



## Hose Guides For Sewer Cleaning

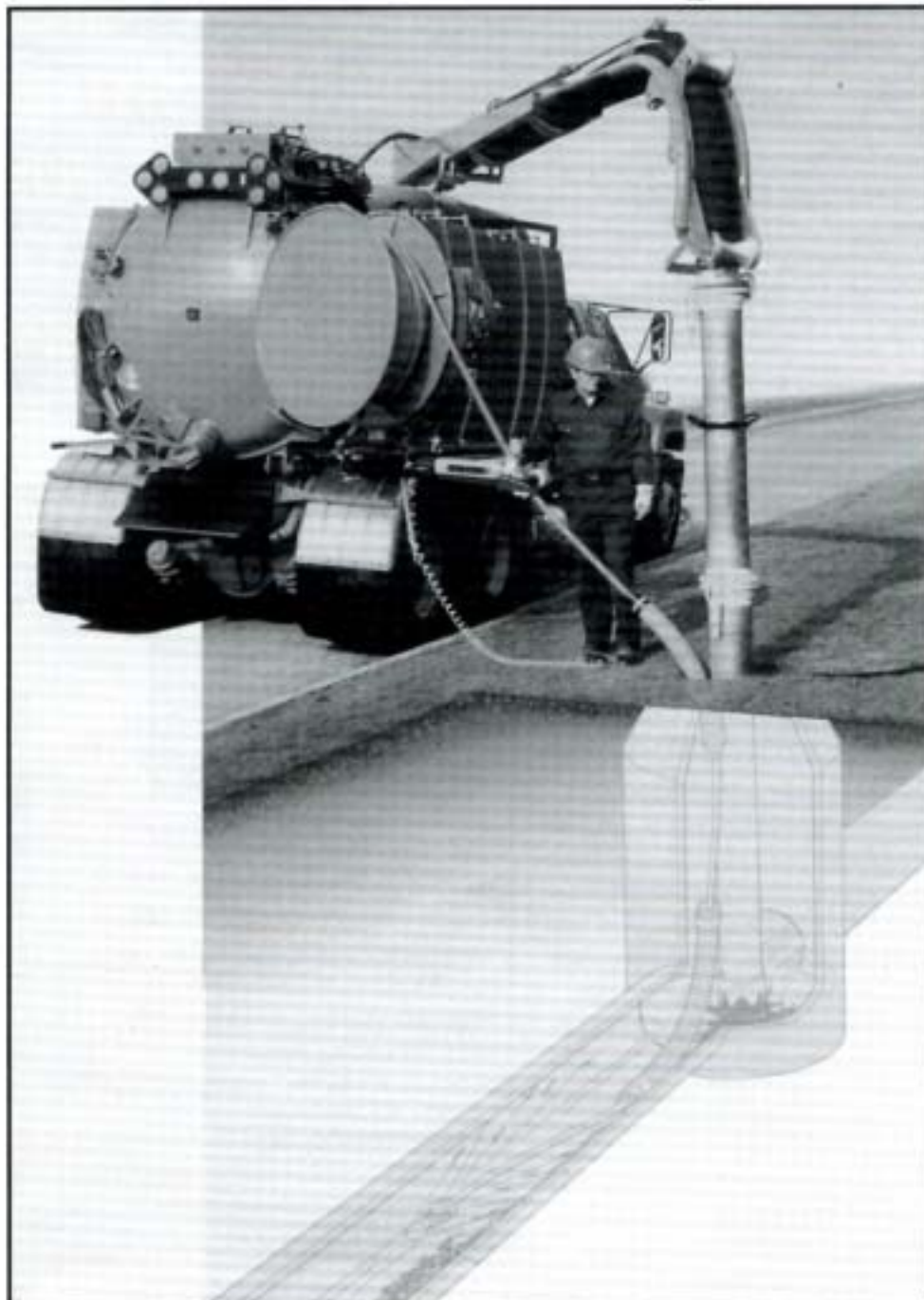
**S**erious injuries can result from not following safety procedures when cleaning sewer pipes with a waterjet mole. If the mole is not inserted into the pipe 2 to 3 feet before the pressure is applied, the mole can be propelled outward and injure the operator.

Paddy Swan described such an incident in an article in the April 1990 issue of *Jet News*. In this instance an operator, working alone, was cleaning a three-inch drain pipe at the base of a six-foot manhole. He placed the multiple jet nozzle attached to the hose in the manhole.

He then returned to the pump, put the pressure to load and let the hose run out from his hose reel. The hose appeared to stop after a short distance so the operator went to the manhole. The mole suddenly appeared from the manhole and hit the operator directly in the face. The operator lost an eye.

This operator was inexperienced and working alone. Drain cleaning is not

(continued on page 8)



A sewer cleaning unit with a flexible hose guide for the cleaning mole.

Photograph courtesy of Aquatech Inc., Twinsburg, OH

## Corrupad Eliminates Airborne Dust And Triples Productivity With Waterjet

A company dedicated to producing environmentally friendly products should naturally want to provide a clean, healthy work environment. Corrupad Protective Packaging acknowledged this premise and sought to free its facility of airborne dust. By replacing band saws with ultrahigh-pressure (UHP) waterjet cutting equipment, Corrupad succeeded in improving its work environment while also boosting productivity.

