WJTA Jet News
Waterjet Technology Association
APRIL 1997
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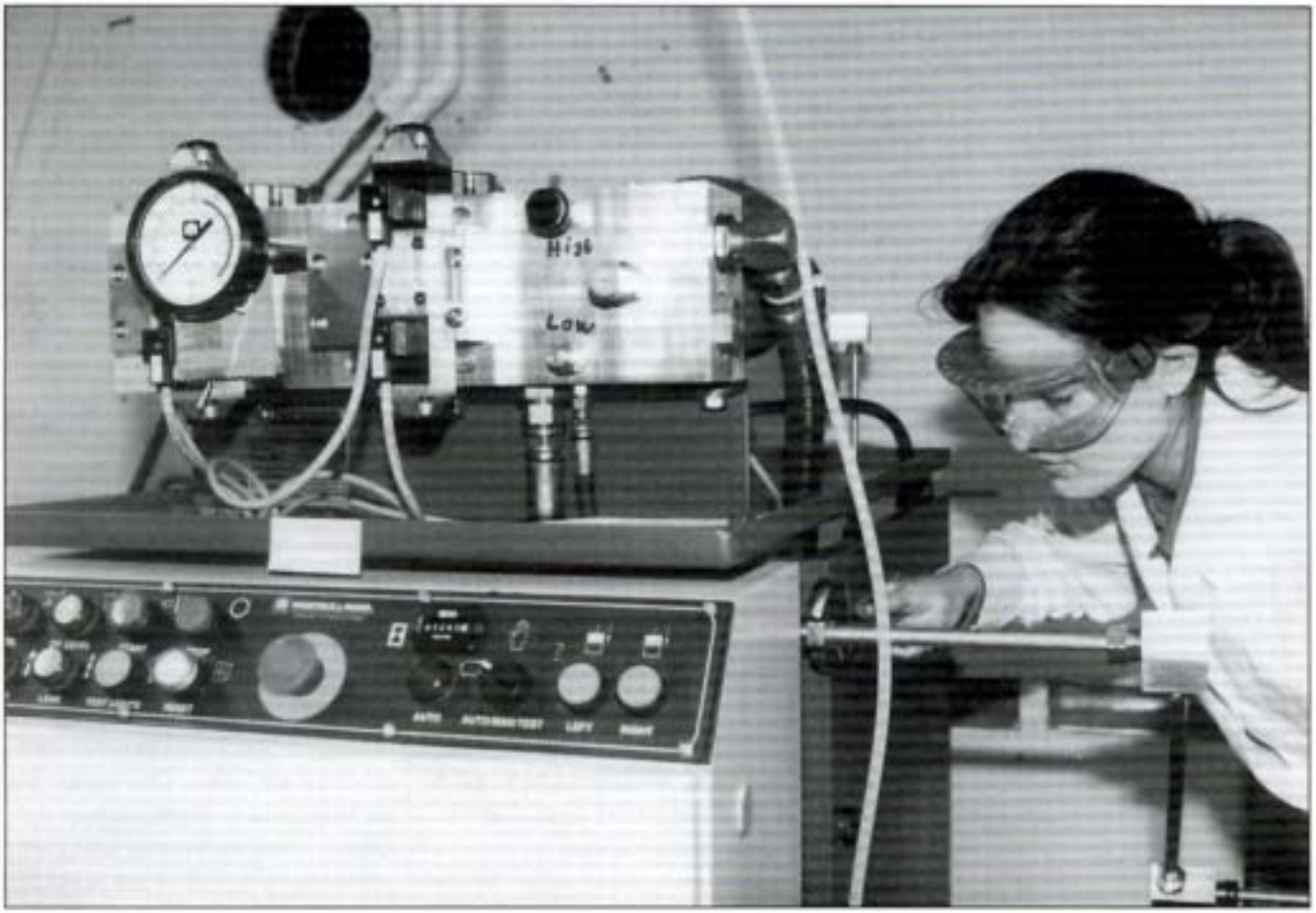
917 Locust Street, Suite 1100 • St. Louis, MO 63101-1413, USA • Telephone: (314)241-1445, Fax: (314)241-1449

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.

