAB Öst project manager Robert Lundström. "Nothing compares to the Conjet system. 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. It doesn't cause any micro cracks in the sound concrete left behind and leaves all the rebars intact and cleaned, 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."

The 565 meters long reinforced concrete bridge, with its 120 meters central span over the Hammarby Lock, carries rail, road and pedestrian traffic between the Stockholm districts of Södermalm and Johanneshov. The original road bridge was opened in 1947 and was later widened to carry the adjacent railway track. But a combination of age, frost and ingress of deicing salt has penetrated the waterproofing and damaged the 50 year old structure's concrete deck. Some initial repairs, also using Conjet Robots, were carried out in 1991 to the railway bridge deck and its edge beam. To complete the renovation bridge

Jet News
Page 2

of reinforced concrete tapering from 400 millimeters thick at the center down to 200 millimeters at the edge. Once the Conjet Robot has been preset by the operator the machine only removes weak and damaged areas of concrete to a predetermined quality depth above or below any steel reinforcement, which, if exposed, is also cleaned of rust.

NCC Waterjet's Conjet Robot relies on a jet of high pressure water exiting from a special nozzle at supersonic speed and forcing its way into the damaged concrete's porous and cracked surface. The water creates an hydraulic overpressure in the concrete which breaks when this pressure rises above the tensile strength of the concrete. Water at pressures of 900 bar to 1100 bar and flows ranging from 150 litres/minute to 250 litres/minute is fed through a flexible hose to the Conjet Robot's nozzle from a high pressure pump

(continued on page 16)

April/May 199
New Products, Developments

NLB Corporation has introduced the Ultra-Clean 36\textsuperscript{e} model 36250D ultra-high pressure pump unit.

The ULTRA-CLEAN 36 system provides water pressure of up to 36,000 psi to take on a wide variety of difficult cleaning, surface preparation and cutting jobs. The Model 36250D features a 250 horse power diesel engine to produce that pressure, and a flow rate of up to 10 gallons per minute. A reliable, low-revolutions per minute NLB quintuplex plunger pump assures long life and minimal downtime.

The Model 36250 can be mounted on a steel skid or a trailer for easy transport to job sites. Controls, gauges and discharge hose connections are conveniently located for the operator.

NLB has also introduced new automated and semi-automated waterjet tube lancers that eliminate the need for an operator to handle a high-pressure flex lance and limits his/her exposure to debris. Both models can be configured for horizontal or vertical cleaning to blast heat exchanger tubes of built-up oils, scale, catalyst and minerals with water pressure of up to 15,000 psi (1,050 bar).

The fully-automated ATL-3000 is light and small enough to be carried to jobsites on a trailer and positioned by a forklift truck. An air-driven reel pushes one, two or three lances into the fouled tubes so that the high-pressure water can clear them. The control platform moves to assure the operator maximum visibility, and a remote control is included for convenience.

The semi-automated ATL-3500 SAFLEX\textsuperscript{TM} unit is designed for smaller jobs. The operator simply holds the water jet lance against the heat exchanger tube sheet and actuates the triggers, moving the lance from tube to tube to position it. The lance, which cleans at a rate of from one to four feet per second, can be adjusted to automatically stop moving when the nozzle passes the far end of the tube sheet. The ATL-3500 is pneumatically-driven, so no electricity is required. The unit has a built-in shutdown mechanism to dump pressure and stop the flex lance's movement if the operator pulls the gun away from the tube sheet.

For more information, contact NLB Corporation, 29830 Beck Road, Wixom, MI 48393-2824, phone: (810)624-5555, fax: (810)624-0908. Effective May 1997, the (810) area code will change to (248).

(continued on page 8)
The Waterjet Technology Association's 9th American Waterjet Conference  
August 23-26, 1997  Hyatt Regency, Dearborn, Michigan

**Preliminary Schedule of Events**

<table>
<thead>
<tr>
<th>Saturday, August 23</th>
<th>Monday, August 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m.-Noon</td>
<td>9:30 a.m.-2:30 p.m.</td>
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<tr>
<td>Short Course on the Fundamentals and Applications of Waterjet Technology</td>
<td>Exhibits</td>
</tr>
<tr>
<td>Noon-1:30 p.m.</td>
<td>8:00 a.m.-11:00 a.m.</td>
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<tr>
<td>Luncheon for “Short Course” Participants</td>
<td>Applications Workshops</td>
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<tr>
<td>1:30 p.m.-4:30 p.m.</td>
<td>8:30 a.m.-11:30 a.m.</td>
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<tr>
<td>Short Course (continued)</td>
<td>Research &amp; Development Sessions</td>
</tr>
<tr>
<td>6:30 p.m.-9:30 p.m.</td>
<td>Noon-2:00 p.m.</td>
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<tr>
<td>Welcoming Reception In The Exhibit Hall -- Exhibit Opens</td>
<td>Luncheon in Exhibit Hall</td>
</tr>
<tr>
<td><strong>Sunday, August 24</strong></td>
<td><strong>Tuesday, August 26</strong></td>
</tr>
<tr>
<td>8:00 a.m.-11:00 a.m.</td>
<td>9:30 a.m.-3:00 p.m.</td>
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<tr>
<td>Applications Workshops</td>
<td>Technical Tour and Field Demonstrations</td>
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<tr>
<td>8:30 a.m.-11:30 a.m.</td>
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<tr>
<td>Research &amp; Development Sessions</td>
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<tr>
<td>9:30 a.m.-5:00 p.m.</td>
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<tr>
<td>Exhibits</td>
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<td>Noon-2:00 p.m.</td>
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<tr>
<td>Awards Luncheon</td>
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<tr>
<td>2:30 p.m.-4:30 p.m.</td>
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<tr>
<td>Applications Workshops (continued)</td>
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<tr>
<td>5:00 p.m.-6:00 p.m.</td>
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<tr>
<td>WJTA Biennial Business Meeting</td>
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</tbody>
</table>