Founded in 1992, Corrupad, Bensenville, Illinois, is the exclusive North American licensee of corrupad. Made from 100 percent post-consumer waste, corrupad offers manufacturers an environmentally friendly alternative to foam for protecting products in transit. The single face corrugated material is fully recyclable. Corrupad routes its products domestically through distributors and also has licensing agreements with a number of Pacific Rim firms. The company's customer list includes IBM, Packard Bell, Xerox, Eastman Kodak and General Motors.

A combination of newsprint, magazines, office waste and a small amount of post-consumer corrugated material form the raw materials for corrupad. An outside company produces the paper to specification and sends it to a second outside firm that converts it into single face corrugated material.

Using a proprietary process, Corrupad feeds the corrugated material through winders and formers to produce the final packaging product. The process creates three basic configurations: angles, channels and



flat pads. Corrupad incorporates no molds, tools or dies into its process, allowing the company to deliver its product at less expense than competitive offerings.

Corrupad's environmental focus prompted the company to seek an alternative to the band saws it previously used to cut corrupad. "Bandsaws create an excessive amount of airborne dust in the workplace," said Mike Weiner, executive vice president at Corrupad. Airborne dust posed a hazard to workers on the factory floor and the company's expensive machinery. "Additionally, the saws cut too slowly to meet our production needs."

### Water Solves Airborne Dust Difficulties for Corrupad

To eliminate the airborne dust and concurrently improve productivity, Corrupad purchased an ultrahigh-pressure waterjet cutting system from Flow International Corporation (FLOW), Kent, Washington. "Waterjets generate no airborne dust during the cutting process and cut faster than the saws," said Weiner.

"The shape cutting capabilities of the waterjet allowed us more creativity in cutting different shapes than the bandsaw."

Flow's waterjet cutting equipment uses water pressurized to 60,000 pounds per square inch (psi) to cut or slit the packaging material. During operation, an ultrahigh-pressure pump forces the water through a small diamond orifice 0.009 inch in diameter. A coherent, high-velocity waterjet stream traveling at up to three times the speed of sound is formed. A catcher device collects the kerf material and spent water for easy disposal.

Corrupad's system features a CNC controlled, six-axis pedestal-style robot integrated with waterjet equipment. Movement of the pedestal robot resembles that a person's shoulder, arm and wrist. The multi-axis system effortlessly cuts three dimensional shapes. A four foot by six foot catcher tank collects the spent water and kerf material. An enclosure around the equipment helps to minimize noise in the workplace.

Technology inherent with waterjet eliminated airborne dust and improves occupational hygiene. The high velocity waterjet stream creates a Venturi or localized vacuum as it exits

(continued on page 3)



## Spir Star Moves To New Facility

**S**pir Star, Inc., manufacturer of high pressure thermoplastic hose is relocating to a new facility at 11983 FM 529, Houston, TX 77041, new phone: 713-856-8989, new fax: 713-856-8999.

"The additional increase in warehouse space will allow us to handle the demands of our customers better," states Tony Bessette, Spir

Star's vice president. "Being able to respond to our customers around-the-clock is what our organization is based on, and this new facility will give us an additional advantage in meeting that requirement."

The new facility will increase the current inventory capacity of hose, fittings and adapters, including National

Pipe, British Standard Pipe, Metric Thread, High and Medium Pressure Tube Nipples, Type M Adapters and a full range of quick disconnects to 40,000 psi.

For additional information, contact the sales staff at Spir Star, Inc., 11983 FM 529, Houston, TX 77041; phone: 1-800-890-7827.

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## Corrupad Eliminates Airborne Dust, from page 2

the orifice. Water mixes with the air and forces it and the airborne kerf material downward. Consequently, the vast majority of the kerf material is deposited directly into the catcher tank.

### Waterjet Offers Faster Cut Speed and Higher Quality Cut Than Conventional Machinery

Weiner reports Corrupad has tripled its productivity versus the band saw. "It's also much more accurate and we achieve a higher quality cut than with the bandsaw," said Weiner. Corrupad's waterjet stream cuts packaging material up to 2.5 inches thick.

Despite adding waterjet to its process, Corrupad has experienced no problems with wetting. The razor-thin waterjet stream moves at over 2,000 feet per second, causing little if any wetting of the packaging material.

According to Weiner, the Flow machine was easy to install and workers quickly mastered operation of the machine. "We reduced labor requirements for cutting the corrupad by seventy percent," said Weiner. Weiner says Corrupad recorded a complete return on its investment in 14 months. "It's been a very good tool for us," said Weiner.



## Material Testing For Cavitation Erosion Resistance

**D**YNAFLOW, Inc. is pleased to announce the availability of material testing for cavitation erosion resistance according to the new ASTM G-134 specification. This test exposes a sample of the material to be characterized to a submerged cavitating waterjet under controlled conditions. The material erosion is assessed by periodic measurement of weight loss and cavity depth.