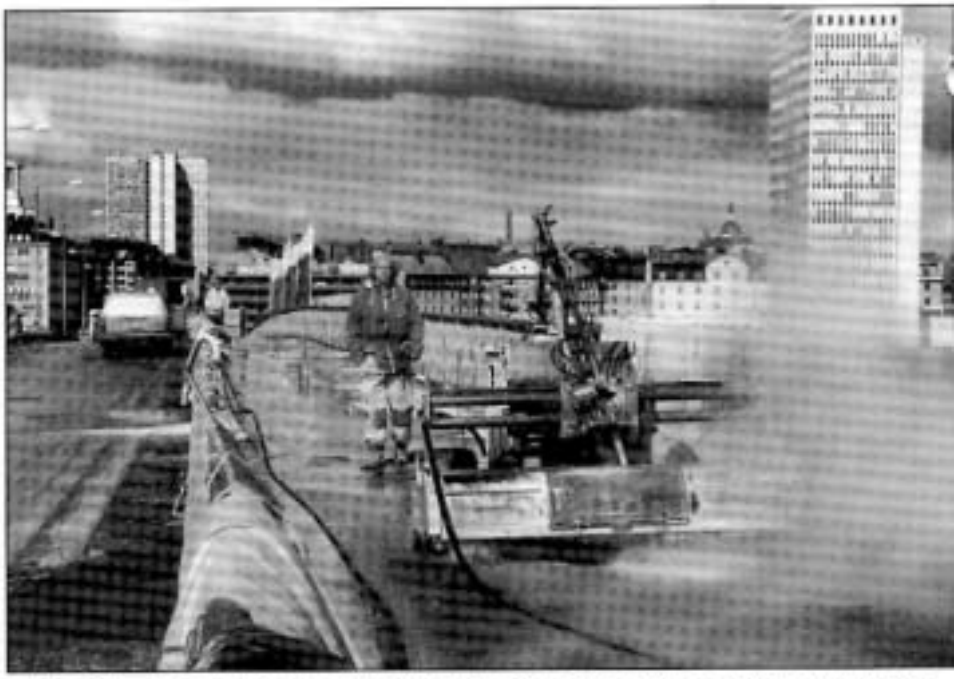
(continued on page 13)

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



A Conjet robot high pressure water jetting hydrodemolition machine is being used to cut away damaged concrete and repair the deck of the Skanstulls Bridge in Stockholm, Sweden.

owner Gatu-och Fastighets-Kontoret subsequently awarded what is believed to be Sweden's largest hydrodemolition repair contract to PEAB Öst.

PEAB Öst, based in Sollentuna, north of Stockholm, is initially removing the deck's asphalt wearing course to expose the damaged concrete underneath. NCC Waterjet, using its remotely operated, computer controlled Conjet Robot with built in automatic quality control, follows on behind removing a nominal 20 millimeters of damaged concrete from the road deck and 40 millimeters from the pedestrian walkways. NCC Waterjet has to take off about 500 meters^3 of damaged concrete from the deck and is completing an area of between 100 meters^2 and 400 meters^2/day.

PEAB is replacing the damaged material from the walkway with the same thickness of new concrete. But on the main road deck the contractor is strengthening the original 300 millimeter slab by adding a new layer 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)

New Products, Developments

NLB Corporation has introduced the Ultra-Clean 36® 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™ 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 shut-down 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)

B M Co. LLC 1-800-792-5462
Parts Company

NLB ATL-3000 automated tube lancer.

NLB ATL-3500 SAFLEX™ tube lancer.