*A complete copy of the Preliminary Technical Program appears in this issue beginning on page 3.*

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**ULTRA-CLEAN 36®**

strips it in no time

*The leader in high-pressure water jet technology*

29830 Beck Road, Wixom, MI 48393-2824
(810) 624-5555*, Fax (810) 624-0908*
http://www.nlbcorp.com
*Area code 248, mid-1997

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The tougher your cleaning and surface preparation jobs, the more you need an ULTRA-CLEAN 36® water jet system from NLB Corp. It features pressure of up to 36,000 psi and flow up to 6 gpm. So it quickly blasts away corrosion, paint, epoxy — just about anything — and leaves a WJ-1® surface.

The simple pump design minimizes wear, so it runs hour after hour, month after month. NLB customers have proven it in countless applications over the past 25 years.

NLB offers the broadest range of water jet pumps and accessories in the world, and the technical knowledge and customer service to make water work for you. Call NLB today.

---

*WJ-1® is an international surface standard, ref. NACE No. 5/SSPC-DP 12.*

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Jet News  
April/May 1997
AWJ Machining Operations


AWJ Machining Studies

"A Comparative Study Of Suspension And Injection Methods In Rock Cutting With Abrasive Waterjet," A. Bortolussi, R. Ciccu, and A. Vargiu.

AWJ Nozzle Wear and Optimization


Polymer, Suspension, Ice, and Cryogenic Jets

"Investigation Of Icejet Machining," E. Geskin, L. Tsimenetsky, F. Li, and P. Meng.

Modeling Studies-Jet-Material Interaction

"Complex Equation For Determination Of Injection Abrasive Liquid Jet Parameters," L. Hlavac.
"Simulation Of 3D Abrasive Waterjet Machining," Z. Yong, and R. Kovacevic.

Jet Flow Studies

"Jet Flow Study In Air And In The Slot," N. Ilies, A. Magyari, S. Radu, M. Achem, and A. Magyari.

Pulsed Jets


High Pressure Systems

"Finite Element Analysis Of Hydraulic Manifold Port For The Intensifier Pump," J. Xu.
"Performance And Dynamic Analysis Of Intensifiers And Intensifier Systems," P. Singh. (continued on page 6)
Manipulator and Control Systems

"Pedestal Robot Waterjet Configurations," D. Snider.
"High-Precision Waterjet Cutting Of Three dimensional Contours In Industrial Productions," F. Do, and M. Knaupp.

Quarrying, Mining, and Excavation

"Development Of Water Jet Cutting In Extremely Hard Granite Quarries 10 to 20 Feet Deep" P. Wyatt, and M. Peterson.
"Tool/Rock Interface Assisted by High Pressure Waterjets," J. Vasek, and M. Mazurkiewicz.

Applications in Hazardous Environments

"High Velocity Water-Jet Techniques Assist In Seismic Repair," D. Bernard.
"Water Jetting Application In The Petro Chemical Industries," A. Magnuson.

Submerged Cutting and Off-Shore Applications

"Reach-Enhancement Of A Submerged Waterjet Using Air Shrouding," A. Miller, and D. Daly.

Cleaning, Stripping and Surface Preparation (1)

"Waterjet Nozzle Operation And Selection Criteria For Surface Preparation," E. Ting.

Cleaning, Stripping and Surface Preparation (2)

"Removal Of Coatings With Low Pressure Pulsed Water Jets," M. Vijay, R. Puchala, and N. Paquette.
"Concrete Technology And Surface Preparations For Protective Coating, Flooring, and Lining Materials," D. Bernard.
"Protecting Concrete In Industrial Facilities," D. Bernard.

Cleaning, Stripping and Surface Preparation (3)

"Advanced Hardware For Surface Preparation Applications," R. Schmid.