DYNAFLOW has conducted characterization testing for material resistance to erosion by cavitation and liquid drop impact for many years for applications that include propellers, pumps, turbine blades, and artificial mechanical heart valves. In addition to G-134, DYNAFLOW conducts ASTM tests G-32 for cavitation erosion employing an ultrasonic horn

and G-73 for liquid drop impact erosion employing a rotating disk traveling up to 750 feet per second.

DYNAFLOW also employs its patented DYNAJETS™ cavitating and interrupted waterjet technologies for cavitation and liquid impact erosion studies that can be customized to the individual needs of each customer. This provides great flexibility in sample preparation and level of detail of the investigation. By proper selection of the specific waterjet, the erosivity can be adapted to enable rapid and economical evaluation of widely varying material types.

More information can be obtained from the DYNAFLOW web page at <http://www.dynaflo.com> or by calling (301)604-3688.

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## From the President's Desk

When inquiries of a technical nature are received by our St. Louis office, they are usually referred to me. The following are some of the questions that have been received recently. I would welcome any comments regarding the answers that I gave to these inquiries.

- **What is the highest pressure that should be used to strip paint from a brick building without harming the brick?**

I advised that it would be wise to limit the pressure to about that of the unconfined compressive strength of the brick.

- **Are there health hazards associated with the aerosols engendered during waterjet of abrasive jet cutting?**

I do not know of any research done in this field but it is wise to presume that there could be hazardous aerosols created by cutting hazardous materials such as lead or when using quartz abrasives.

- **A sculptor wanted to know if waterjets could be used to cut a basin in limestone of granite for a work he is contemplating that incorporates a waterfall.**

This is within the capability of waterjet cutting although some experimentation would have to be done to assure the desired depth of cut for the basin. I referred him to one of our members who has the equipment appropriate for this job.

- **Another sculptor wanted to know if the paving stones he wanted to use in a garden sculpture can be cut with waterjets.**

This is a straight-forward job for abrasive jet cutting. I referred the sculptor to relevant *Jet News* articles.

- **A coal miner wished to know if waterjets could be used to cut drainage channels in the shale floor of an underground coal mine.**

Waterjets could do this job easily. The only complication would be that it would be very difficult to get a permissible pump to take into a gassy mine. Coal mine regulations are stringent with regard to the equipment that can be taken into a gassy mine because of the danger of methane explosions.

- **A manufacturer of mechanical tunnelling equipment requested information on waterjet assisted mechanical tunnelling machines.**

I referred him to the work of Mike Hood.

- **A member needed information on a water filtration system that recycles.**

I referred him to another member who has similar equipment.

- **Is it feasible to use waterjets to stimulate the flow of gas from a gas well?**

This has been done. I referred the caller to a member who has experience in this field.

- **Are there any government regulations related to the design pressure of hoses and fittings for non-manually operated waterjet**

cutting machines such as would be used on an assembly line?

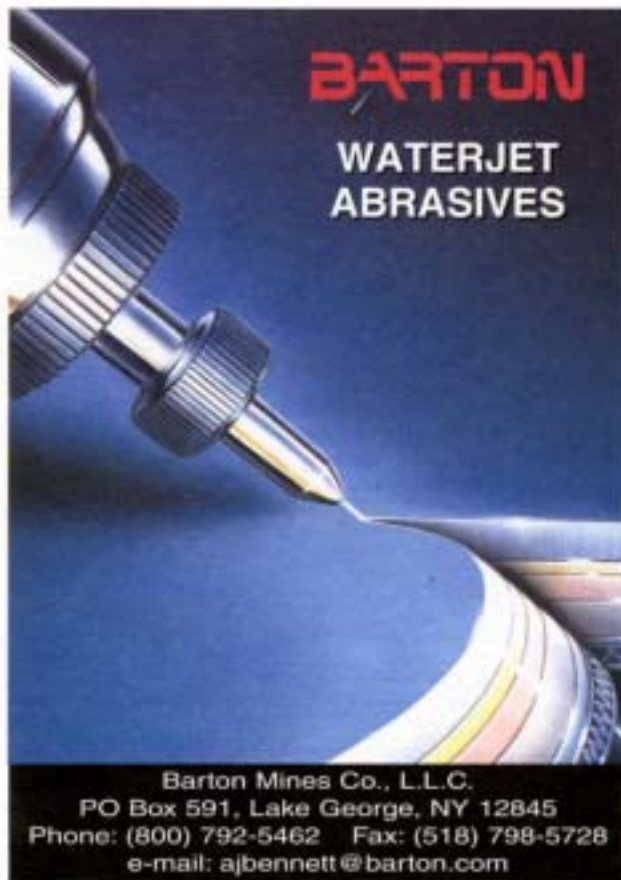
I don't know of any such regulations and I suggest that the design be done to hydraulic standards.

- **Are there any safety standards published which specifies a minimum lance length of four feet for shotgunning?**

It is so specified in section 55.3 on page 83 of Underwriters Laboratories Standard UL 1776 on waterjet cleaning machines.

- **A contractor asked for a formula that would give the force that a jet exerts on a target as a function of the distance from the nozzle.**

I referred him to some empirical work done on this subject and published in the literature.