The Waterjet Technology Association's 9th American Waterjet Conference

August 23-26, 1997 Hyatt Regency, Dearborn, Michigan

Preliminary Schedule of Events

Saturday, August 23

8:30 a.m.-Noon	Short Course on the Fundamentals and Applications of Waterjet Technology
Noon-1:30 p.m.	Luncheon for "Short Course" Participants
1:30 p.m.-4:30 p.m.	Short Course (continued)
6:30 p.m.-9:30 p.m.	Welcoming Reception In The Exhibit Hall -- Exhibit Opens

Sunday, August 24

8:00 a.m.-11:00 a.m.	Applications Workshops
8:30 a.m.-11:30 a.m.	Research & Development Sessions
9:30 a.m.-5:00 p.m.	Exhibits
Noon-2:00 p.m.	Awards Luncheon
2:30 p.m.-4:30 p.m.	Applications Workshops (continued)
5:00 p.m.-6:00 p.m.	WJTA Biennial Business Meeting

Monday, August 25

9:30 a.m.-2:30 p.m.	Exhibits
8:00 a.m.-11:00 a.m.	Applications Workshops
8:30 a.m.-11:30 a.m.	Research & Development Sessions
Noon-2:00 p.m.	Luncheon in Exhibit Hall
2:00-4:30 p.m.	Applications Workshops (continued)
2:00-5:00 p.m.	Research and Development Sessions (continued)
7:00 p.m. - 11:00 p.m.	Social Function

Tuesday, August 26

9:30 a.m.-3:00 p.m.	Technical Tour and Field Demonstrations

A complete copy of the Preliminary Technical Program appears in this issue beginning on page 5.

9th American Waterjet Conference

Dearborn, Michigan August 23-26, 1997

Preliminary Technical Program

AWJ Machining Operations

"Abrasive Waterjet Cutting And Piercing Of CFCC Materials," *Z. Guo, M. Ramulu, and M. Jenkins.*
"Abrasive Waterjet Process Dependent Performance Of Polymer Composites Under Dynamic Loading," *M. Ramulu, and D. Arola.*
"Process Developments And Apparatus For Discretisized Abrasive Waterjet Milling," *K. Ojmertz, and G. Holmqvist.*
"Abrasive Waterjet Turning Of Diamond Grinding Wheels," *M. Nanduri, D. Taggart, T. Kim, and D. Sheldon.*

AWJ Machining Studies

"Optimization Of Abrasive Waterjet Cutting - The Surface Finish Issues," *J. Zeng.*
"A Comparative Study Of Suspension And Injection Methods In Rock Cutting With Abrasive Waterjet," *A. Bortolussi, R. Ciccu, and A. Vargiu.*
"Experimental And Numerical Analysis Of Waterjet Impacting And Piercing Process," *M. Ramulu, and H. Yeh.*
"Transient Strains Of A Piercing Abrasive Waterjet," *Z. Guo, M. Ramulu, and M. Jenkins.*

AWJ Nozzle Wear and Optimization

"On Nozzle Wear," *M. Hashish.*
"Effect Of The Inlet Taper Angle On Abrasive Waterjet Nozzle Wear," *M. Nanduri, D. Taggart, T. Kim, C. Haney, and F. Skeele.*
"Evaluation Of An Accelerated Wear Test For AWJ Nozzles," *D. Taggart, M. Nanduri, T. Kim, and F. Skeele.*

Polymer, Suspension, Ice, and Cryogenic Jets

"Ultra High Pressure Non-Abrasive Polymer Jetting A Production Implementation," *R. Lombari.*
"Abrasive Suspension Jet (ASJ) Machining Of Hard Materials," *M. Hashish, and P. Miles.*
"Investigation Of Icejet Machining," *E. Geskin, L. Tismenetskiy, F. Li, and P. Meng.*
"Fine Powder Fabrication Using High Pressure Waterjet And Cryogenic Jets," *M. Hashish, and P. Miles.*