(continued on page 16)
Waterjets Play Major Role In U.S. Sugar Production

Every day waterjets in flumes at 120-140 psi and 5,000 gallons per minute wash, heat, and carry an average of over 6,000 tons of sugarbeets into Minn-Dak Farmers Cooperative's sugar mill in Wahpeton, ND. In 1996, sugarbeets processed here were planted and grown in 82,000 acres of farmland in North Dakota, western Minnesota and South Dakota. The 1996 crop of sugarbeets contained an average of 17.5 percent sucrose.

Some of the Wahpeton cooperative's major bulk buyers include Malto-Meal, General, Brach's Candy, Kellogg, Nestle, Hershey's, and Kraft. Minn-Dak markets its sugar with two other sugarbeet cooperatives through United Sugars corporation of Minneapolis, MN. United Sugars is the nation's largest beet sugar marketer and the third largest sugar marketer in the United States. The Wahpeton plant produced five percent of the total sugar consumed in the United States. Minn-Dak annually produces over 400 million hundredweight (CWT) of sugar.
Flow International Corporation has introduced a new version of its Flying Bridge™ waterjet shapemaking system featuring FlowMaster, FLOW's Windows®-based PC machine control. The Flying Bridge combines a large work table and affordable price for production applications with the simple operation and productivity benefits of FlowMaster.

FlowMaster dramatically reduces setup time and programming, consequently increasing parts produced per hour. Users simply point and click on icons to operate the machine. No prior experience in abrasive waterjet, CNC or CAD/CAM is required to cut parts, regardless of complexity.

Flow Master is fully compatible with other PC-based software. Operators can download .DXF files from a disk or computer network, create the part with FlowMaster's drawing functions, or scan a drawing with the optional FlowShift module and scanner. Streamlined programming entails selecting material type, thickness and desired surface finish. FlowMaster automatically selects optimal cutting parameters, including speed and feed rates, for virtually all materials and provides cost estimating and cutting time functions.

In addition to FlowMaster, the Flying Bridge comes with a four foot by eight foot work table, a three-axis motion system, the Paser 3™ abrasive waterjet cutting head and a 60,000 psi intensifier pump. Linear accuracy of +/-0.010 inch and repeatability of +/-0.005 inch is attained. Bellows protect the Flying Bridge's closed-loop AC Servo drives and ball screw mechanisms.

For more information, contact FLOW, 23500 64th Avenue South, Kent, WA 98032, phone: (206)850-3500, fax: (206)813-3285.

---

The SpaBed™ by Aquatic Industries.

You can get a waterjet massage without getting wet. In a new technique, dry hydromassage, the end user floats on the plant surface of Aquatic Industries' patented SpaBed™, while heated water and air circulate through a series of rotating jets. A manual bed-side diverter valve controls which of five jets are operational, giving the user a choice of an upper, lower or full body massage.

At present the SpaBed™ is marketed to private individuals, fitness centers, full service spas, and tanning salons. Potential applications of dry hydromassage include use as a stress reducer and tension reliever. Prices for the residential units start around $5,200.00. The SpaBed™ is available from Aquatic Industries, L.L.C. at P.O. Box 889, Leander, TX 78646-0889, telephone: (512)259-2663 ext. 212 or fax: (800)421-3633.


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Dear Jet News:

The February 1997 issue of Jet News stated that "SUPER-WATER™ has not received FDA approval for cutting food products." As is the case with most federal approvals, the regulations are quite complicated and if any of your readers wishes to understand the approved uses for SUPER-WATER™ in the food and allied industries, please contact Berkeley Chemical Research Inc.

Sincerely yours,

Dr. W. Glenn Howells
Berkeley Chemical Research
P.O. Box 9264
Berkeley, CA  94709-9264
Telephone: (510)526-6272
Fax: (510)525-2375

Jet News
April/May 1997
polyflex™
The Source For All Your Hi-Pressure Hoses, Valves & Fittings.

You want to harness the power of high pressure fluid – let polyflex™ design a complete package of reliable components for your system.

polyflex™ has been the world leader in high pressure steel reinforced thermoplastic hose technology for over 27 years, and is recognized for the consistent reliability of its products and service.

Parker's line of polyflex™ hoses range from 4,000 psi to 60,000 psi. Every hose assembly is pressure tested to at least 1.5 times the recommended working pressure and is tagged with an assembly number for full traceability. A complete line of pressure tested, certified, 100% traceable assemblies are offered with a standard one or two day delivery.

polyflex™ thermoplastic hose assemblies are extremely lightweight, chemically resistant and are designed to minimize pressure drop and volumetric expansion. They offer excellent service in applications such as: Pressure Testing, Instrumentation, Fuel Injection, High Pressure Waterblasting and Water Jet Cutting, High Pressure Hydraulic Tools, and Nitrogen Pumping.

Higher pressures, longer lengths, lighter weights and faster response times are standard features offered in hose umbilicals for subsea applications.