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# Pile Driving With Waterjets

By: Dave Crumrine, Oscar J. Boldt Construction Company

**T**he Oscar J. Boldt Construction Company project team at St. Marys Hospital in Madison, Wisconsin, devised an innovative waterjetting technique to replace conventional pile driving methods that were creating soil settlement and structural damage problems on the SW Wing Expansion Project.

According to Curt Wagner, Vice President-Special Projects for Boldt, "Seismic and soils monitoring had indicated that existing structures could not withstand conventional pile driving at energy levels required to drive to bedrock."

After a series of meetings between the project team and outside consultants, the team determined that a process using pressurized water to place soils in suspension appeared to hold promise. However, no firm could be found that had experience using material as long as the 140-foot H-pile the project required.

Wagner researched the technique and turned the information over to Boldt Superintendent Jerry Schwartz and Pile Driving Foreman Jim Pagel, who designed, modified and/or fabricated equipment to accomplish this "first-time" event. An experienced set of pile drivers aided the field



Boldt personnel use two cranes to implement an innovative waterjetting technique to drive 140-foot H-piles at St. Marys Hospital Center jobsite in Madison, Wisconsin. The technique solved structural damage and soil problems the team experienced while using conventional pile driving

operation, and on-site assistance of several consultants during initial drives helped perfect the technique.

The new method required a larger crane and a host of additional equipment—some readily available, and some not. Boldt staff in the Appleton, Wisconsin office and yard quickly located and expedited the required equipment.

To make the task more challenging, a tight job site required that the 140 foot piles had to be fabricated within the building excavation with all splices, jet piping, hoses and nozzles before being hoisted into a specially

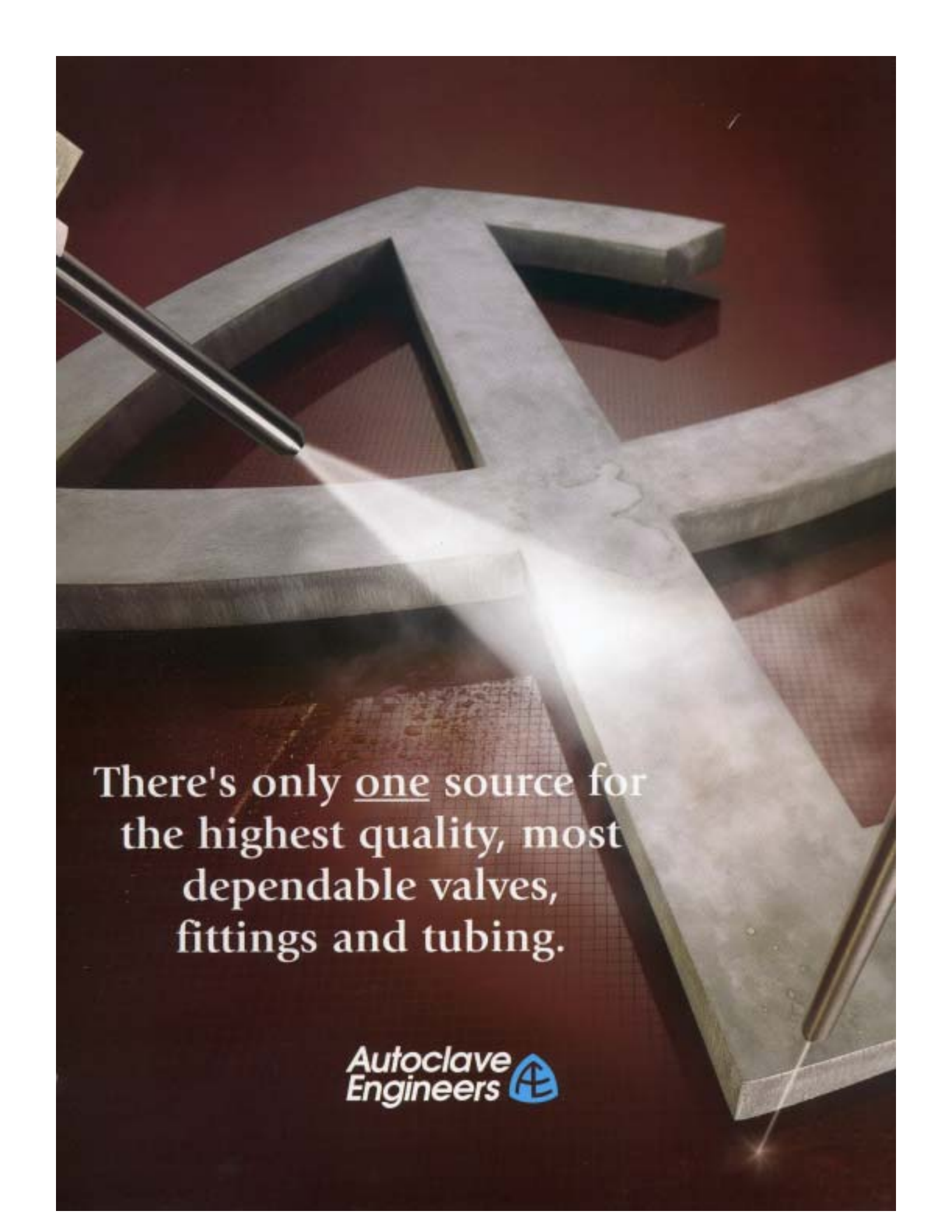
reinforced set of 180-foot-tall pile driving leads. Two cranes were required to hoist the pile to prevent the member from buckling. After the pile was placed in the leads, a specially fabricated "floating pile gate" was utilized to center the pile in the leads. Final positioning was then completed and the leads set. A dewatering jet pump and tanker truck provided the needed water and pressure. Although pressure and volume requirements varied throughout the operation, between 8,000 and 22,000 gallons of water were pumped typically at 110 psi and 225 gallons per minute for each pile.

