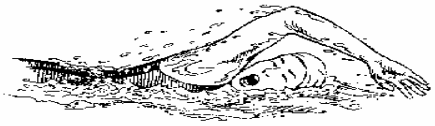
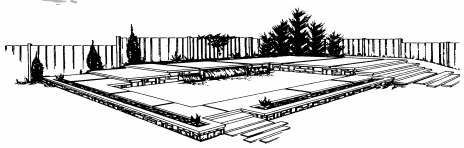
NATIONAL SPA & POOL INSTITUTE

# Water Digest

San Diego Chapter www.Spa.and Pool.org February 2000


## NSPI Holds On-Line Discussion About Vanishing Edge Pools

On January 20th, NSPI successfully conducted it's first on line technical forum discussing questions on vanishing edge technology. There were over 100 questions and answers with approximately 35 builders logged on.

Mr. Lew Akins, a vanishing edge expert was sitting at his home computer in Texas fielding questions from builders all around the country by way of your NSPI website (NSPI.org)…all at the same time. It was like being at a seminar getting answers to questions without having to leave your office. It was great!

The vanishing edge questions and answers remain on the website courtesy of Mr. Akins for all to share. Here's how to get the posted information:

If you have not received your NSPI members website password then please request it by email from memberservices@nspi.org.

Go to www.nspi.org
Click on "Member"
Type in your member user name and password
Click on "Member Services" and five options will appear
Click on "Discussion Forum" and two options will appear
Click on "Discussion Forum Log On"

If you previously registered with the forum fill in your username and password and then click on the "Login" button.

If you have not previously registered then click on the "Register" button and fill in all information requested. When the information has been filled in completely then click on the "Register" button. Please note that the username and password you choose to use for the forum does not have to be the same as your username and password to access the members website.

Once in the forum click on "Vanishing Edge QA With Lew Akins" on the left. The posted messages will appear in the lower right hand portion of the screen.

CONTINUE THE VANISHING EDGE CONVERSATION

As you visit the sight, you are welcome to post new vanishing edge questions for others to answer. Take advantage of this opportunity to learn more from each other's experiences. Get connected!..if you don't get it…you don't get it!

## Board of Directors

# Presidents Letter

Thanks to all that attended the IPPSA table top show. As usual this show gave us more information and face to face contact with manufacturers than national or regional shows. We hope that our IPPSA brethren will continue this fine tradition. Orange County NSPI and IPPSA will have a similar show on March 28th for those of you that couldn't make ours.

The RSPV's for the Vance Gillette meeting on Tuesday March 14th. are rolling in. I asked Rick English to post the names to our web page (www.spa.and.pool.org) since we won't be able to respond to each individual message. The room has a capacity of 100 and almost half are already booked. I guess that a free meal and the chance to hear how to make our businesses more profitable is a deal that you can't refuse. If you haven't done so already, grab your phone and call the 800 number.

This month your board advanced plans for this year's super event: The San Diego NSPI/IPPSA Golf Tournament and Design awards. By combining these events we get you a better deal on both. The date is still set for Friday, September 29. After an invigorating golf tournament in the afternoon, we'll sit down to a great dinner and awards presentation. The multimedia presentation will display the pools entered in the contest.

We really want to get some entries from all of our builders. We've heard the reasons why you have not entered in the past. We're trying to address those issues. If you don't have a photographer then we are trying to line up a group deal for an architectural photographer. You can still hire someone else. You can still take the photos yourself. This will be your backup. We've reduced the fees for entry. We've made it easy. We've given you the summer to get beautiful shots. We've let you enter any pool that you have built or remodeled. It doesn't matter when you built it as long as it has not been a winner in the past.

Speaking of prices, wait till you read what we have for you!