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.*
"Experimental And Numerical Studies On The Mechanism Of Abrasive Jet Cutting," *M. Niu, Y. Fukunishi, and R. Kobayashi.*
"Three-Dimensional Numerical Simulation Of Abrasive Jet Cutting Process," *T. Sawamura, Y. Fukunishi, R. Kobayashi.*

Jet Flow Studies

"Visual Information Of The Mixing Process Inside The AWJ Cutting Head," *A. H. Osman, D. Buisine, B. Thery, and G. Hussaye.*
"Numerical Simulation For The Ultra-High-Pressure (High-Speed) Water Jet In The Well-Bottom Flow," *X. Li, Z. Weixing, W. Zhiming, and S. Zhonghou.*
"Theoretical An Experimental Study On The Conical Rotatory Water Jet Flow," *X. Li, F. Shuhua, W. Ruihe, and S. Zhonghou.*
"Jet Form Study In Air And In The Slot," *N. Ilias, A. Magyari, S. Radu, M. Achem, and A. Magyari.*

Pulsed Jets

"Generating Powerful Pulsed Jets With Electric Discharges: Fundamental Study," *M. Vijay, M. Bielawski, and N. Paquette.*
"Theoretical Derivation Of Parameters For Helmholtz Resonator Producing Pulsing Liquid Jet," *L. Hlavac.*
"Peculiarities Of Interaction Of Unsteady Water Jets With Targets," *G. Atanov.*
"The Study of Oscillating Jet Nozzle With Flow Control Oscillator," *T. Chuanlin, L Xiaohong, L. Zhenfang.*

High Pressure Systems

"A Pulsation-Free Fluid Pressure Intensifier," *G. Yie.*
"Mechanics Of The Powder Hydro-Cannon With The Regard Of Wave Processes While Powder Burning," *G. Atanov, and A. Semko.*
"Finite Element Analysis Of Hydraulic Manifold Port For The Intensifier Pump," *J. Xu.*
"Modeling High Pressure System Dynamics," *T. Labus.*
"Performance And Dynamic Analysis Of Intensifiers And Intensifier Systems," *P. Singh.*

(continued on page 6)

9th American Waterjet Conference Preliminary Technical Program, from pg. 5

Manipulator and Control Systems

"Pedestal Robot Waterjet Configurations," *D. Snider.*
"Computer Aided Manufacturing For Three-Dimensional Abrasive Water Jet Machining," *A. Henning.*
"High-Precision Waterjet Cutting Of Three dimensional Contours In Industrial Productions," *F. Do, and M. Knaupp.*
"Development Of A Robotic System For Cleaning Of Chemical Reactors," *E. Geskin, and L. Tismenetskiy.*
"Waterjet Machine Tool Of The Future — A Vision," *M. Hashish.*

Quarrying, Mining, and Excavation

"Development Of Water Jet Cutting In Extremely Hard Granite Quarries 10 to 20 Feet Deep" *P. Wyatt, and M. Peterson.*
"Water Jet And Abrasive Water Jet Performances In Materials Cutting," *N. Ilias, A. Magyari, S. Radu, M. Achim, and O. Radu.*
"Enhancing The Drilling Potential Of Polycrystalline Diamond Impact Tools," *R. Gertsch, D. Hall, and D. Summers.*
"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.*
"Abrasive Water Suspension Jets For Nuclear Decommissioning Final Investigations For The First Application," *C. Brandt, H. Louis, G. Tebbing, and C. Witzsche.*
"Practical Problems In The Demilitarization Of Munitions," *R. Fossey, K. Sims, J. Blaine, J. Tyler, M. Sabin, and D. Summers.*
"Water Jetting Application In The Petro Chemical Industries," *A. Magnuson.*
"Designing A Waste Retrieval System For Radioactive Waste Recovery," *G. Galecki, R. Fossey, and D. Summers.*

