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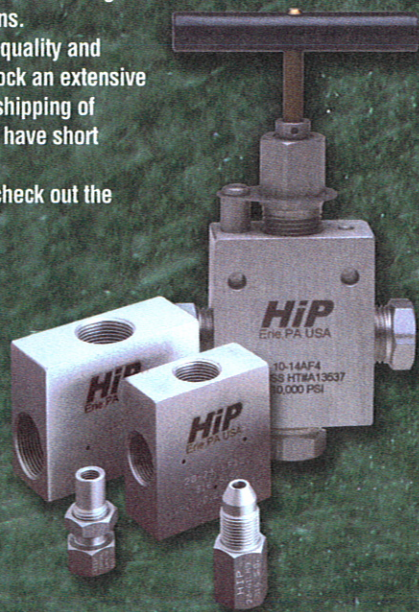
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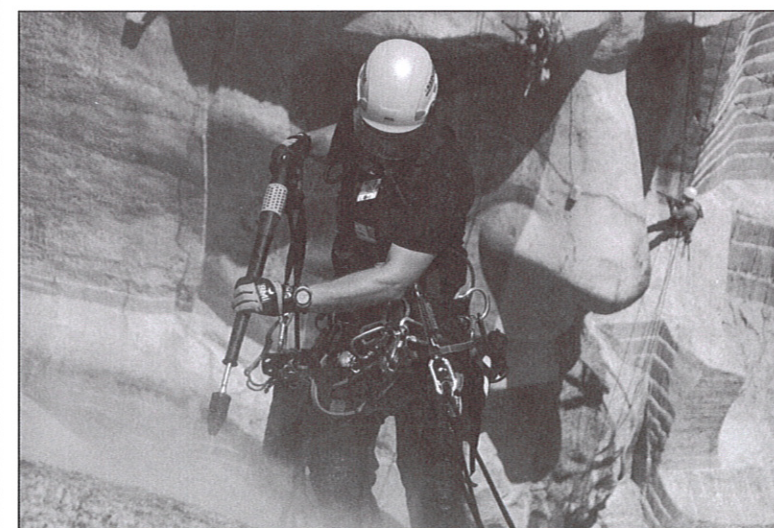
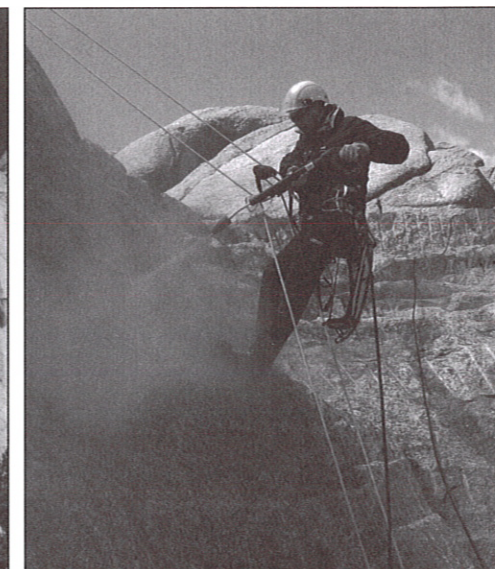
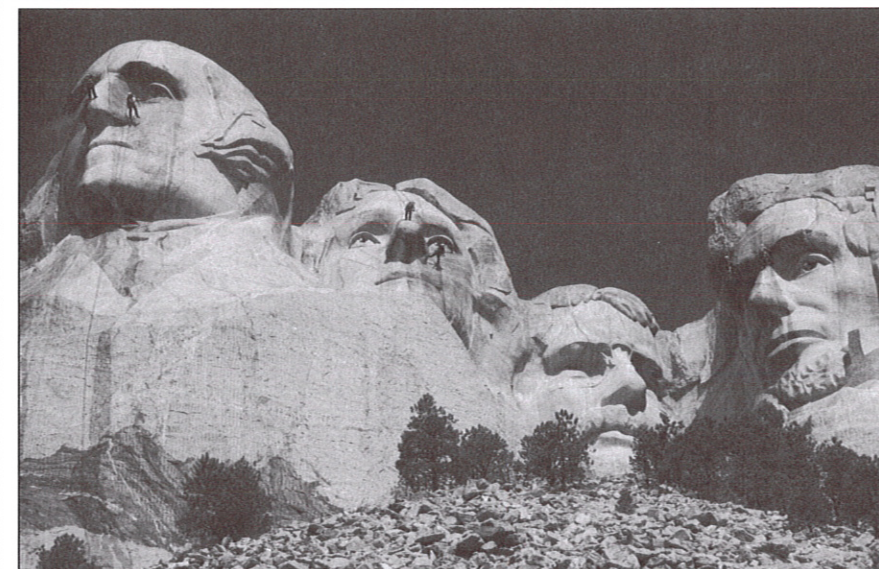
Jet News

OCTOBER 2005

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Waterjet Cleaning On Mt. Rushmore



On the inside

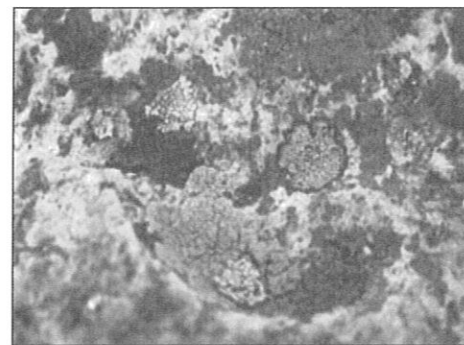
Evolution - A New Hydrodemolition Robot From Aquajet	pg. 4
Waterjets Carve Marble For Dallas Airport	pg. 10
Element Six Announces A "Long Life" Synthetic Diamond Nozzle	pg. 13
LAI Announces Change In Ownership	pg. 15
New Rotary Coupling Available From StoneAge	pg. 17

See article on page 2

Waterjet Cleaning On Mount Rushmore, from page 1

Kärcher, in cooperation with the U.S. National Park Service, recently had the honor of cleaning the presidents' heads on Mount Rushmore in South Dakota. Sculptor Gutzon Borglum's giant heads of American Presidents George Washington, Thomas Jefferson, Theodore Roosevelt and Abraham Lincoln were carved between 1927 and 1941. They are about 60 feet high and, along with the Statue of Liberty in New York, probably the best-known monuments in the United States. Mt. Rushmore is located near Rapid City, South Dakota.

The restorative cleaning work was carried out as part of a culture-sponsoring project. The aim of the project was to remove lichen, algae, moss and other organic stains that could damage the underlying rock by way of bio-corrosion. The cleaning kicked off on Independence Day, July 4, 2005, and required a little more than three weeks to complete.



The cleaning was performed purely with water, without any chemical additives. The five diesel-powered Kärcher HDS 1000 DE hot water pressure washers, through which about 7,000 litres of water were pumped every day, performed without a hitch over the whole period. They had been lifted by helicopter and placed immediately behind the heads at the beginning of the project and were exposed to the elements for four weeks.



The granite surfaces were cleaned with rotary nozzles using Kärcher's patented DirtBlaster technology, which

(continued on page 6)

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Element Six Announces A "Long Life" Synthetic Diamond Nozzle, from page 13

The University of Applied Sciences (www.skwt.ch), North Western Switzerland, is located in one of the most highly industrialized and developed areas of the country. It is thanks to this location that the links between research and practice through rapid technology and knowledge transfer play a dominant role at the University. Prof. Dr. Kurt C. Heiniger heads the research group for thermo- and fluid engineering.

The main activity of Micro-Verschleiss-Technik AG (MVT AG) (www.mvt.ch), Nidau, Switzerland, is the research and development for nozzles and their components of high pressure waterjet applications. In addition to supplying high pressure waterjet nozzles, MVT offers machining, centerless grinding, polishing and lapping of super hard materials such as sapphire, ruby and various ceramics.