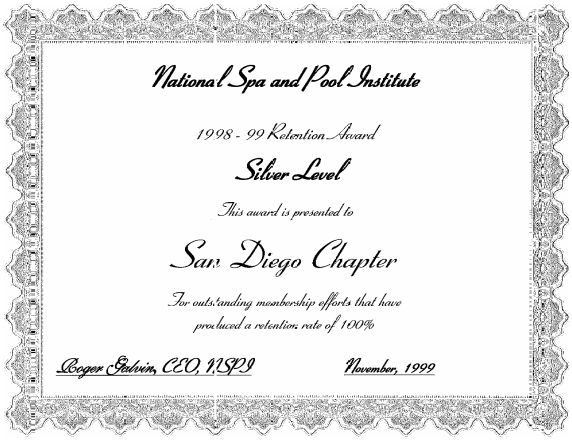
For a mere $95 you get the golf tournament **and** the dinner. Got a foursome? A four pack of tickets will be only $350. Can't play golf? Significant other is coming later? OK, dinner alone will be just $25. We are talking about a serious meal. Not just chips and dip.

We'll begin accepting reservations after the March meeting.

Like I said last month, there is no excuse to not enter! Fire up the film, pose the pool and submit that sucker.

***Phil Grider***, NSPI San Diego President

PS. As you can see below, we won the prestigious Silver Level Membership Retention Award. Congratulations and thanks to Mike Galloway our Membership Chairman.



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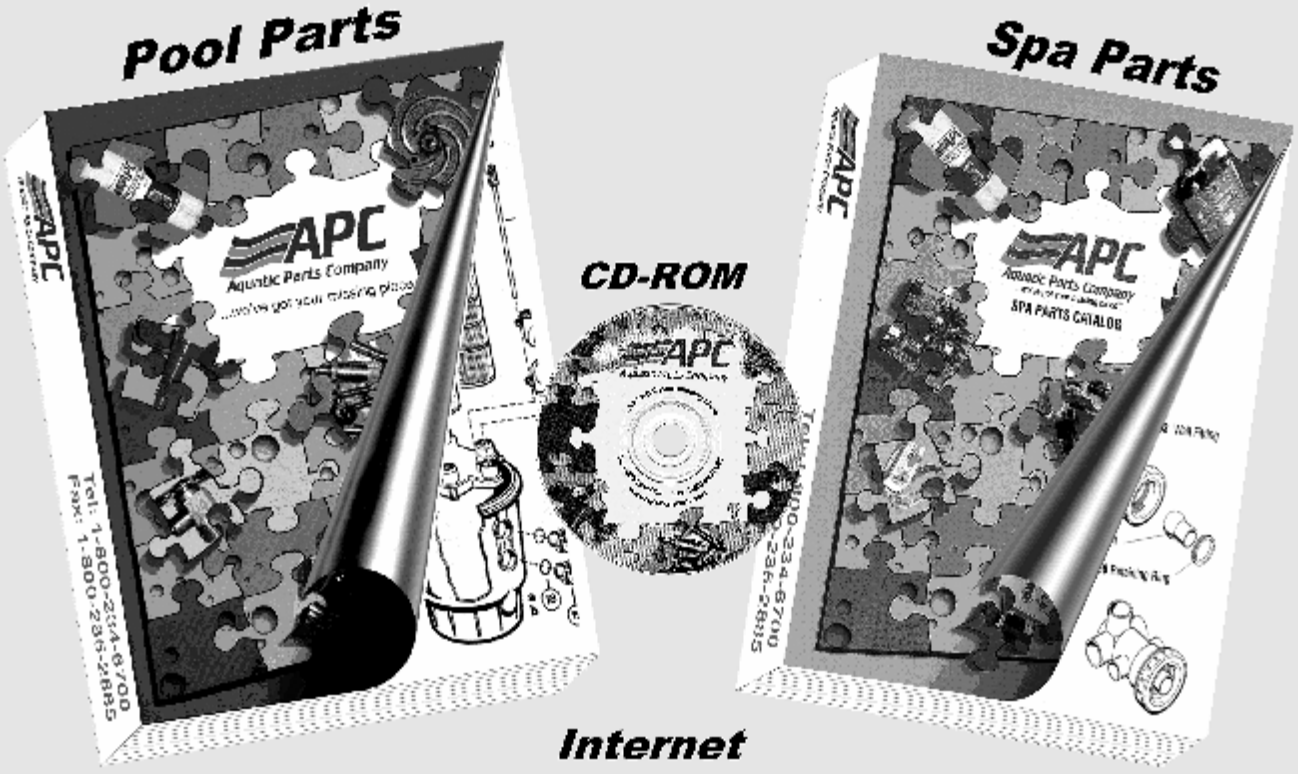