Other products include: Multi-Line Hose Assemblies, Stainless Steel Valves, Fittings, and Quick Disconnect Couplings. polyflex™ is staffed with knowledgeable high pressure specialists and engineers that are ready to answer your questions and to assist you with technical specifications.

For more information call or fax your local Parker distributor or Parker Hannifin's - Parflex Division - polyflex™ Operations.

Parker Hannifin Corporation
4263 Dacoma • Houston, Texas 77092
Phone: 713-686-5236 • Fax: 713-686-1292
Toll Free: 800-446-5236

[Image of polyflex components]
Nominations Open For WJTA Board Of Directors

"N"ominations for the Waterjet Technology Association (WJTA) Board of Directors are now open," announced Dr. Andrew Conn, secretary of the Waterjet Technology Association.

"With rapid advances in fluid jet technology, the Waterjet Technology Association is growing rapidly. The Association needs dedicated directors to lead the members as the WJTA grows," says Thomas J. Labus, chairman of the 1997 Committee on Nomination. "The duties of the directors are truly challenging and rewarding."

The four-year terms of office of Andrew F. Conn, Ph.D., Mohamed Hashish, Ph.D., Thomas J. Labus, George A. Savanick, Ph.D., and David A. Summers, Ph.D., and Bruce Wood, will expire on August 24, 1997. Therefore, nominations are sought for six (6) board members, each to serve

(continued on page 12)
WJTA New Members

Corporate

ESAB Cutting Systems
Wm. Jeff Hoffart
David D. Dumas
Circle Pines, MN

Freemyer Co., Inc./Industrial Pressure Inc.
Len Freemyer
Mike Wolford
Mike Gracey
Odessa, TX

Honda Of Canada Mfg.
Ian Hamby
Wayne Shipman
Harry Devlin
Alliston, Ontario, Canada

Hydra Dyne Industrial Cleaning Services Ltd.
Joe Dyne
Kent Wilkinson
Brian Johnston
Sarnia, Ontario, Canada

RCI Waterjet Cutting Services, Inc.
Charles DiPasquale
Bob Caravan
Rob Caravan
Mississauga, Ontario, Canada

The Astra Corporation
Dennis Mayerschoff
Robert Wolf
Paul Zoglio
Hyland, PA

Corporate Individuals

Mark DeGeyter
Honda Of Canada Mfg.
Alliston, Ontario, Canada

Individuals

Eric Chalmers
Fedtech, Inc.
Mounds View, MN

Donald R. Dagen
Concurrent Technologies Corp.
Johnstown, PA

James Green
U.S. Metals, Inc.
Mentone, IN

Frank Kamler
Babcock & Wilcox
Cambridge, Ontario, Canada

Thomas Lee
ACT Engineering Co., Ltd.
Taipei, Taiwan

Gennaro Martorelli
Martorelli Brothers
Merrides, CT

Charles McClamrock
Montgomery, AL

Frank McLeod
Subcon, Inc.
Florence, SC

Beat Meyer
ASBA AG
Switzerland

Kenny Morley
Penet Environmental
Louisville, KY

B.N. Mukherjee
Hadi H. Al-Hammam Est. For Contracting
Kingdom Of Saudi Arabia

Rod Reston
HydroChem Industrial Services
Orange Park, FL

Paul Schmidt
HydroChem Industrial Services
Midland, NJ

Vijay Singh
Associated Gaskets
Australia

Emmett Webb
North American Construction Co.
Zionsville, IN

DECLARE FREEDOM FROM VESSEL ENTRY!
Improve safety.
Reduce manpower, monitoring, paperwork, and preparation time.
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HURRICANE 3-D
Self-Rotating Nozzle
15 - 80 gpm
12,000 psi
Maximum

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WATERJET CONNECTION
Your ONE STOP waterjet machining service!

1.5" thick gear waterjet cut +/- 0.005
WATERJET CONNECTION is the largest, most comprehensive abrasive waterjet cutting and waterjet consulting service in the U.S.A.
From prototypes to massive volumes.
(A division of the Richel inc. group of companies)

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E-mail richel@ix.netcom.com
Fax: 330-633-7670

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www.waterjetconnection.com www.richel.com
Nominations Open for WJTA Board of Directors, from page 10

a four-year term of office beginning August 24, 1997.

According to the WJTA bylaws, each of the above-named individuals are eligible for re-nomination and re-election to the WJTA Board of Directors.

With regard to all first-time nominees, 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 facilities that are already represented on the board by individuals whose terms expire in 1999. These facilities include: StoneAge, Inc. (John Wolgamott), Maxpro Technologies (Paul Bowser), HydroChem Industrial Services, Inc. (Pat De Busk), Lydia Frenzel Conference Series (Lydia Frenzel, Ph.D.), University of Rhode Island (Thomas J. Kim, Ph.D.), and NLB Corp. (Forrest Shook).