For further information, contact Mr. René Diks, Element Six B.V., P.O. Box 119, 5430 AC Cuijk, The Netherlands, Phone: +31 485 395 868, Mobile: +31 620 411 840, email: info@e6.com, web site: www.e6.com.

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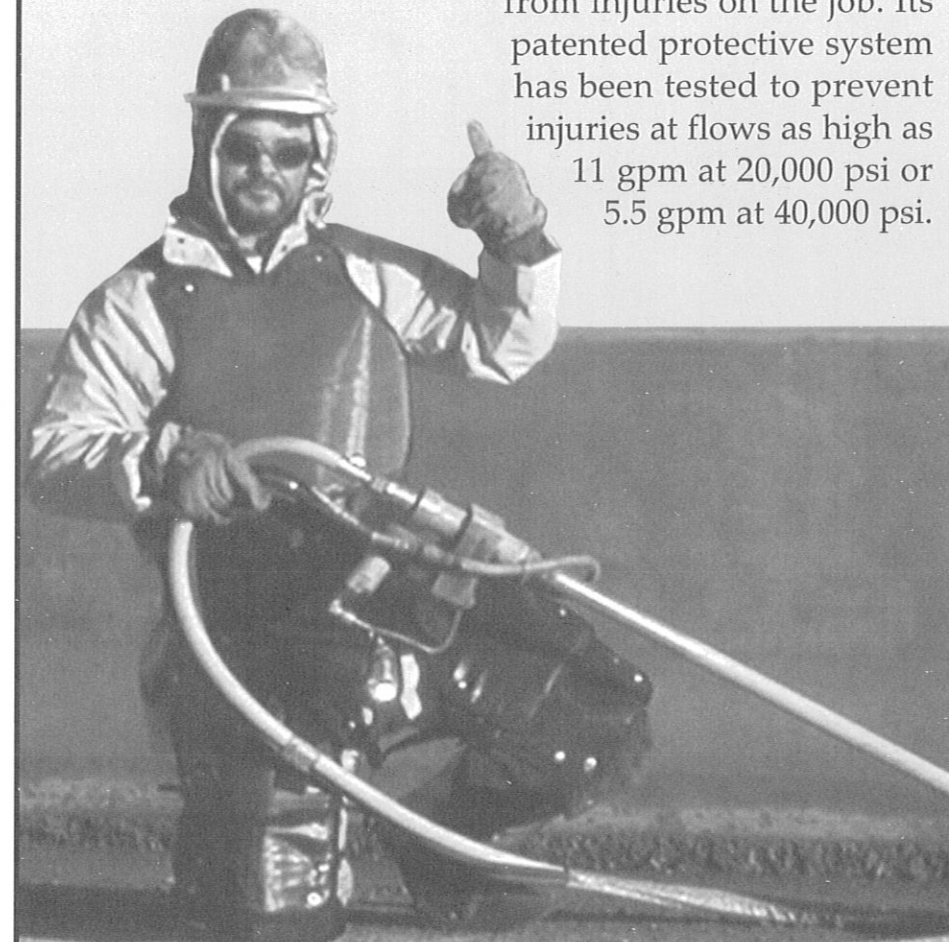
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TurtleSkin WaterArmor toe panel accidentally swiped at 20,000 psi.

Another TurtleSkin toe panel not only saved an operator from serious injury, it was easily replaced, saving the cost of an entire new suit.



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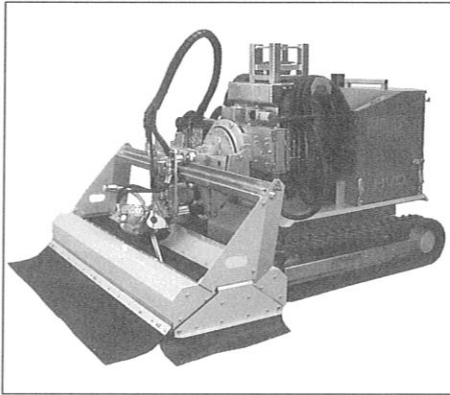
Evolution – A New Hydrodemolition Robot From Aquajet

Aquajet Systems has launched the Evolution control system for its hydrodemolition robots giving a 20% improved removal rate. The new units feature the state of the art on-board Evolution Control System and the new Smart Lance Control System for maximum removal capabilities.

Like other robots in the Aquajet range, the new HVD Evolution and HVE Evolution models are versatile machines that are ideal for working on bridges, tunnels, roads, walls, parking garages or overhead roofs. Working with a typically 1000 bar pressure and 250 l/min, the robot handles removal depths down to approximately 1000 mm of concrete if required.

The Aquajet Evolution robots are equipped with the new Evolution Control System. This on-board computer system together with the Equal Distance System (EDS) provides a 15 to 20% increase in removal capacity. Built to operate in tough conditions, the system has been designed with the operator in mind and is easy to operate. The Evolution has a built-in operator's manual in six languages and detailed operator support in plain languages directly on the display. The operator is able to receive immediate feedback on current production data, such as the actual removed area. The Evolution Control System continuously monitors all vital machine systems and functions. It also provides a warning if parameter settings are outside the machine capabilities.

The new Smart Lance Control ensures more consistent quality of work easily controlled by the operator. In the computerized Smart Lance System the operator feeds in only a few key parameters, such as work width, lance angle, lance speed, and depth. It also automatically adjusts a



number of underlying parameters for optimum results, such as work pattern. The Smart Lance Control also compensates for fluctuating operational parameters caused by ambient temperature changes. The system also allows the possibility to program different widths and depths in the same overpass.

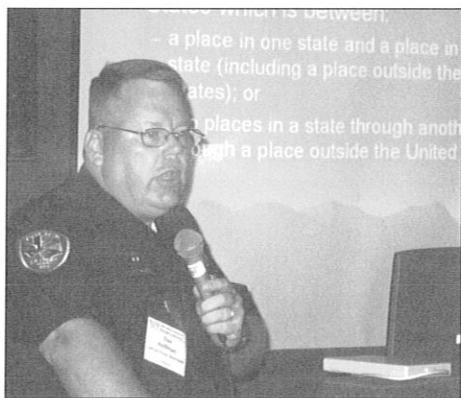
The new Aquajet Evolution robots are equipped with the patented EDS (Equal Distance System). Regardless of the set lance attack angle, the system controls and maintains the nozzle distance from the concrete surface. Maintaining an optimum distance, EDS ensures that no power is lost due to the nozzle being too far from the surface. Controlled from an

electronic display on the machine, the lance attack angle can be set from -45° to $+45^{\circ}$ allowing for efficient removal of concrete under rebars.

The new robot features an expanded reach, to provide a more efficient working area and more precise removal in corners and along edges etc. This feature minimizes manual removal. The versatility of the new robot is further enhanced by the increased possibility to adjust the powerhead sideways. The powerhead is adjustable sideways, totally between 1 to 4 m without moving the crawler-chassis. The side-shift of the power head can be increased to 1900 mm. Total length of the unit varies between 2500 and 2750 mm. Minimum height is 1600 mm with a standard operating height of 6000 mm.