Approximately 13,000 feet of piling was installed using the new water jetting technique.


Because of previous damage to adjacent structures, consultants continued to closely monitor the structures and soils. Seismic monitoring confirmed that energy levels experienced during water jet-assisted driving were substantially less than conventional driving. Throughout the process, the new technique was modified when pile locations were in sensitive areas.

Reprinted from *On The Level*, Oscar J. Boldt Construction Company Employee newsletter, with permission of Oscar J. Boldt Construction Company.



The background of the advertisement is a close-up photograph of a large, industrial metal component, possibly a valve or a large fitting, being welded. Two welding torches are visible: one on the left, angled towards the center, and another on the right, angled downwards. Bright, intense light from the welding process illuminates the scene, creating a strong contrast with the dark, reddish-brown background. The metal structure is composed of several thick, intersecting plates, forming a complex, angular shape. The overall tone is industrial and professional.

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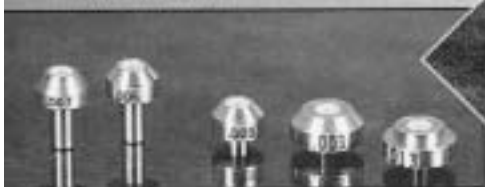
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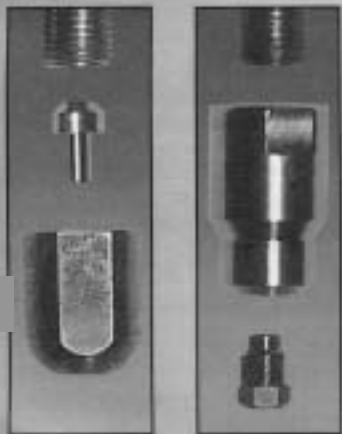
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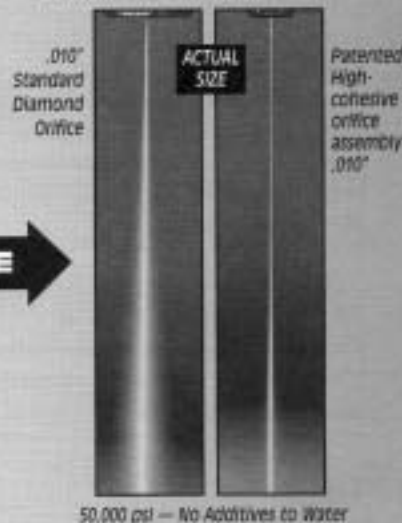
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## Flow International To Introduce New Abrasive Waterjet Cutting Equipment And Demonstrate Latest Software Releases

**F**low International Corporation will introduce its latest abrasive waterjet cutting technology and demonstrate its latest version of FlowMaster®, a software program developed specifically for abrasive waterjet cutting, and FlowNest, Flow's waterjet-specific part nesting software, at IMTS, September 9-16, 1998, in Chicago, Illinois, booth #B1 6035.

Flow will introduce its new integrated Flying Bridge machine tool, a design that integrates the motion control, pump and high pressure components of a waterjet cutting tool. This integrated concept offers customers the assurance that all components have been specially designed to work together, and the advantage of a single point contact and responsibility for all of their waterjet machine tool needs.

Flow will also introduce its new automatic collision and height sensor, which further increases the efficiency of abrasive waterjet cutting by preventing accidental mixing tube breakage, and ensures optimal standoff distance between the work piece and the mixing tube.

Flow's abrasive waterjet cutting systems are ideally suited for cutting tough and lucrative applications such as titanium, Inconel, brass, any steel, aluminum, glass, stone, composites, and other materials from one-sixteenth inch to eight inches thick to accuracies of +/- 0.003 inch.

Flow will demonstrate FlowMaster 3.0, the newest version of its FlowMaster waterjet control software. This software is the most advanced, intelligent and easy-to-use control

system available. FlowMaster integrates control of the high-pressure pump, water, and abrasive along with the automatic control of options such as dual pressure, vacuum-assist, collision sensors, shuttles and other ancillary equipment, making it easy to operate these features right from the operator console.

Flow will also demonstrate FlowNest, Flow's waterjet-specific part nesting software, which allows customers to reduce material waste and maximize part yield.

Flow International Corporation is the world leader in the development and manufacture of ultrahigh-pressure waterjet technology, and a leading provider of factory automation systems. Flow's primary markets include automotive, aerospace, job shop, food processing, paper, and surface preparation.

## WJTA Administration

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## Hose Guides For Sewer Cleaning, from page 1

a one-man job. In addition, he did not assure that the hose and nozzle assembly was inserted correctly into the pipe. Apparently, the mole did not enter the pipe but stayed at the bottom of the manhole.