According to the WJTA bylaws, any WJTA member in good standing (1997 membership dues paid) may submit a nomination(s). Nominees must also be WJTA members in good standing. The deadline for making nominations is at least eight (8) weeks prior to the biennial business meeting scheduled for Sunday, August 24. Your nomination(s) should reach the WJTA office no later than May 23, 1997. To submit a nomination(s), complete the form below and return to:

Thomas J. Labus, Chairman,
Committee on Nomination
Waterjet Technology Association
917 Locust Street, Suite 1100
St. Louis, MO 63101-1413
Phone (314)241-1445
Fax (314)241-1449

Remember, nominations must be received no later than May 23, 1997.

---

Industrial Cleaning Equipment For Sale

Two (2) Flow International Husky S-200 Ultra High Pressure Pumps

Operating pressure 40,000 psi.
Flow rate 6.5 gpm. Driven by Caterpillar Model 3306 205 HP diesel. Skid mounted. One (1) 1989 Pace America box trailer. One (1) 1994 Wells Cargo box trailer. The equipment is located at Suffolk, VA and may be inspected by appointment. Bids will be received through April 30, 1997.

For further details contact:

Jay Gardner
2200 City Center
301 Commerce Street
Fort Worth, TX 76102
Telephone: (817)258-6000

---

WJTA Nomination Form

Name Of Nominee_________________________ Title_________________________
Address_________________________
City_________________________ State____ Country____ Postal Code_______
Telephone_________________________
In US/Canada (______) ______ (area code) Outside US/Canada [_____] ______ (country code) (city code)
Fax_________________________
In US/Canada (______) ______ (area code) Outside US/Canada [_____] ______ (country code) (city code)

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

Name Of Nominator_________________________ Title_________________________
Address_________________________
City_________________________ State____ Country____ Postal Code_______
Telephone_________________________
In US/Canada (______) ______ (area code) Outside US/Canada [_____] ______ (country code) (city code)
Fax_________________________
In US/Canada (______) ______ (area code) Outside US/Canada [_____] ______ (country code) (city code)
Vulcan Waterjet Cures Hospital's Problem

Vulcan Waterjet Cutting Services recently assisted the University of Chicago Hospital's Radiation and Cellular Oncology Group in completing a newly designed Breast Board patient care device. The innovative Breast Board positioning apparatus will greatly enhance patient comfort while delivering stable support during radiation treatments.

In their ongoing quest for more efficient and comfortable methods of providing patient care, the faculty and staff of the University of Chicago Hospital's Radiation and Cellular Oncology Group compiled specifications for a patient support and positioning apparatus. The specs included a more stable support for larger patients, easy operating adjustments to provide quick and accurate positioning, strong yet lightweight construction, plus existing characteristics of the current treatment equipment.

Working closely with the Department of Radiation and Cellular Oncology, the University of Chicago Engineering Center was assigned the responsibility of actually designing and prototyping the new Breast Board.

Vulcan Waterjet Cutting Services met the challenge of cost effectively manufacturing the small run. Since the waterjet is completely computerized, no costly tooling was necessary. Vulcan Waterjet's abrasive jet cut through the acrylic and polycarbonate with ease, producing finished parts. Not only was the cut rate substantially faster than that of a band saw, the supersonic waterjet erosion process left a clean, smooth, burr free edge that required no further machining. The large pieces of stock material presented no problem for the large bed of the waterjet cutter, and nesting software maximized usage of material to further contain costs.

Vulcan Waterjet provides FREE sample cuts upon request. For more information about Vulcan Waterjet Cutting Services, call (414)645-2040 or (800)932-5323, or send e-mail to vwwaterjet@aol.com.

Waterjet Additive Makes Demilitarization Of Munitions Safer, from page 1

It was research in the area of the reaction of aluminum powder with water that gained Ana Navarro, a 17-year-old senior at Minnetonka High School in Minnesota, a second place award in the 1996 International Science and Engineering Fair and the status as one of the 40 finalists in the 1997 Westinghouse Science Talent Search.

Alliant Techsystems of Hopkins, Minnesota has applied for a patent in Ana's name for a chemical passivation process that she developed to inhibit the reaction of aluminum in water. Navarro passivated the surface of the aluminum powder by mixing potassium phosphate into the jetting water.

A neighbor of Ana's, Paul Miller, has been her scientific mentor for seven years. Miller is an engineering fellow at Alliant Techsystems. Navarro got the idea for passivating the surface of aluminum after she heard Miller describe the problem to her tenth-grade science class. Navarro tested her idea in a laboratory at Alliant Techsystems using equipment loaned by the Bureau of Mines and an intensifier pump loaned by Ingersoll-Rand.

Navarro developed her method just before Alliant realized that many of the munitions it had contracted to destroy in Ukraine contained aluminum. "We had a solution before we realized that we had a problem," Miller said. Tests followed, eventually on real bombs, which validated the method.

Navarro's idea is now being used by Alliant Techsystems to destroy 750-pound-bombs in a Navy facility at Crane, Indiana and will be used in the Ukraine to dismantle former Soviet munitions.