The variable-width chassis provides maximum stability during set up and operation. The low centre of gravity in the chassis further enhances the stability. In its narrow version, access to the tightest passages; doorways, alleys, footbridges, is achieved. The

(continued on page 7)

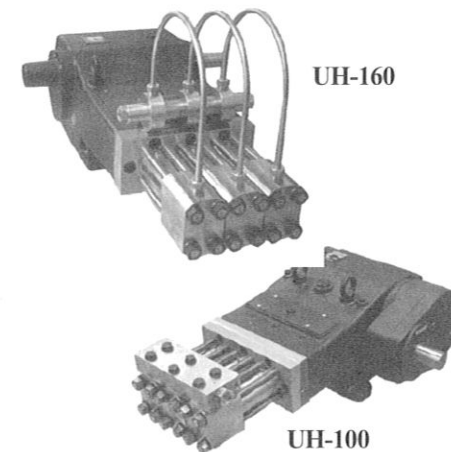


The Waterjet Boot Camp held during the WJTA American Waterjet Conference, August 21-23, 2005, Houston, Texas, offered participants a variety of useful business tips and information. Pictured here: (left) DOT Commercial Vehicle Enforcement Officer Dan Hoffman talks about DOT regulations for trucks and trailers; (right) Jamie Forrest, R&D Engineer from NLB Corp., presents helpful information on proper inlet pump suction conditions.



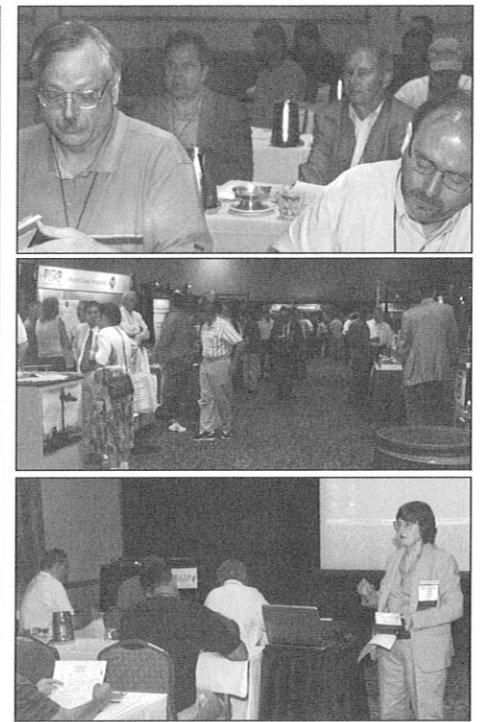
New 40K-psi Direct Drive Pumps

Qualjet has introduced two 40K psi pumps, UH-100 (100hp) and UH-160 (160hp), from OHPrecision. Most other 40K psi pumps used in the water blasting market were built on existing lower pressure pumps that are bulky and unreliable at high pressure. These two pumps are built on the same technology that has been serving the UHP waterjet cutting industry in the past two decades. The same high-pressure seals that endure 55K psi are now "soothed" with 40K psi pressure. These pumps are compact (UH-100 weighs 616lb with a flow rate 3.9gpm), yet strong and durable. The lifetime of the seal set averages 500 hours and other key components last 2000 or more hours. OHP also builds customized pumps based on customer's choice of power end. 50K psi models are available upon request.



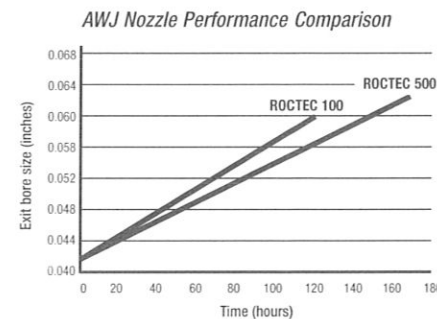
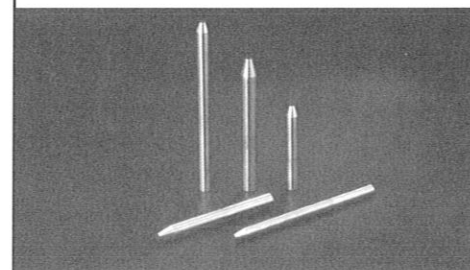
Private labeling is open for discussion. Qualjet also sells high-pressure waterjet components made by OHPrecision.

View Qualjet's online catalog at www.qualjet.com. For more information, contact Qualjet at (866)782-5538 or info@qualjet.com.



Activities at the 2005 WJTA American Waterjet Conference, Aug. 21-23, 2005, Houston, TX, included, from top: paper presentations; center: exhibits; bottom: pre-conference workshop.

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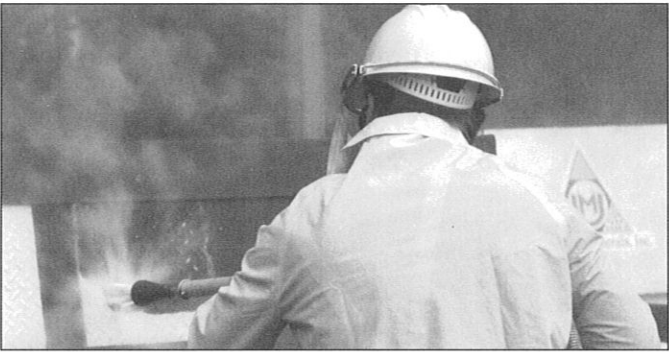
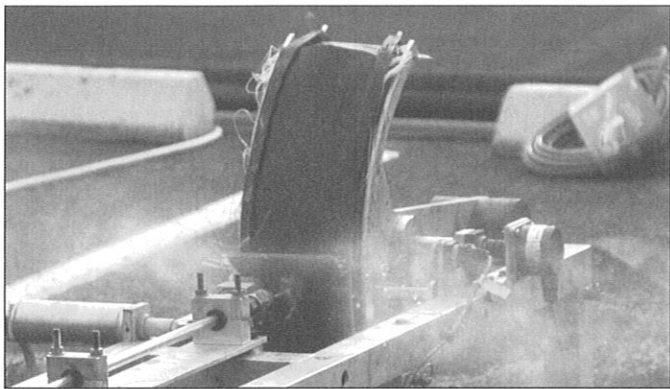
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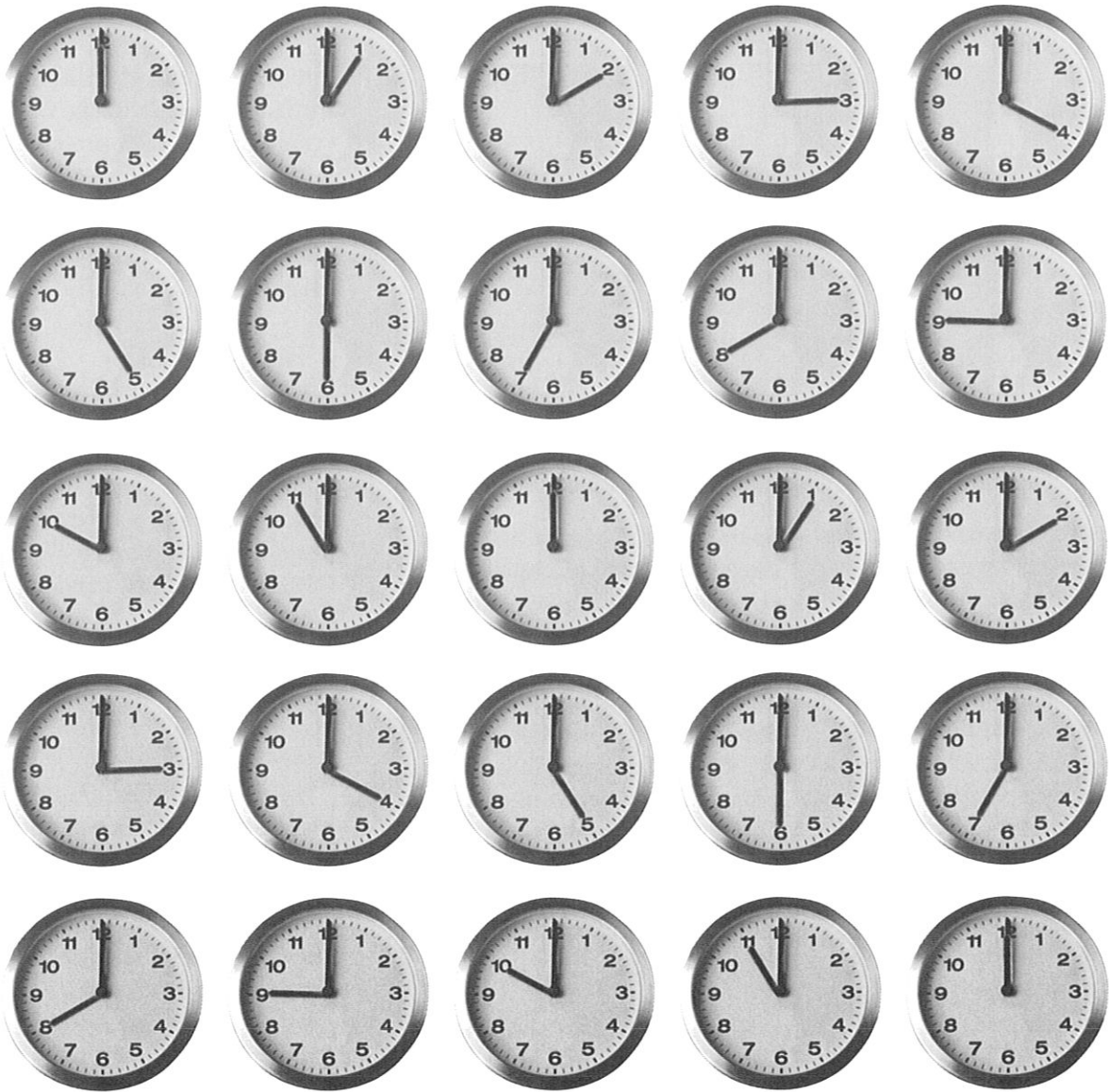
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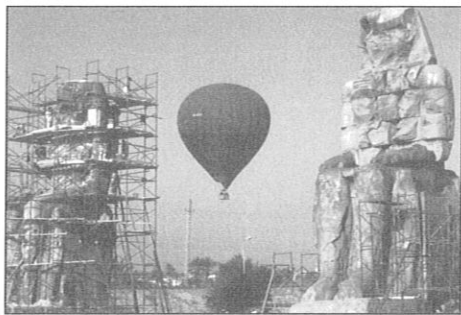
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Waterjet Cleaning On Mount Rushmore, from page 2