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## Super Vision International Signs an e-commerce Contract With Internet Company -- Homeportfolio.com

ORLANDO, Fla.--(BUSINESS WIRE)--Jan. 20, 2000--Super Vision International, Inc. (NASDAQ:SUPVA, Class A Common), Thursday announced that it has signed a contract to sell its products over the Internet with Homeportfolio.com.

Homeportfolio is a marketing and direct sales service that provides high end products to architects, design professionals and homeowners. Homeportfolio will market and sell Super Vision's fiber optic lighting kits. Homeportfolio offers the opportunity to reach millions of potential customers who may have never been exposed to fiber optic lighting products before.

``Super Vision has joined the e-commerce revolution,'' said Richard Heiner, marketing director for Super Vision. ``Homeportfolio has the sales and marketing structure in place to handle the retail consumer, and it is a wonderful venue for design professionals to learn more about this exciting new fiber optic lighting technology.''

Mark Gates, Account Manager for Homeportfolio.com, stated that, ``Homeportfolio.com is excited to offer a new technology in lighting that is unique to our site. With over 700,000 visits to our site per month, we are pleased to provide these products to our audience via e-commerce.''

Super Vision's products are used in the architectural, lighting, landscape, sign and swimming pool industries. Super Vision's SideGlow(TM) cable is manufactured as a replacement for neon and Super Vision's EndGlow (TM) cable is manufactured for conventional downlighting and underwater/hazardous area lighting. Super Vision is owned in part by Cooper Industries (NYSE:CBE - news) and Hayward Industries, major manufacturers of lighting and pool products respectively. For more information, please visit the Super Vision web site at www.svision.com.





SACRAMENTO, Calif. (AP) - It smells like turpentine and spreads through water so quickly and thoroughly that a **scant spoonful can foul an Olympic swimming pool**.

MTBE, a gas additive that makes the air cleaner, but its pollutes the water.

By leaking from gas stations' underground tanks, it has forced wells to close, run up millions of dollars in cleanup costs.

MTBE has two critical characteristics - its ability to spread quickly, caused by its high solubility, and its permanency. Even in its tiniest proportions, five parts per billion, MTBE has an easily detectable smell.

As a result, California - the nation's No. 1 user of MTBE, with about 11 percent of all fuel containing the substance - has banned it by the end of 2002, and other states are expected to follow suit. And an Environmental Protection Agency panel has recommended strengthening programs to reduce MTBE's presence in drinking water.

MTBE, or methyl tertiary butyl ether, is now found in the fuel consumed by 70 percent of the nation's cars. About 4.5 billion gallons of the additive are manufactured annually.

In Santa Monica, hit first and hardest by major MTBE contamination in 1995, the substance leaked into the water supply from the underground tanks of gas stations.

The city shut down at least half of its wells and is now importing most of its water from Southern California. The city believes the cleanup could cost $100 million,

Glennville, a mountain town in the Sierra Nevada, was devastated by the MTBE that spread into its water supply from a single tank. The contamination registered 20,000 ppb.

``Even the ice had a strange odor,'' Lori Jauch said. ``In the very beginning, when they came up and told us what was happening, I think everybody in the community was shocked. They had one meeting, and everybody was upset.''

The town's water supply was shut down, and water is now trucked in from Bakersfield, an hour to the west.

# Understanding The Charts



Fred Hare of Sta-Rite wrote a really great article in Swimming Pool Spa Age this month. It was called "Problem Preventers Offer Real Solutions."
Fred addresses five all too common problems in pool and spa constructions.