The title of Ana's prize-winning project is "Determining an Aluminum Passivating Solution for High Pressure Erosion Systems Used to Demilitarize and Recycle Unwanted Munitions."
Candidates Sought For 1997 WJTA Awards

You are invited to submit candidates for these special awards that are presented biennially by the Waterjet Technology Association to honor a company, organization or individual who has made a significant contribution to the industry through accomplishments that directly enhance waterjet technology and the industry as a whole.

Candidates must be received no later than July 1, 1997. The award recipient, to be selected by the Awards Committee of the Waterjet Technology Association, will be honored at a presentation ceremony on Sunday, August 24, 1997, in conjunction with the 9th American Waterjet Conference in Dearborn, Michigan.

Following is an official form for candidate nominations. Complete one form for each nomination submitted. Please make additional copies of the form as needed. Nominations providing complete written information specified on the form may be faxed to (314)241-1449 or mailed to the Waterjet Technology Association, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413, USA.

1997 WJTA Awards Nomination Form

Instructions: Complete sections below and submit a narrative (300-word maximum) to support your nomination on a separate sheet of paper. Please print or type all information.

I nominate the following company, organization, or person as a candidate to receive a 1997 WJTA Award (CHECK ONE Award):

☐ Distinguished Pioneer Award

The nominee must:
- Have made contributions to the waterjet industry;
- Have made contributions to the achievement of the goals of WJTA;
- Have high moral character;
- Have strong personal and business ethics;
- Be dedicated to the future of the waterjet industry and to the growth of WJTA.

☐ Safety Award

What has the nominated company, organization or individual done to introduce new and innovative ideas in safety? This could include, but is not limited to new products, new concepts, new safety techniques...any unique activity which increases the overall safety of waterjet equipment.

☐ Technology Award

What has the nominated company, organization or individual done to introduce new and innovative ideas in engineering or manufacturing? This could include, but is not limited to, new products, new manufacturing techniques, patents...any unique activity that advanced the technology of the waterjet industry.

Candidate: ___________________________ Company: ___________________________

Address: ___________________________ Country: ___________________________

City/State/Zip: ___________________________ Phone In US/Canada (______) area code Fax (______) area code

Phone Outside US/Canada [_____] (______) country code city code Fax [_____] (______) country code city code

Candidate Submitted By: ___________________________ Company: ___________________________

Address: ___________________________ Country: ___________________________

City/State/Zip: ___________________________ Phone In US/Canada (______) area code Fax (______) area code

Phone Outside US/Canada [_____] (______) country code city code Fax [_____] (______) country code city code

Signed: ___________________________ Date: ___________________________

Nominations must be received no later than July 1, 1997. For a prompt response, fax completed form to (314)241-1449, or mail to the WJTA, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413, USA.
1997 Calendar Of Events

May 10-16, 1997: American Society for Surface Mining and Reclamation 14th Annual Meeting, Austin, Texas. For more information, contact the North American Coal Corporation, 14785 Preston Road, Suite 1100, Dallas, TX 75240, fax: (214)387-1051.

May 29 - June 1, 1997: Stonetec ’97. Educational program and exhibition of stone technology, equipment, tools and materials. Nuremberg, Germany. In the U.S., contact Concord Expo Group, phone: (508)371-2203, fax: (508)371-7121. In Germany, contact Nürnberg Messe by fax at 09-11/86-06-2-28 or by e-mail at 100763.260@compuserve.com.

June 14-16, 1997: Richel, Inc., a waterjet consulting firm, is offering a three day, hands-on waterjet cutting course, targeted at anyone exploring opportunities in this, an exploding business. The course will be held in Florence, SC. Mornings are devoted to theory, afternoons to hands-on work, giving attendees the opportunity to operate a system. Attendees are encouraged to bring samples of materials they want tested. Specific attention to starting up and operating a waterjet business, including marketing, administration, how to price work, and typical selling rates is always popular with entrepreneurs who attend. A full and complete understanding of the industry, how it relates to your business and your opportunities, is assured. For more information call (330)633-7698.

August 23-26, 1997: 9th American Waterjet Conference. Contact: Waterjet Technology Association, 917 Locust Street, St. Louis, MO 63101-1413, phone: (314)241-1445, fax: (314)241-1449, e-mail: wja@aol.com.

September 17-19, 1997: InterGLASSmetal/ Fenestration World ’97, Greater Columbus Convention Center, Columbus, Ohio. Educational program and exhibition. Sponsored by the Sealed Insulated Glass Manufacturers Association, the American Architectural Manufacturers Association, the American Scientific Glass Blowers Society and the Screen Manufacturers Association. Contact: Dame Associates, Inc., 51 Church Street, Boston, MA 02116, phone: (617)482-3596, fax: (617)423-0245, toll-free in U.S. and Canada: (800)843-3262.