increases the effective cleaning pressure by up to 50%. The use of hot water will delay any recurrence of growth on the rock sculptures. Following the cleaning trials conducted earlier in April, two independent

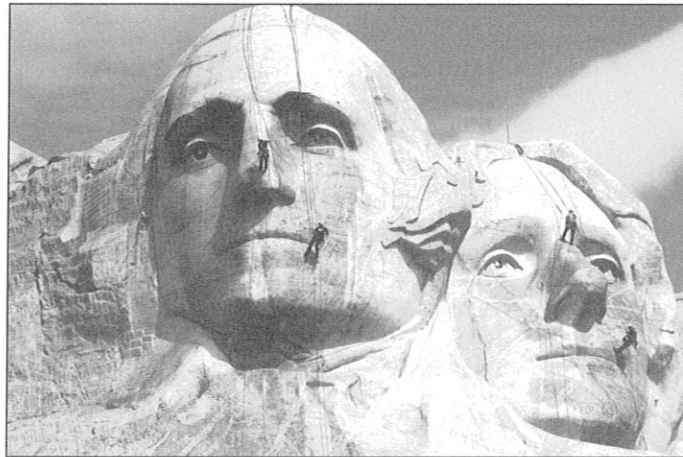
scientific experts deemed this process to be the most effective and most gentle on the material. As expected, the aim of the cleaning project – to remove layers of dirt that could damage the rock without detrimentally affecting the surface of the sculpture, was accomplished. Something that had not been expected was the fact that visual cleanliness of the monument, as perceived from the observation platform, has been noticeably improved: The heads have actually been visibly lightened by the high-pressure wash with pure boiling water and now stand out more from their natural background.



In the past 20 years Kärcher has carried out some 80 cleaning projects

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on the world's greatest historical monuments. For example, the company gently and expertly cleaned the Brandenburg Gate in Berlin and the Statue of Christ in Rio de Janeiro in 1990. The Colonnades of St. Peter's Square in Rome were cleaned in 1998 in the largest façade cleaning project ever undertaken on a historic building. Two years ago Kärcher specialists removed harmful layers of dirt from the more than 3,300 year-old Colossi of Memnon in Luxor, Upper Egypt.

Kärcher USA is a wholly-owned subsidiary of Alfred Kärcher GmbH & Co. KG, a family-owned company based in Winnenden, Germany. Kärcher is celebrating its 70th anniversary.

Following are summaries of the daily work schedule.

Helicopters transport equipment on top of the mountain

Thursday, July 7:

Having strong winds yesterday, which made the work more difficult, the rest of the equipment could be transported to the top of Mount Rushmore today. This includes five Kärcher high-pressure cleaners weighing more than 180 kg each as well as hoses, ropes and drinking water for the team. A

pool was installed, which now will be filled with water by the fire brigade for operating the high-pressure cleaners.

National Park Service supports Kärcher with the cleaning workings

Friday, July 8:

In total 15 people are cleaning the presidents' heads at Mount Rushmore. Five of them are in the ropes at the same time. The team consists of Kärcher cleaning experts, professional roping specialists as well as rangers of the National Park Service (NPS).

Initial Care of Presidents' Faces is not Merely Serving for Beauty

Monday, July 11:

The cleaning of the presidents' heads is not merely for beauty: lichens and moss which gained ground onto the granite sculpture can lead to bio corrosion. If then water infiltrates during the winter, frost can cause cracks in the rock, which up to now were sealed with a special mortar. Kärcher contributes to the long-term preservation of this artwork by sponsoring the cleaning project at Mount Rushmore.

Dream Job Cleaning Specialist

Wednesday, July 13

Kärcher Application engineer Thorsten Möwes has already cleaned a lot of monuments, for example the Memnon statues in Luxor (Egypt) and the National Library in Athens (Greece). But the Mount Rushmore project is something very special to him. Meanwhile the German feels like home in Rapid City. In the meantime the residents recognize the young guy

(continued on page 9)

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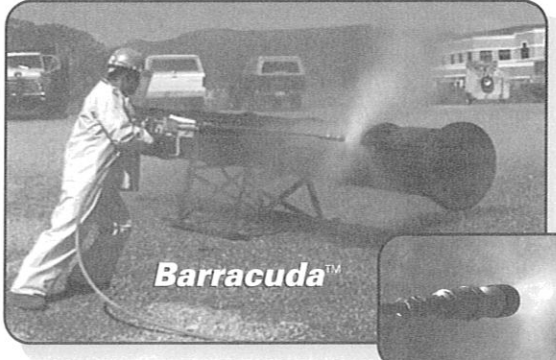
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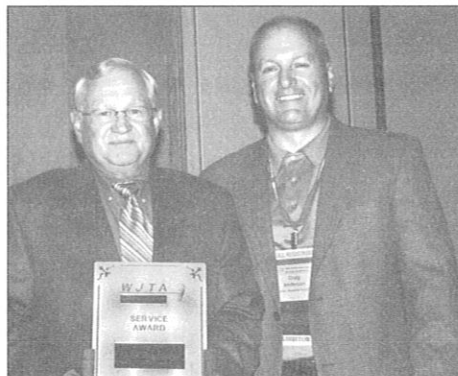
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Awards Presented At The 2005 WJTA American Waterjet Conference August 21-23, 2005 • Houston, Texas



The 2005 WJTA Pioneer Award is presented by David A. Summers, Ph.D., to Dr.-Ing. Hartmut Louis, Institute for Material Science, University of Hannover, Germany. Dirk Peter (left), accepted the award on behalf of Dr. Louis, who was unable to attend.