A hose guide should have been used to ensure the nozzle was in the pipe. Hose guides are shown on the front cover and in the accompanying figure. The hose guides pictured here are available from Shamrock Pipe Tools, Inc., P.O. Box 64918, Baton Rouge, LA 70896, phone: 1-800-633-7696, fax: 1-800-777-0660, and from Aquatech Inc., 2026 Summit



"Tiger-Tail" flexible hose guide assembly designed to be used in a manhole at the sewer pipe. Photograph courtesy of Shamrock Pipe Tools, Inc., Baton Rouge, LA

Commerce Park, Twinsburg, Ohio 44087, phone: 1-800-800-1016, fax: 1-216-995-5001.

## WJTA New Members

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#### Michael Alloway

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10 Industrial Hwy, MS #41  
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This system has been in operation 18 months and is in immaculate condition. It is fully operational and can be viewed by appointment. The system is complete in every way and includes software and computers. Existing client base is available.

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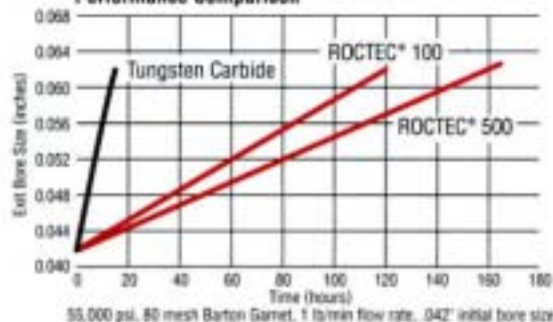
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ROCTEC 500 AWJ nozzles are available exclusively from your abrasive waterjet equipment manufacturer. Or for more information, contact Boride Products, 2879 Aero Park Drive, Traverse City, MI 49686. Phone: 1-800-662-2131 (U.S. only) or 1-616-946-2100. Fax: 1-800-662-2132 (U.S. only) or 1-616-946-3025.



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# An Intensive Waterjet Cutting Course

By: Gary L. Robinson

**W**hat is waterjet cutting? What kind of materials can you cut with water? What does the machine look like? How does it operate? How do I get started? Anyone who has any interest in waterjet cutting and those with established businesses can get these questions and more answered at the waterjet cutting course to be held August 16-19, 1998, in Florence, South Carolina. This course is provided by Richel, Inc. and instructed by Richard Ward, P.E.

The four day course explores practically every detail of owning and operating a waterjet cutting machine and the chances available for profitability. The course is designed for both persons either wanting to set up a business or those with established job shops. Regardless of the amount of knowledge anyone has going into the course, they walk away with substantially more coming out!

## Day One

This session starts by investigating waterjet cutting as an investment opportunity and it's potential profitability. In case you're concerned about this industry being saturated, this class will show you where waterjet units are worldwide and what kind of work is being done. By the end of the day, you will know how to identify potential local and national business, analyze fixed and variable costs to your business, how to price and quote work, what questions to ask a potential client, and generally structure your business.

## Day Two

Discussions on the advantages of waterjet cutting start the morning. How the actual process works,

including the operation of pumps, abrasive cutting heads and feed systems are covered. There is also an introduction to G & M codes and Absolute & Incremental Programming. If you don't know what codes and programing are all about, you will learn when you write your own program before lunch! A presentation on the difference between cutting with laser, plasma, oxyfuel and waterjet let you know the pro's and con's of each method. From here you begin the hands-on part of the course by first learning about the machine's controller and how to use basic CAD/CAM. Cutting techniques are demonstrated showing feed rates for abrasive cutting and when to use abrasive, water-only cutting, piercing techniques on various materials, and variations on kerf (cutting) widths on individual and stacked materials. None of this would be complete without a practical demonstration by cutting the part you wrote the program for earlier!

Afterward, you'll learn to maintain the machine itself by comparing good and bad orifices, checking your stream alignment, abrasive maintenance, and how to change a cutting nozzle.

## Day Three

The third day gets into understanding cutting characteristics and criteria and the relationship between them. Various finishes and

quality can be achieved depending on the speed of the cut and the thickness of material. Also discussed is how to obtain quality when cutting circles and corners by controlling the speed of the cutting head. Typically, the faster it moves, the greater the taper top to bottom through the material.

The slower it cuts, the wider the kerf becomes, effectively reducing the taper to zero. This session will teach you how to compensate for these and a number of other variables. You'll learn about software available to control these variables and the ideal parameters you need to achieve good parts. After lunch it's more hands-on lab time with the equipment. Piercing and cutting brittle materials and how to protect their surface from being damaged is shown. Each person is

(continued on page 12)

## Waterjet Cutting Techniques Course August 16-19, 1998 Florence, South Carolina

A three-day (with an optional fourth day) hands-on waterjet cutting course targeted at anyone exploring opportunities in waterjet technology. Mornings are devoted to theory and 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.