1 Using horsepower to sell a job
2 Using a single pump for multiple functions
3 Not preplanning the plumbing layout.
4 Overcoming problems with horsepower
5 Being "Locked in" to one type of equipment.

| Full Rated | Up Rated | Gallons | Pipe Diameter Suction Run | | | Pipe Diameter Return Run | | |
|---|---|---|---|---|---|---|---|---|
| Pump (HP) | Pump (HP) | Per Minute | 0-25' | 25-50' | 50+' | 0-25' | 25-50' | 50+' |
| 1/2 | 3/4 | 43 | 1-1/2" | 1-1/2" | 2" | 1-1/2" | 1-1/2" | 1-1/2" |
| 3/4 | 1 | 63 | 1-1/2" | 2" | 2" | 1-1/2" | 2" | 2" |
| 1 | 1-1/2 | 73 | 2" | 2" | 2-1/2" | 2" | 2" | 2-1/2" |
| 1-1/2 | 2 | 105 | 2-1/2" | 2-1/2" | 3" | 2" | 2-1/2" | 2-1/2" |
| 2 | 2 1/2 | 115 | 2-1/2" | 3" | 3" | 2-1/2" | 3" | 3" |

All of these problems have a common thread. The hydraulic planning of each pool and spa as a unique system.
Most pool pumps are oversized. It is easy to sell a customer a big pump. It takes work and skill to sell a properly sized system. If the pump is too large for the plumbing then the big pump will actually move less water and use more electricity than the small pump. Additionally, the pump, plumbing and possibly the filter will all have a shorter life expectancy.
The article concludes with a table that shows the Ideal pipe sizing to use with each horsepower.
When I see a table like this, it drives me nuts until I can figure out how the figures were calculated. So I thought I'd make you all suffer along with me. Warning, take off your shoes. We may have to count past 10.

There are two hidden assumptions in this chart. The first is the head curves of the pumps. These give us a relationship between pressure and gallons per minute. Thus we have to assume that the pressure will not significantly vary for any combination of suction and discharge runs on the chart. In fact, the pipe sizes were selected to insure that the pressure does remain constant.
For example, there is only one pressure that will produce 43 GPM on a 1/2 Hp pump. If the pressure increases then the GPM decreases.
The next assumption is the velocity of the water in the pipe. The ANSI standards say that suction velocity should be no more than 8 linear feet per second. Return line velocity can be up to 10 linear feet per second.
What if you see that the head pressure on your system will be higher or lower? How do you figure the velocity of the water and the pipe sizing?
Velocity is measured in feet per second yet we all are accustomed to gallons per minute. Unfortunately our British system of measurements, which even the British don't use, has two unrelated measurements of volume: gallons and cubic feet. All you can do is memorize the fact that there are 7.48 gallons of water in one cubic foot.

*(Continued on page 6)*

# Understanding The Charts - Continued

*(Continued from page 5)*

If we take gallons per minute and divide by 7.48 gallons per cubic foot then we get cubic feet per minute. Then we divide by sixty seconds per minute to get cubic feet per second.

We don't want cubic feet per second. We want just plain old linear feet per second. To get cubic feet to linear feet we need to divide by square feet. Where do we get that.

If we divide cubic feet per second by the cross section area of the inside of the pipe (in square feet) we will get linear feet per second. That must be the velocity. In fact that is exactly how it is figured. Easy?

Well yes and no. Lets look at some pipe data. The numbers in the table come from ASTM D1785.

| Nominal Pipe Size | Nominal Outside Diameter | Nominal inside diameter | Nominal Wall Thickness | Minimum Wall Thickness |
|---|---|---|---|---|
| 1" | 1.315 | 1.029 | .143 | .133 |
| 1-1/2" | 1.900 | 1.590 | .155 | .145 |
| 2" | 2.375 | 2.047 | .164 | .154 |
| 2-1/2" | 2.875 | 2.445 | .215 | .203 |
| 3" | 3.5 | 3.042 | .229 | .216 |

The first thing that I see is that the nominal inside diameter is (except for 2½") always a bit bigger that the nominal pipe size. I guess that it is comforting to know that a one inch pipe will never have an inside diameter of less that one inch.