The 2005 WJTA Service Award is presented by Craig Anderson (right) to NLB Corporation. NLB President Forrest Shook (left) accepted the award.



Marcel van Wonderen (left), KLM, Amsterdam, Netherlands, receives the best research paper award from WJTA Conference Proceedings Editor Mohamed Hashish, Ph.D.



The 2005 WJTA Technology Award is presented by Sam Wu (left) to Jay Zeng, Ph.D. (right), senior scientist at OMAX Corporation.



The 2005 WJTA Safety Award is presented by George A. Savanick, Ph.D., to TurtleSkin WaterArmor by Warwick Mills. TurtleSkin Marketing Director Jenny Houston (left) accepted the award.



Ramazi Datiashvili, M.D., New Jersey Medical School, Div. Of Plastic Surgery, Department of Surgery, Newark, NJ, receives the best applications paper award from Dr. Hashish.

A New Hydrodemolition Robot From Aquajet, from page 4

track width varies between the narrow versions' 1030 mm to 1510 in the wide version. The weight of the unit is 1900 kg for the HVE electrically driven version and 2000 kg for the HVD diesel driven version.

The robot is available with either diesel or electric drive. It is powered by a 12 kW diesel engine (HVD) or with an 11.5 kW electric motor (HVE). The diesel-driven version can be equipped with an engine brand specified by the customer.

The robot features a new radio controlled remote system for increased safety and operator environment. The operator can move around the machine during operation

and set-up, while maintaining control of the machine. There is also no cable to run over. For environments where radio control is not feasible, remote hardwiring control is also included.

Aquajet Systems AB was founded in Sweden 18 years ago and is one of the world's leading producers of hydrodemolition equipment. Aquajet units are currently operating in 24 countries around the world.

For further information, contact: Stefan Hilmersson, Aquajet Systems AB, Brunnsvägen 15, SE-570 15 Holsbybrunn, Sweden, Tel: int +46 (0)383 508 01, Fax: int +46 (0)383 507 30, e-mail: aquajet@aquajet.se

Safety Committee Solicits Comments On Improvements To Recommended Practices

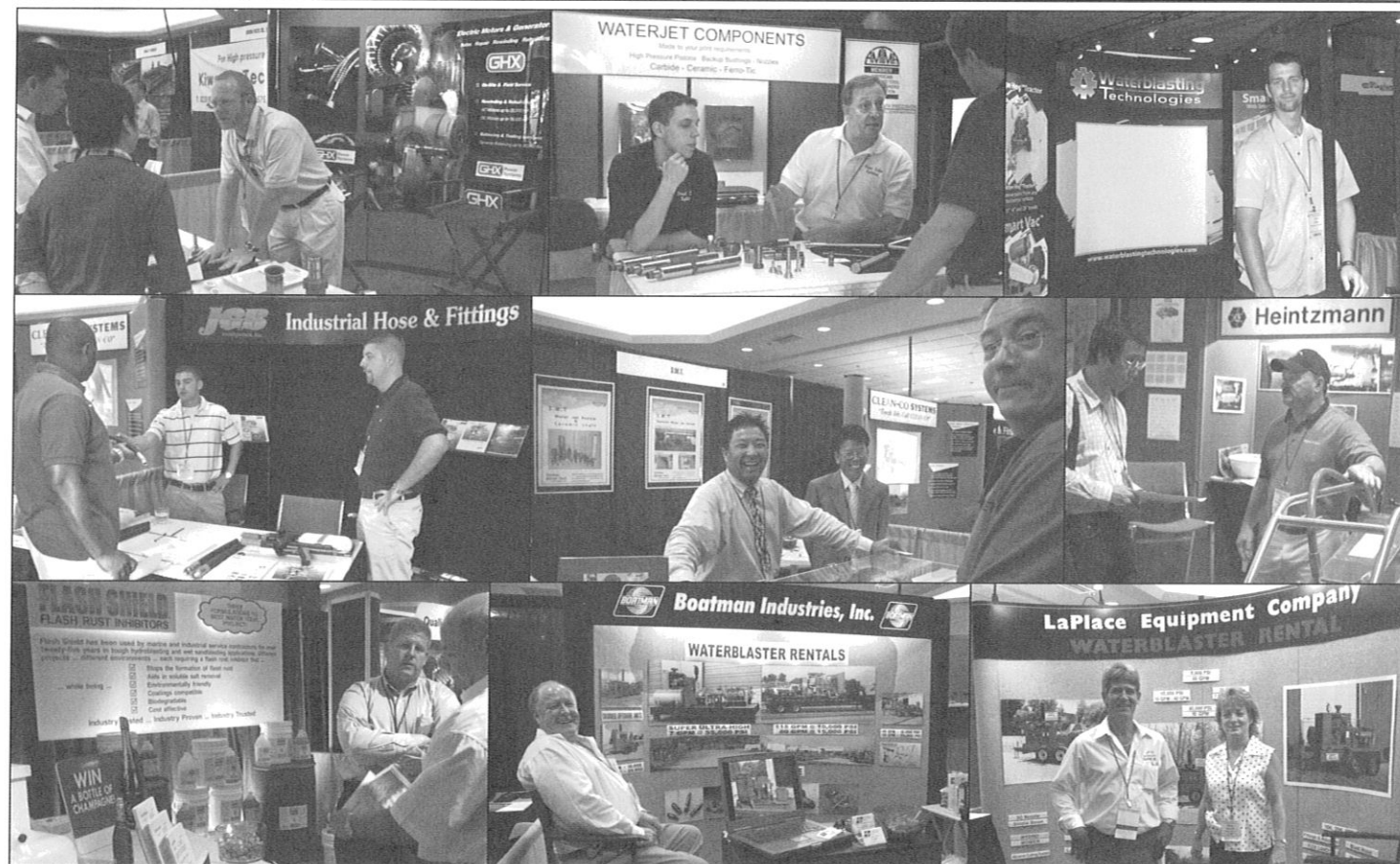
The WJTA Safety Committee hereby solicits comments regarding improvements to the publication, *Recommended Practices for the Use of Manually Operated High Pressure Water-jetting Equipment*. While *Recommended Practices* is reviewed periodically at the biennial conferences of the WaterJet Technology Association,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

Please address your comments and suggestions to: Safety Committee, c/o WJTA, 906 Olive Street, Suite 1200, St. Louis, MO 63101-14134, fax: (314)241-1449, e-mail: wjta@wjta.org, web site: www.wjta.org.



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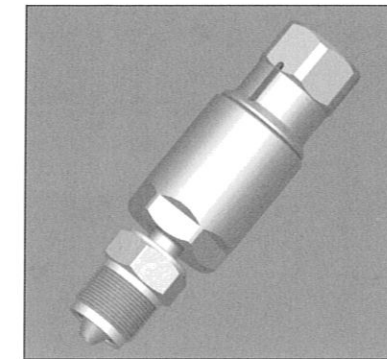
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(continued on page 12)

New Rotary Coupling Available From StoneAge

A new rotary coupling called the SL-H9H9 is now available from StoneAge, Inc. The SL-H9H9 swivel was designed to be a versatile, compact union for use in conveying high pressure fluid from a stationary line to a rotating or twisting assembly. Due to the unique seal design, the torque necessary to rotate the swivel is relatively small, even at high pressures.