Submerged Cutting and Off-Shore Applications

"Development Of A DYNAJET Cavitating Water Jet Cleaning Tool For Underwater Marine Fouling Removal," *K. Kalumuck, G. Chahine, G. Frederick, and P. Aley.*
"Reach-Enhancement Of A Submerged Waterjet Using Air Shrouding," *A. Miller, and D. Daly.*

Cleaning, Stripping and Surface Preparation (1)

"Mathematical Simulation Of Waterjet Cleaning," *P. Meng, E. Geskin, M. Leu, L. Decaro, and Z. Huang.*
"Waterjet Nozzle Operation And Selection Criteria For Surface Preparation," *E. Ting.*
"A Study Of Rotary Jets For Material Removal," D. Wright, J. Wolgamott, and *J. Zink.*

Cleaning, Stripping and Surface Preparation (2)

"Removal Of Coatings With Low Pressure Pulsed Water Jets," *M. Vijay, R. Puchala, and N. Paquette.*
"Mobile Full Recovery Waterjet Stripping Systems," *R. Rice.*
"A Study On Descaling Of Water Injection Tubing by Water Jetting," *L. Gensheng, M. Jiaji, S. Xiaoming, and Z. Guangchen.*
"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)

"Continuing Improvement Initiatives Of Surface Preparation With Waterjetting," *L. Frenzel.*
"Advanced Hardware For Surface Preparation Applications," *R. Schmid.*

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Safety Committee Solicits Comments On *Recommended Practices*

The Safety Committee hereby solicits comments regarding improvements to the publication, *Recommended Practices For The Use Of Manually Operated High Pressure Water Jetting Equipment*. The *Recommended Practices* is reviewed periodically at the biennial conferences of the Waterjet Technology Association. The next review will be at the 9th American Waterjet Conference, August 23-26, 1997, in Dearborn, MI. We invite your comments and recommendations for consideration.

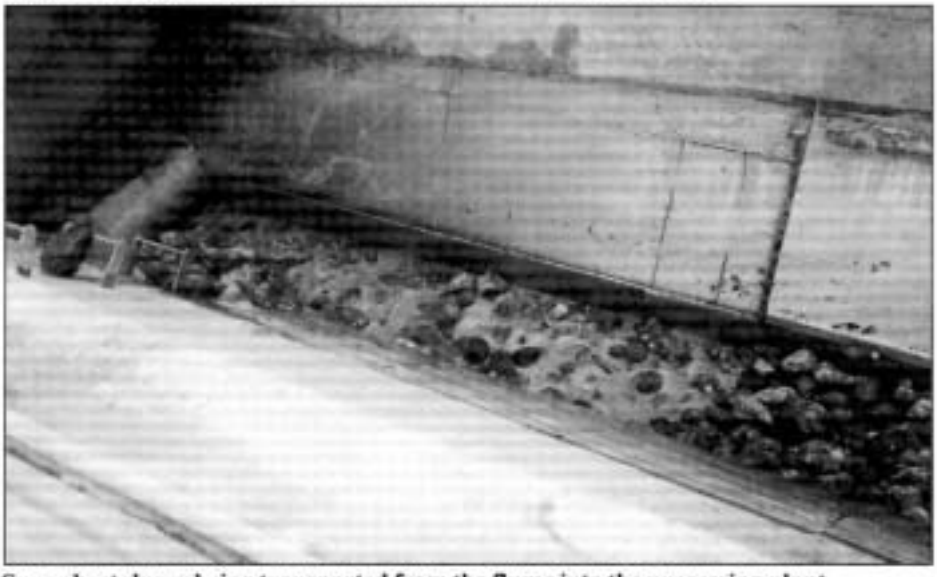
Please address your suggestions to: Safety Committee, c/o WJTA, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413.

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.

Sugar beets being dumped from loaded truck into a transport flume.



Sugar beet slurry being transported from the flume into the processing plant.