October 28-30, 1997: Cerasia ’97, Asia Pacific Exhibition For Ceramics, Stone And Bathroom Fittings. Contact: Cerasia UK: Paragon Exhibitions Ltd., Brook House, Yoxall Road, Newborough, Burton-on-Trent, Staffordshire, DE13 8SU, England, Tel: +44 (0) 1283 575654, Fax: +44 (0) 1283 575622.

5th Pacific Rim International Conference On Water Jet Technology
February 3-5, 1998, New Delhi, India

Purpose: Transfer of technology to establish joint ventures and partnerships.

Special Invitation to Corporations Worldwide from Mohan Vijay, Ph.D.

I just came back from New Delhi, meeting a number of very important individuals from government organizations (for example, Department of Science & Technology), national professional organizations (e.g., Indian Institution of Plant Engineers (IIPE), universities, research institutes and corporations. Since June (1996), in order to promote this Conference, I have given a number of seminars on applications of fluid jets (80 slides and 30 minute video presentation), including an interview on All India Radio which was broadcast on March 12, 1997. I have submitted brief memos with beautiful photographs for publication in the news media. A vital message has clearly emerged from all these interactions. All the professionals I have met thus far wish to hear "SUCCESS STORIES" which should include a brief description of the systems used for specific applications, including costs. The following inquiries are typical examples:

"As you know frequent digging of Indian highways is an endemic problem. We are looking for solutions or technology which will enable immediate on the spot repairs by a small dedicated unit. Any information or leads on the subject from you would be gratefully welcomed."

"Thanks for bringing this Conference to India. We have read about this technology especially in the context of concrete demolition. We like that this technology be introduced in India at the earliest opportunity. We are very much excited about this Conference..."

I will be in India once again in June/July and September/October. On both occasions, I would like to show video/slides on applications such as plant maintenance, concrete, processing leather products, grouting (strengthening of dams), etc., to important members of professional associations. If you wish to publicize your company and if you have special video clips/slides, photographs, I will be quite pleased to include them in my presentations. The photographs will also be included in a special article (under preparation) which will be distributed widely in India through professional associations. Please send me at least 10 copies of brochures or photographs indicating, where possible, approximate cost and size of the systems (commonly asked questions!).

Mohan M. Vijay, Program Manager, Centre for Fluid Power Technology, National Research Council of Canada, Ottawa, Ontario, Canada, K1A 0R6, telephone: (613)993-2731 or 748-7264, fax: (613)952-1395, e-mail: mohan.vijay@nrc.ca.
A waterfront view of Detroit—also known as Motor City—Michigan, just a short drive from the WJTA Conference hotel in Dearborn, Michigan. Motor City boasts plenty of auto related history, recreation and entertainment.

Conjet Robot Restores Stockholm's Skanstulls Bridge, from page 2

Driven by a 350 kilowatt to 550 kilowatt diesel engine 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, which is attached to a traversing cradle running back and forth along a feed beam. 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. At the same time the machine moves back a predetermined distance ready to make the next adjacent cut.

Safety is paramount and the entire nozzle assembly is attached to the end of the Conjet Robot's arm and covered by a protective shroud. The boom gives the operator considerable flexibility to use the Conjet Robot in a wide variety of hydrodemolition tasks on horizontal and vertical surfaces, ceilings and soffits. An optional multi-positioning boom can also reach under a bridge deck soffit while the machine stays on the deck above.

PEAB started on site in April 1996 and aims to complete the project in two years, including breaks during the winter months.

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Our client, a multi-national Fortune 200 company seeks an individual to load full cycle development projects to field high pressure pumps and components. Requires excellent interpersonal communications and cross functional team building skills. Ph.D., preferred. Must have a strong knowledge of fluid dynamics, fatigue analysis, stress analysis, FEA, Algor and/or Pro Engineer. The successful candidate will have a demonstrated track record of developing new products and systems (through beta testing and manufacturing) in a 50,000+ PSI environment.

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Telephone: (704)543-1111
Fax: (704)543-0945
E-mail: lowechar@aol.com

Conference Preliminary Technical Program, from pg. 6


Safety, Information, and Business Aspects


"Developing A Training Complex For High Pressure Water Blast Training," L. Moe.

"An Analysis Of Operating Costs For Waterjet Cutting," A. Bennett.

"Building A Business In Waterjet Cutting/ Machining," R. Ward.
Dearborn/Detroit Highlights

- Henry Ford Museum & Greenfield Village. The Museum houses one of the most stunning car collections anywhere along with a not-to-be-missed collection of vintage railroad engines.


- The largest exhibition of ancient Egyptian treasures to visit the U.S. on display at the Detroit Cultural Center's Institute of Arts. Displays include more than 200 masterpieces of Egyptian art, from the predynastic period to the end of the Roman Empire. The Cultural Center is also home to the Historical Museum, the newly opened (April 1997) Museum of African American History and the Science Center.