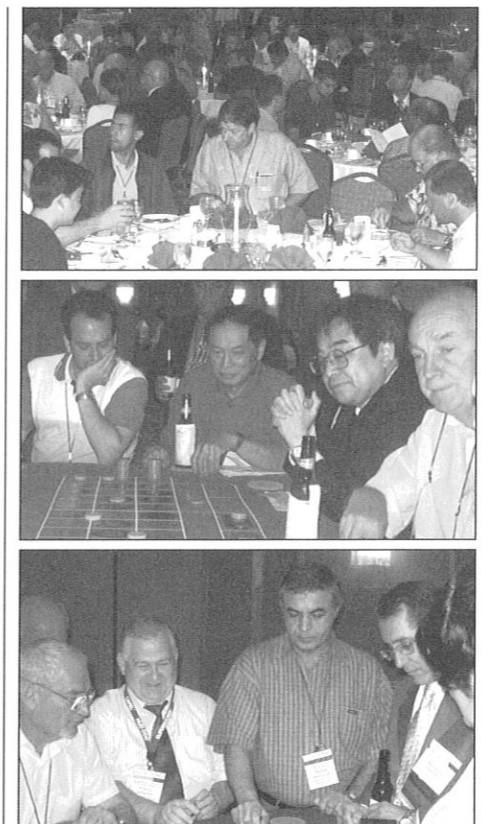


SL-H9H9 Swivel

The SL-H9H9 has a straight flow through design with a leak free high pressure seal, so no pump power is wasted. The high pressure seal can be expected to last a minimum of 40 to 60 hours, and is simple to replace. This swivel should not be used as a self-rotating tool (rotated by waterjet thrust) as it does not have any type of

speed control. The tool can be used at operating pressures from 5,000 to 40,000 psi and flow rates up to 12 gpm. The tool has a 9/16 high pressure autoclave female inlet and a 9/16 high pressure autoclave male outlet.

For more information, visit www.stoneagetools.com.



Scenes from the post-banquet party held at the 2005 WJTA American Waterjet Conference, Aug. 21-23, 2005, Houston, TX

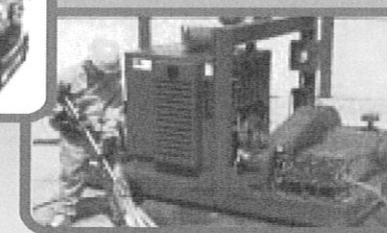
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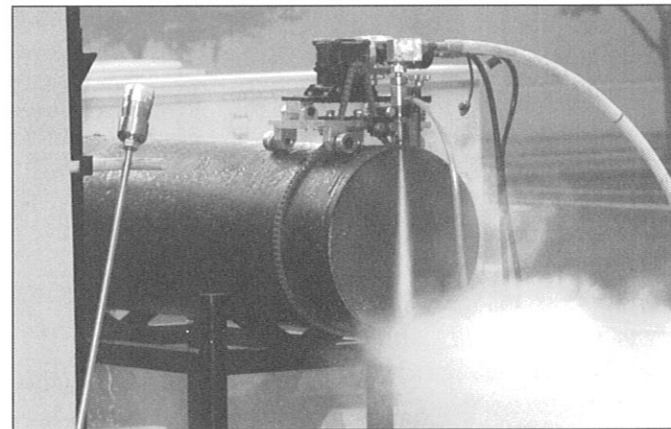
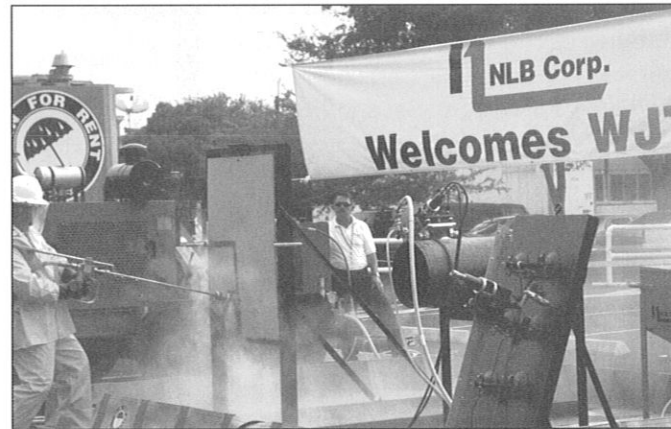
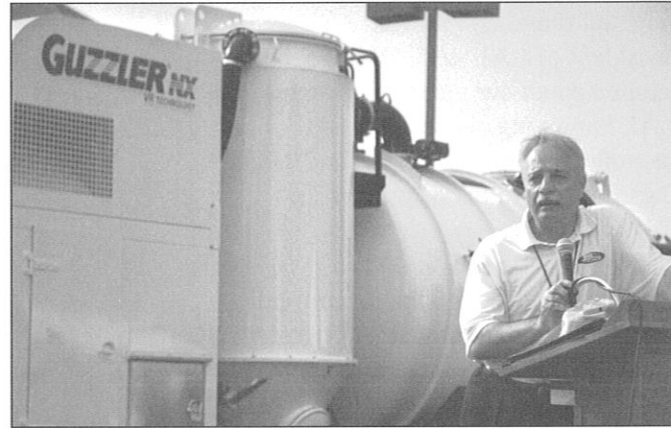
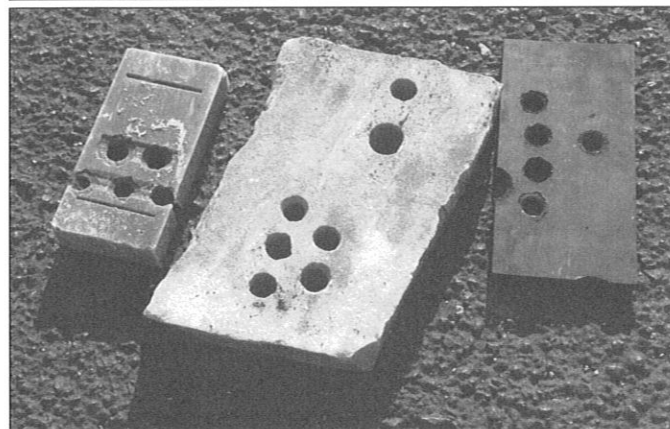
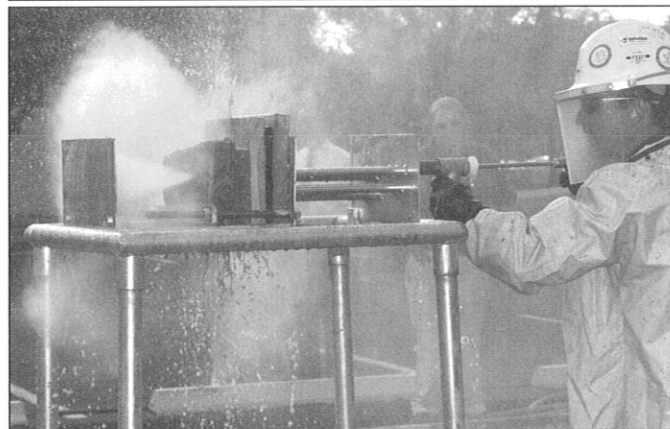
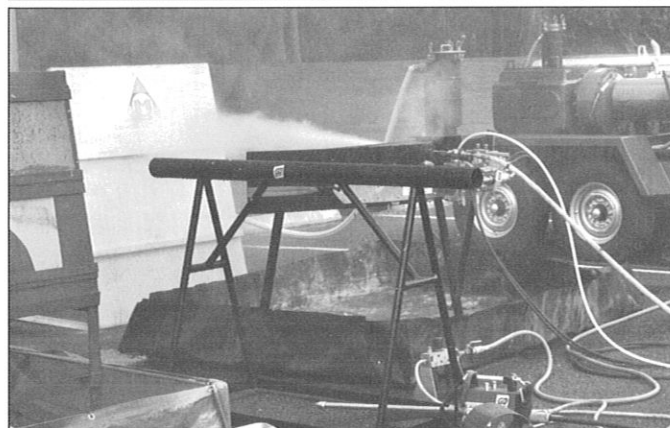
TOOLS

- Rotary Gun - 4 or 8 Nozzles
- Aqua-Spider - Wall/hull cleaner
- Mini-Scrubber - Hand held cleaner



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(continued on page 20)

Waterjet Cleaning On Mount Rushmore, from page 6

on the street and pose questions to him about his varied job.