New Products, Developments, from page 3

Flow International Corporation has introduced a new version of its Flying Bridge™ waterjet shapecutting 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 ballscrew mechanics.

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 pliant 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.

Patent numbers: U.S. #4,635,620; #4,713,853; #4,684,486 and nine corresponding foreign patents.

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

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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.

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Toll Free: 800-446-5236

Parker
Fluid Connectors

Nominations Open For WJTA Board Of Directors

"Nominations 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., 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)

Nominations/Elections Procedures

In accordance with the bylaws of the Waterjet Technology Association, revised in 1993, nominations and elections to the Board of Directors include the following procedures:

- At least two calls for nominations to the board of directors will be published in the *Jet News*. The first call for nominations appears in this issue. **Nominations will be accepted through May 23, 1997.**
- A list of the eligible nominees and a brief biographical sketch for each individual will be published in the June 1997 issue of *Jet News*.
- An official ballot listing the eligible nominees will then be forwarded by mail to all eligible voting members of the Association on July 11. **Signed and executed ballots must be mailed to the Association's office for tallying by August 20, 1997.**
- The names of newly elected board members will be announced on Sunday, August 24, 1997, at the WJTA general membership meeting held in conjunction with the 9th American Waterjet Conference in Dearborn, Michigan.

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

WJTA New Members

Corporate

ESAB Cutting Systems
Wm. Jeff Hoffart
David B. 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 Dynes
Kent Wilkinson
Brian Johnston
Sarnia, Ontario, Canada

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

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

Corporate Individuals

Mark Degeer
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

Gernero Martorelli
Martorelli Brothers
Merrides, CT

Charles McClamroch
Jay R. Smith Mfg. Co.
Montgomery, AL

Frank McLeod
Subcon, Inc.
Florence, SC

Beat Meyer
Alfli AG
Switzerland

Kenny Morley
Petit 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

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.

WJTA Nomination Form

Name Of Nominee _____ Title _____
Address _____
City _____ State _____ Country _____ Postal Code _____
Telephone
In US/Canada (_____) _____ Outside US/Canada [_____] (_____) _____
(area code) [country code] (city code)
Fax
In US/Canada (_____) _____ Outside US/Canada [_____] (_____) _____
(area code) [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 (_____) _____ Outside US/Canada [_____] (_____) _____
(area code) [country code] (city code)
Fax
In US/Canada (_____) _____ Outside US/Canada [_____] (_____) _____
(area code) [country code] (city code)

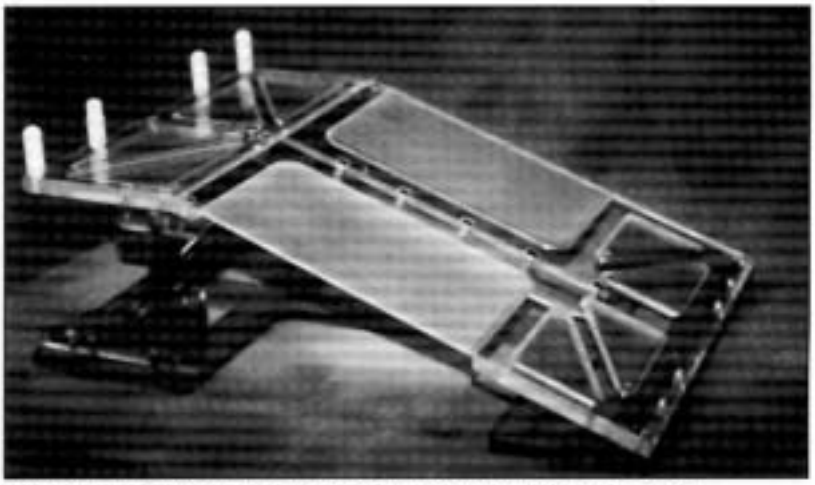
Vulcan Waterjet Cures Hospital's Problem

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.



University of Chicago Hospital's Breast Board cut with a waterjet.