- The headquarters of the Big Three Automakers: the imposing General Motors Building; the Ford Motor Company World Headquarters known in car circles as the "Glass House"; and Chrysler Corporation's new world headquarters and technical center.

- Windsor, Canada, just across the Detroit River, accessible via the Detroit-Windsor Tunnel. Windsor is a favorite destination for shopping, dining and casino gambling. You may be asked to show a picture I.D.; non-U.S. citizens will need a passport.

Hotel Reservations

Contact the Hyatt Regency Dearborn for hotel reservations.

Make your hotel reservations early to take advantage of the special WJTA Conference rates. Use the convenient form below, or call the Hyatt reservations system toll-free at 1-800-233-1234, or dial the Hyatt Regency Dearborn direct at (313)982-6880. Be sure to request the special group rate for the 1997 WJTA Conference.

WJTA 9th American Waterjet Conference Hotel Reservation Form

Hyatt Regency Dearborn Welcomes: 9th American Waterjet Conference
August 23-26, 1997

Please reserve room accommodations for:

Arrival Date __/__/____  Arrival Time ________________
Departure Date __/__/____
Name
Hyatt Gold Passport* Card #*
Address __________________________ State __________
City __________________________ Postal Code __________
Telephone Number __________________________

Sharing Room With __________________________

The Hyatt Regency Dearborn will only accept guaranteed reservations. You may guarantee your reservation with an accepted credit card number, expiration date, and signature or by an advanced deposit for one night's lodging. Please make check payable to the Hyatt Regency Dearborn.

Accommodation Requests

<table>
<thead>
<tr>
<th>Smoking</th>
<th>Check One</th>
<th>Rate Per Day</th>
<th>Business Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single (one person)</td>
<td>$103</td>
<td>$118</td>
<td></td>
</tr>
<tr>
<td>Double (two persons, two beds)</td>
<td>$103</td>
<td>$118</td>
<td></td>
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<tr>
<td>Double (two persons, king, bed)</td>
<td>$103</td>
<td>$118</td>
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</tr>
<tr>
<td>Triple (three persons)</td>
<td>$128</td>
<td>$143</td>
<td></td>
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<tr>
<td>Quad (four persons)</td>
<td>$128</td>
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Reservation requests are based upon availability at time of arrival.

Credit Card # __________________________ Exp. Date ________
Signature __________________________

[ ] MasterCard  [ ] VISA  [ ] American Express  [ ] Diners Club
[ ] Discover  [ ] Japan Credit Bureau

Check-in: 3:00 p.m.  Check-out: 12 Noon

Please note: A $25.00 departure charge fee will be incurred if there are any changes to the departure date after check-in.

To guarantee convention rates, reservations must be received by the Hyatt Regency Dearborn by August 2, 1997.
Eight Easy Ways To Attend The 1997 Waterjet Conference

1. FULL CONFERENCE: Includes admission to all technical and scientific sessions, exhibit hall, coffee breaks, luncheons, receptions, social function on Monday, and technical tour and demonstration. Each full registration also receives one copy of the Conference Proceedings.

2. COMBO: Includes everything listed under Full Conference PLUS admission to the Waterjet Short Course.

3. SAVE-ON MULTIPL EMPLOYEE FULL/COMBO REGISTRATIONS: Companies that purchase three or more full or combo registrations receive a special discount for each additional employee registered after the first two. To take advantage of the special discount, register the first two (2) employees from your company at the regular FULL/COMBO Rates and receive the discounted rate for the third and subsequent employee registrations.

4. DAILY ATTENDANCE: Includes admission to all technical and scientific sessions, exhibit hall, coffee breaks, and luncheon on that day. NOTE: The official Conference Proceedings and admission to the social function on Monday are NOT included in the daily registration fee. The Proceedings and tickets to the social function on Monday must be purchased separately.


6. EXHIBIT HALL ONLY: Includes admission to the WJTA Exhibit Hall where you'll see waterjet equipment, supplies, and services on display. Does NOT include the luncheon in the exhibit hall on Monday. Luncheon tickets may be purchased separately.

7. TECHNICAL TOUR: Includes round-trip bus transportation, luncheon, and admission to several company sites where you'll see live waterjet demonstrations.

8. STUDENTS: The registration fee for WJTA student members is $20.

Student registration includes admittance to technical programs and the technical tour, but does NOT include copies of books or admittance to any food/social functions. NO discount is available for students that are not members of the WJTA. WJTA student members must be enrolled full-time in a university graduate or undergraduate program.

CANCELLATION POLICY

Fees will be refunded in full for cancellations received at least four weeks prior to the Conference. Cancellations received more than 10 days and less than four weeks prior to the Conference will be subject to a $50 charge. No refund will be made for cancellations received less than 10 days prior to the Conference. However, substitutions may be made at any time.

Discounts for WJTA members and early-bird registrants!

WJTA members receive a special discount off the regular registration fees. You will also receive an additional discount if your registration is postmarked or received in the WJTA office by August 8, 1997.

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