Reacting Flexible with Pressure and Nozzle Technology

Friday, July 15:

The application engineers are able to react very precisely to the different cleaning tasks at Mount Rushmore using powerful heated high-pressure cleaners and nozzle technology by Kärcher: lichens and other stubborn dirt are completely removed with the so-called dirt-blaster and boiling water whereas sensitive spots are cleaned with the smoother flat jet. You can also vary with the water quantity, temperature and distance from the nozzle to the surface.

Cleaning specialists doubly secure

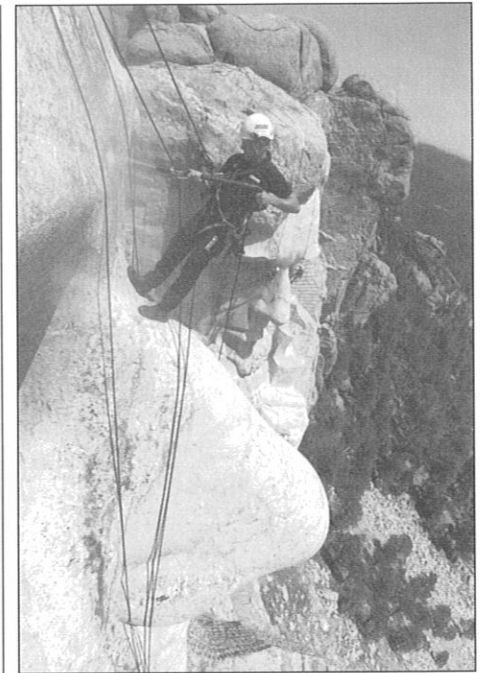
Wednesday, July 20:

The cleaning work on Mount Rushmore is being performed at dizzying heights. Conventional methods of access such as scaffolds, powered access equipment, lift buckets and work platforms could not be considered due to the topographical conditions. For this reason the specialists get to their mountain-top workplaces using a carefully thought-out rope access technique. A fixed clad core fibre rope allows exact positioning of the cleaning specialists on the mountain. A second rope increases their overall safety. The lifelines are anchored above the work area, on the heads of the presidents. The specialists lower themselves into position from this point. Thanks to so-called ascenders or rope grabs, they can move freely up and down without assistance.

The cleaning specialists on Mount Rushmore work in very different positions: Sometimes they are able to stand with both feet on the rock,

sometimes they are suspended in mid-air; now and then they even lie horizontally – when it is necessary to clean the underside of an overhanging rock – below a chin or nose, for example.

Most of the techniques and equipment used for working at heights originated in mountaineering. Nevertheless, rope-assisted working methods have very little in common with climbing or mountaineering. Being a good leisure-time climber does not necessarily mean that one is suitable for working at heights. Working in high places where access is difficult remains the realm of specially trained and examined personnel – always under the direction of a qualified supervisor.



(continued on page 10)

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Waterjets Carve Marble For Dallas Airport

PTC Italiana, a distributor in Genoa, Italy, for StoneAge, Inc., sent in a great story that combines the StoneAge 40K BC-UH Barracuda™, Italian marble, and the new wing of the Dallas, Texas International Airport. PTC supplied waterblast equipment to the largest Italian marble factory, located near Carrara, the marble capital of the world. The early Romans used marble from this location in the construction of temples and statues. Michelangelo came there to select blocks of marble from which he would carve works of art such as the Pieta' or the Moses. Now the marble is being prepared by a company called Campolonghi that will supply the decorative surfaces for the new wing of the Dallas, Texas, International Airport.



output of 30Kpsi @ 10gpm, produced the desired effect in carving the marble.

Article and photographs excerpted by permission from the August 2005 StoneAge *Newsblast* article, "Barracuda Carves A Niche In Italy." For more information, visit www.stoneagetools.com.

Waterjet Cleaning On Mount Rushmore, from page 9

Cleaning operations on Mount Rushmore finished

Monday, August 1:

The cleaning work on Mount Rushmore has been successfully completed on schedule. Hartmut Jenner, managing director and spokesman for the board of Alfred Kärcher GmbH & Co. KG officially handed over the cleaned monument to Gerard Baker, the superintendent of the National Park Service (NPS) at Mount Rushmore. He took this opportunity to present one of the pressure washers used for the operation to the Park Service and announced a long-term sponsorship for the presidents' heads. Kärcher would be happy to take on the preservation of this famous monument in the future and carry out regular inspections and cleaning operations in collaboration with the NPS.

The success of the operation was mainly due to the excellent and smooth co-operation that existed within the German-American cleaning team from the very beginning. The German Embassy in Washington used this occasion to award the German-American Friendship Prize to the National Park Service at Mount Rushmore.

Article excerpted by permission from the web site: www.karcher.com. Photographs courtesy of Alfred Kärcher GmbH & Co. KG.

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LAI Announces Change In Ownership

LAI Companies, a leading provider of advanced laser and waterjet contract-manufacturing services, announced it has been acquired by Spell Capital Partners, LLC, a private equity and buyout firm based in Minneapolis, MN. The acquisition was completed this month.

"The acquisition offers LAI a new beginning, opportunities to continue to develop our customer relationships and resources to expand our position in our targeted markets," Stewart Cramer, president of LAI, said. "We are excited about our plans for growing LAI, improving our specialized manufacturing technologies and taking the company to the next level."

Formerly known as LAI Companies, the company is now called LAI International, Inc. LAI operates manufacturing facilities nationwide, including LAI East, Westminster, MD, LAI Midwest, Minneapolis, and LAI Southwest, Phoenix, AZ. LAI is incorporated in Minnesota, and corporate headquarters will be based in Phoenix.

Spell Capital buys controlling interests in well-managed, historically profitable manufacturing and distribution businesses, the company said. Spell Capital works with management of acquired companies to grow the businesses both internally and through acquisitions. The firm controls eight other manufacturing and distribution companies with estimated annual sales revenues of more than \$1 billion.

Manchester Companies, Inc., a Minneapolis investment banking and management advisory firm, facilitated the transaction. Terms of the deal were not disclosed. "The strategic investment by Spell Capital Partners positions LAI for significant growth under its current management team,"

Jon Doeher, a principal with Manchester, said in a statement.

LAI specializes in precision waterjet processing and laser machining to manufacture complete components for aerospace,

automotive, electronics, medical, power generation and other industrial manufacturing industries. The company provides High-Definition Waterjet Machining™, and precision waterjet cutting and drilling.