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 vwaterjet@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.

❒ Service Award

How has the nominated company, organization or individual contributed in time and talent toward improvement in the Waterjet Technology Association?

❒ 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: _____

City/State/Zip: _____ Country: _____

Phone In US/Canada (_____) _____ Fax (_____) _____
area code area code

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

Candidate Submitted By: _____ Company: _____

Address: _____

City/State/Zip: _____ Country: _____

Phone In US/Canada (_____) _____ Fax (_____) _____
area code area code

Phone Outside US/Canada [_____] (_____) _____ Fax [_____] (_____) _____
country code city code 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: Stonettec '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-n 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: (3134)241-1445, fax: (314)241-1449, e-mail: wjta@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 575564, 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.

Conference Preliminary Technical Program, from pg. 6

"Cleaning Process Equipment With Automated High Pressure Water," *M. Gracey.*

"Use Of Ultra-High Pressure Waterjetting For Rocket Motor Refurbishment," *G. Swenson, and B. Andrus.*

Safety, Information, and Business Aspects

"Waterjet-Related Noise And Its Countermeasures," *H. Katkura, and H. Miyamoto.*

"Beyond Web Pages: Using Internet As A Business Strategy Tool For Waterjet Industry," *P. Singh.*

"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.

- Homes of the famous auto barons: the water-front mansion of Lawrence P. Fisher, founder of Fisher Body; the Scottish baronial home of Henry and Clara Ford; the Tudor home of Matilda Dodge Wilson and the English Cotswald-style estate of Edsel and Eleanor Ford.

- 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_____

City _____ State _____

Country _____ 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.

Applies only to Hyatt exclusive gold passport members only.

Hyatt Regency Dearborn
Reservations Department
Fairlane Town Center
Dearborn, MI 48126
Telephone: (313)982-6880 Fax: (313)982-6884

Please check preferred accommodations. All rooms are subject to 6% sales tax and 7% county assessment tax. Business plan rooms include the following: fax machine, computer modem, iron and ironing board, continental breakfast, and access to business suite (includes business supplies and computer printer).

Accommodation Requests Smoking ❑ Non-Smoking ❑	Check One	Rate Per Day	Business Plan
Single (one person)		$103	$118
Double (two persons, two beds)		$103	$118
Double (two persons, king, bed)		$103	$118
Triple (three persons)		$128	$143
Quad (four persons)		$128	$143

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 (except Short Course), 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 MULTIPLE 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.

5. **WATERJET SHORT COURSE:** Includes the manual *Fluid Jet Technology — Fundamentals And Applications*, coffee breaks, and luncheon.

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 anytime.

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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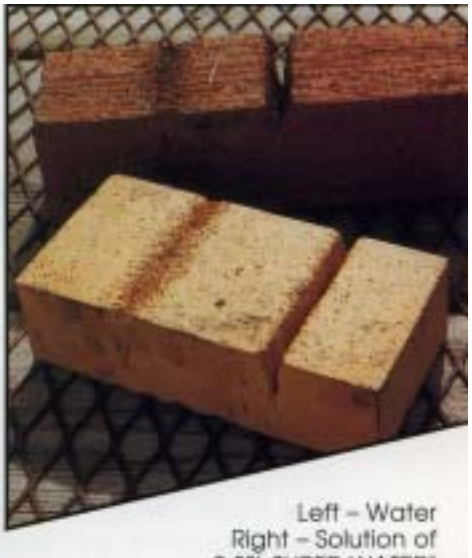

Left – Water
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- dramatically increases cut quality of shoe soles at 50,000 psi with a 15% increase in production rate. Also operating expenses and maintenance costs are reduced, and nozzle life increased by 3 to 6 times.[5]
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- removed rubber from space shuttle booster motors and sludge (compressive strength 15,000 psi) from Ontario Hydro's nuclear power steam generators.[7]

(References on reverse side.)

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