To register or obtain additional information, contact:

Richard Ward, president of Richel, Inc.  
Phone: (330)633-7698  
Fax: (330)633-7670  
E-mail: richel@richel.com

# WJTA Request For Proposals

The Waterjet Technology Association (WJTA) is requesting proposals for the preparation of reports on topics of interest to our membership. These reports will be literature searches, surveys, and data gathering activities only, not research and development work. These reports will then be made available to WJTA members at a minimal cost.

The following topics are of interest:

1. Spark hazard, or lack of, with abrasive waterjets.
2. The use of pipe threads and other pipes found in high pressure connections.
3. Concrete demolition rates using waterjets.

4. Market size for waterblast equipment or services.
5. An index of papers in WJTA publications, cross-referenced by subject and author.
6. Types of abrasives — characteristics and applications.

Please submit your proposals to:  
WJTA, 917 Locust Street, Suite 1100,  
St. Louis, MO 3101-1413.

Include a description of the scope of work to be performed, total cost, author's credentials and anticipated time to complete the work. Proposals will be evaluated and funds committed

by the WJTA Monograph Committee (John Wolgamott, Thomas J. Kim, Ph.D., Lydia Frenzel, Ph.D., and Mohamed Hashish, Ph.D.). Once a topic has been assigned, it will be announced in *Jet News* and members will be encouraged to submit information to the author(s). Proposals for reports on other topics will also be considered.

A total of \$5,000 has been budgeted for the first reports. The number of topics this will fund will depend on the cost of each report. If the initial reports are judged as worthwhile, more funding will be made available and additional reports will be solicited. WJTA members are encouraged to submit ideas for other topics to study.



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## Safety Committee Solicits Comments On Improvements To Recommended Practices

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

Please address your comments and suggestions to: **Safety Committee, c/o WJTA, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413, fax: (314)241-1449, e-mail: [wjta@primary.net](mailto:wjta@primary.net), website: [www.wjta.org](http://www.wjta.org)**

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## 1998 Calendar Of Events

- **September 21-23:** 14th International Conference on Jetting Technology, Brugge, Belgium. For more information call: 44(0)1234750422.
- **September 24-26:** Pumper and Cleaner Environmental Expo, Long Beach Convention Center, Long Beach, California. For more information, contact: Phil Lane, Cole Publishing, 1720 Maple Lake Dam Road, P.O. Box 220, Three Lakes, WI 54562-0220, phone: (800)257-7222, fax: (715)546-3786.
- **October 5-8:** PowerClean '98, Las Vegas, Nevada. For more information call: (800)441-0111.

## An Intensive Waterjet Cutting Course, from page 10

able to input and execute programs at the CNC controller, learning how to manipulate the built-in features to produce work quickly and accurately the first time.

### Day Four

You'll want to be awake this morning when they show how to strip and rebuild the pumps that pressurizes the water for the cutting heads! Water quality, and how to address any variations from the optimum requirements are discussed. Pressure drops in tubing and how to ensure a system will cut at the maximum possible speed are covered. Discussions on cutting difficult geometry and computer demonstrations on CAD/CAM software close out the learning sessions for the week.

Each day ends with extended lab time and hands-on experience with the machine. Individuals usually will find time to have their specific concerns and questions answered. This is plenty of information in four days, but time flies when you're having fun!

Richel, Inc. is a waterjet consulting group. For additional information contact by telephone: (330)633-7698, fax: (330)633-7670, or website: [www.richel.com](http://www.richel.com).



# 10th American Waterjet Conference

August 14-17, 1999 • JW Marriott • Houston, Texas • USA

## First Announcement And Call For Papers

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

The 10th American Waterjet Conference will focus, from a practical and scientific viewpoint, on the most up-to-date industry advances in waterjetting equipment, techniques, and applications. Some of the areas to be addressed include but are not limited to:

- Abrasives, Water, and the Environment
- Advanced Industrial Applications
- Advances In High Pressure Technology
- Automotive Applications
- Cleaning and Coating Removal
- Components and Systems
- Construction and Non-Manufacturing Applications
- Contractor Applications and Processes
- Demilitarization, including removal of land mines (demining).
- Drilling Applications
- Excavation, Tunneling, and Mining Applications
- High Pressure Equipment and Systems
- Jet Mechanics
- Jet-Material Interaction
- Manufacturing Processes
- Market and Future Needs
- Novel Jets and Applications
- Process Modeling and Control Studies
- Rock Cutting
- Safety, Training, and Environmental Protection

Commercial and academic authors are encouraged to submit titles and abstracts for consideration. To submit an abstract(s), please complete the abstract submission form on the back of this sheet, attach a copy of your abstract(s), and forward to the attention of the Conference Coordinator at the Waterjet Technology Association. The deadline date for submission of abstracts is November 1, 1998.

An Abstract Review Committee consisting of four referees, chosen from the Organizing Committee and the International Advisors, will review the abstracts. Authors will be advised by February 3, 1999, regarding the decision of the Abstract Review Committee.

The 10th American Waterjet Conference is organized by the Waterjet Technology Association and is endorsed by the International Society of Water Jet Technology. The Waterjet Technology Association looks forward to providing this forum and to your involvement and participation.