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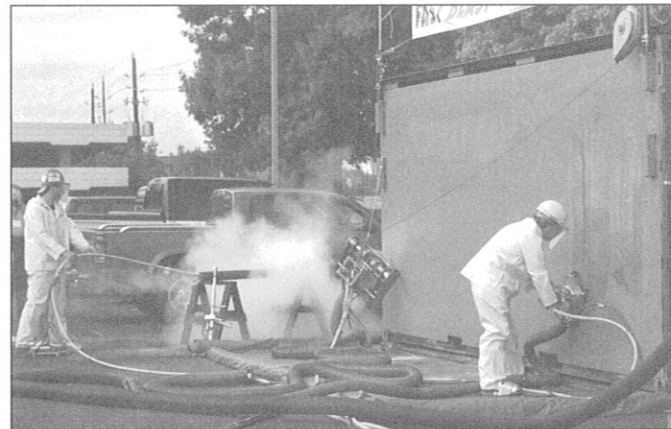
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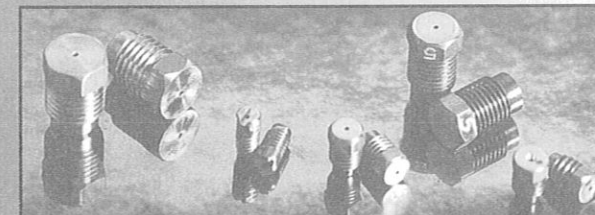
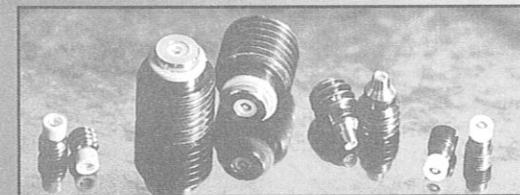
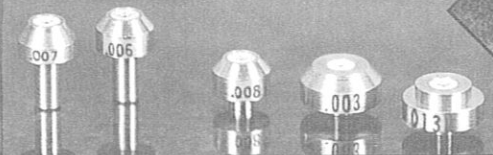
(continued on page 16)

Special thanks to **Rain for Rent, LaPorte, Texas**, for supplying the water tank and fixtures for the live demonstrations. Rain for Rent is a leading supplier of turnkey liquid handling solutions. Visit www.rainforrent.com for more information.

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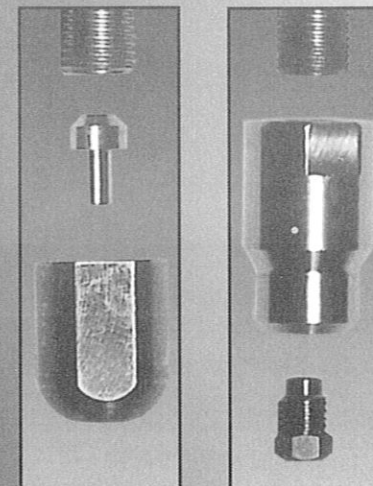
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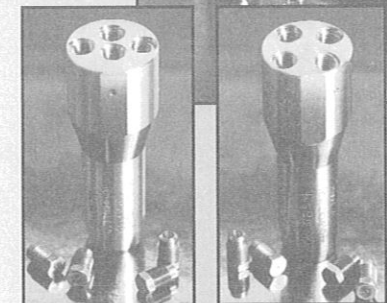
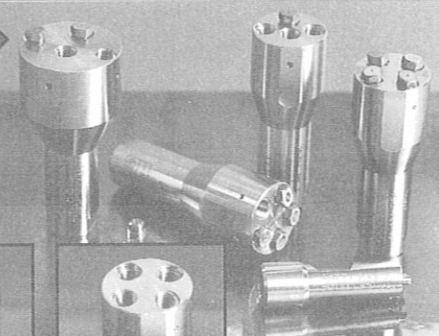
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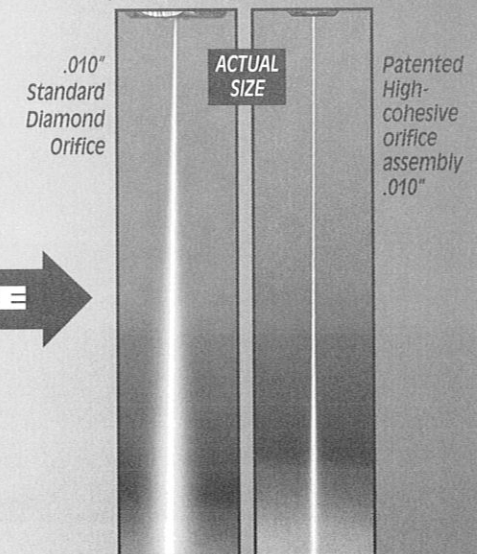


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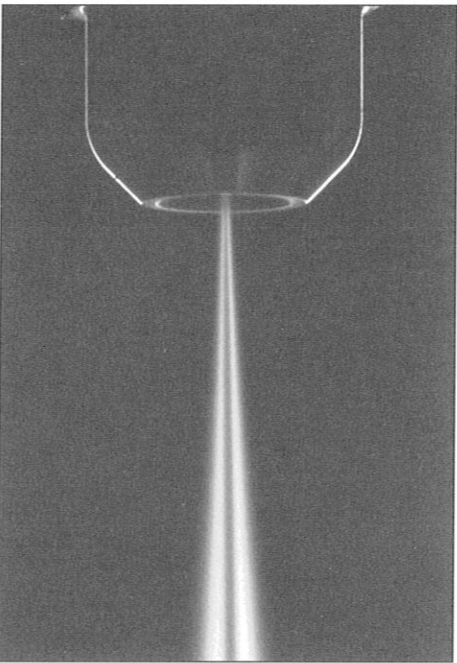
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Element Six Announces A “Long Life” Synthetic Diamond Nozzle

A new range of Long Life Synthetic Diamond Nozzles is now available from Element Six, a world leader in the development, manufacturing and marketing of all forms of synthetic diamond for industrial and commercial use. Element Six has pioneered the development of Chemical Vapour Deposition (CVD) diamond technology since the 1980's. CVD diamond technology opens up many new application areas outside the traditional abrasive uses of synthetic diamond. Diamond's extreme wear resistance, thermal, and chemical properties make it an ideal material of choice for orifices and nozzles operating in high velocity or harsh production environments. Industrial applications for these Long Life Nozzles include waterjet cutting, dry spraying, cleaning, homogenizing and painting. The Long Life Diamond Nozzles for waterjet cutting applications are primarily designed for high volume production environments, such as the automotive or food industry.

In comparison with nozzles made of sapphire, a lifetime improvement in this industry of 15 to 20 times can be achieved. Apart from this



Picture courtesy of The University of Applied Sciences, North Western Switzerland

improvement, the synthetic diamond does not contain cracks or other imperfections in its structure. As a result, implosion events are eliminated.

The successful development and testing of the Long Life Nozzle was the result of collaboration between Element Six, the Swiss company Micro-Verschleiss-Technik AG (MVT) and the University of Applied

Sciences, North Western Switzerland. “We have demonstrated that by using a ‘Long Life’ Diamond Waterjet Nozzle, which produces a consistent waterjet quality, production down time reduces significantly. Consequently this Diamond Long Life Nozzle will generate some great operational cost savings,” says MVT President and Managing Director Martin Wälti.

“Diamond is already the preferred material of choice in many demanding industrial applications, and it is rapidly replacing conventional materials in many harsh environments. Manufacturers that use diamond as an enabling ingredient are benefiting from its superior properties and superior price/performance ratios,” says Paul Dankers, General Manager of Element Six’s operation in The Netherlands.

(continued on page 23)

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2005-2007 WJTA Officers, Board of Directors gather for a photo during the 2005 WJTA American Waterjet Conference, August 21-23, 2005, Houston, Texas: Front row, from left: Forrest Shook; President George A. Savanick, Ph.D.; Lydia M. Frenzel, Ph.D.; Larry Loper, Treasurer; Hugh B. Miller, Ph.D.; and David A. Summers, Ph.D. Back row, left to right: Carl Olsen; Craig Anderson, Secretary; and Mohamed Hashish, Ph.D. Not pictured: Board Chairman John Wolgamott; Vice President Pat DeBusk; and Bill McClister.