## 1999 WJTA Conference Committee

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## 10th American Waterjet Conference

August 13\*-17, 1999  
JW Marriott • Houston, Texas

### Abstract Submission Form

For each paper to be submitted for consideration, please complete this form, **attach a copy of the abstract**, and mail or fax to WJTA by November 1, 1998. Authors will be advised by February 3, 1999, regarding the decision of the Abstract Review Committee. Please send this form even if you e-mail your abstract.

#### Paper Information

Paper Title \_\_\_\_\_  
Authors \_\_\_\_\_

#### Contact Person

(Please print or type)

Name \_\_\_\_\_  
Position/Title \_\_\_\_\_  
Company/Organization \_\_\_\_\_  
Street Address \_\_\_\_\_  
City, Province \_\_\_\_\_ State \_\_\_\_\_  
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Please check the category that best describes the topic of your paper. ☐ Applications ☐ Research

Indexing words (Check the boxes under the different categories that apply to your paper):

##### Type of Study

- ☐ Modeling (theoretical)
- ☐ Experimental study
- ☐ Hardware development
- ☐ Contractor case study
- ☐ Manufacturing case study
- ☐ Software development
- ☐ Economic analysis
- ☐ Legal
- ☐ Other \_\_\_\_\_

##### Process

- ☐ Cutting
- ☐ Drilling
- ☐ Surface preparation
- ☐ Cleaning
- ☐ Stripping
- ☐ Safety
- ☐ Milling
- ☐ Jet-assisted
- ☐ Other \_\_\_\_\_

##### Related Industry

- ☐ Generic
- ☐ Shipyard
- ☐ Mining
- ☐ Construction
- ☐ Aerospace/Aircraft
- ☐ Automotive
- ☐ Oil/Gas/Refinery
- ☐ Quarrying
- ☐ Other \_\_\_\_\_

##### Jets

- ☐ Waterjet
- ☐ Abrasive-waterjet
- ☐ Abrasive suspension jet
- ☐ Pulsed
- ☐ Cavitation
- ☐ Polymer Jets
- ☐ Other \_\_\_\_\_

##### Material

- ☐ Metal
- ☐ Rock
- ☐ Glass
- ☐ Ceramic
- ☐ Composite
- ☐ Concrete
- ☐ Other \_\_\_\_\_

##### Environment

- ☐ Field work
- ☐ Factory work
- ☐ Submerged
- ☐ Nuclear
- ☐ Demilitarization
- ☐ Offshore
- ☐ Other \_\_\_\_\_

\*August 13 is reserved for the Waterjet "Short Course" and Conference Welcoming Reception.

Mail completed form and abstract, **NO LATER THAN NOVEMBER 1, 1998**, to: **Conference Coordinator, 10th American Waterjet Conference, Waterjet Technology Association, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413, USA, telephone: (314)241-1445, fax: (314)241-1449, e-mail: [wjta@primary.net](mailto:wjta@primary.net), website: [www.wjta.org](http://www.wjta.org)**

# Metatarsal Guards May Interfere With Foot Dump Valve

Dear *Jet News*:

Two recent near misses involving foot operated dump valves prompts me to write. In both cases operators were snaking exchanges using standard personal protective equipment (PPE). This PPE included one-piece shin/metatarsal guards. Due to the size of the metatarsal guard being worn, and the limited space between the dump valve foot control and the top guard, both operators experienced difficulty in removing their foot from the dump valve, allowing the uncontrolled energizing of the snakes.

A root cause analysis of these incidents has resulted in our firm changing our standard operating procedure for this type of operation. We will no longer require that metatarsal guards be worn while using a foot dump valve.

Submitted for your information.

Sincerely,

Mike Hannigan  
Corporate Loss Prevention  
CEDA International, Inc.

Dear Mr. Hannigan:

If you are not going to use a one-piece shin/metatarsal guard during this operation, you might consider using a protective jetting suit such as that marketed by Jeteck or NLB Corporation in order to provide shin protection. An article, "New Protective Suit For Waterjetters," was featured in the March 1998 issue of *Jet News*.

The Editor

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## Abrasive Water Jet Machining

**P** *principles of Abrasive Water Jet Machining* by A.W. Momber and R. Kovacevic is now available from Springer-Verlag London Limited.

Abrasive water jet machining was introduced to manufacturing ten years ago and has been increasingly used for treating hard-to-machine and multi-layered materials and as an alternative tool for milling, turning, drilling and polishing. This is the first comprehensive review of the technique, dealing with a broad range of issues including mixing and acceleration processes, material removal mechanisms, process optimization and fluid mechanics. Explanations are given as the book follows the development of an abrasive water jet machining process, from tool generation through to machining results, supervision and control. This methodical journey through the field is marked by drawings, graphs and tables — many of which are being published here for the first time.

Though the book is written at an academic level, it focuses very much on practical applications which reflects the authors' extensive involvement with laboratory research and industrial practices.

Hard-cover bound, *Principles of Abrasive Water Jet Machining* is 398 pp in length and includes 306 figures and 64 tables. ISBN 3-540-76239-6. Price: £49.50. To order, contact Springer-Verlag London Limited, Sweetapple House, Catteshall Road, Godalming, Surrey, GU7 3DJ, United Kingdom, e-mail: [postmaster@svl.co.uk](mailto:postmaster@svl.co.uk)