Next, I see a significant difference between the nominal wall thickness and the minimum wall thickness.

I also see that if I subtract the twice the nominal wall thickness from the outside diameter, I get the nominal inside diameter. What a relief! Something adds up.

If I subtract the minimum wall thickness from the outside diameter then I get a larger inside diameter.

We know that the outside of that pipe has to go inside fittings. Manufacturers won't mess with that number. If they want to save a few buck then they will make the wall thickness as close to that minimum number as their inspectors will allow.

So which diameter do we use to calculate the cross section area? You can assume (I hate that word) that the inside diameter will never be less than the pipe size. If you use that number then any area will tend to be a tad low. Any corresponding velocity that you compute will tend to be a tad high. That means that we are safe just using the pipe size.

The area of a circle is computed by the old formula $\Pi r^2$

Pi (or $\Pi$) is the number 3.14159. Many calculators have a $\Pi$ key. The radius of the circle is half the diameter. The funny number 2 means that you square the radius. That means multiply it times itself.

So we can now compute the cross-section area. Unfortunately, the area that we get will be in square inches. We need square feet!

To convert square inches to square feet divide by 144.

So to calculate velocity in feet per second: take GPM and divide by 7.48. Divide by 60. Divide by $\Pi$.Divide by the radius. Divide by the radius again. Finally multiply by 144.

I've combined all that to the handy equation:

**Velocity= .4085 x GPM / (Pipe Diameter)$^2$**

You could also calculate the GPM by:

**GPM= 2.4479 x Velocity /(Pipe Diameter)$^2$**

Finally, you could calculate the pipe diameter that you need with this gem:

**Pipe Diameter$^2$= (.4085 x GPM /Velocity)**

Then use that square root key on your calculator.

Why didn't I just give you the darn formula and cut out all the math?

For those of you that stayed with it all the way through, you'll never forget the logical steps that took us through from Gallons per Minute to feet per second. So if you forget the formula, you can figure it out on the spot.

We often think that the charts and graphs that we get from manufacturers are derived from complex mathematical functions. You really don't need anything more than a simple calculator.

Now I'm still confused? This formula does not take in to consideration the length of the pipe! Yet all our experience says that we know that the length of the pipe impacts flow rate or something. It is clear from Fred's chart that you need larger pipe for long runs.

*(Continued on page 10)*

| | | |
|---|---|---|
| **Feb 11** | **Region 11 meeting** | **Humphry's, San Diego** |
| **Feb 11** | **Jandy Controls School** | **San Diego** |
| **Feb 12-13** | **Teledyne Laars Heater School** | **San Diego** |
| **Feb 14-18** | **TECH II School** | **Morganville, NJ, Paulette Pitrak (732) 972-9111** |
| **Feb 16-20** | **TECH I & TECH II School** | **Dallas, TX, Leesa DeBaun (817) 297-3352** |
| **Feb 18 - Mar 5** | **TECH I & TECH II School** | **Tucson, AZ, Jan Hayn (520) 575-1300** |
| **Feb 24-26** | **Western Pool & Spa Show** | **Long Beach Conv. Center<br>General: 800-787-7727<br>Exhibitors: 800-746-9772** |
| **Mar 14** | **NSPI Chapter Meeting with Vance Gillette** | **San Diego Marriot** |
| **Mar 16-20** | **Pool & Garden Trade Show and Exhibition** | **Brussels, Belgium** |
| **Mar 20-24** | **TECH I School** | **Portland, OR, Bob Winfield (503) 668-9572** |
| **Mar 28** | **HOTT Show 3-8 p.m.** | **Phoenix Club, Anaheim 714-573-9906** |
| **Aug 25** | **Deadline for Pool Awards Entries** | **Carlton Oaks Country Club** |
| **Sept 29** | **San Diego Golf Tournament and Pool Awards Dinner** | **Carlton Oaks Country Club** |

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**NSPI, we are your HDR Insurance Services underwriters, We thank you and your agent for placing your coverage and trust with us.**

Sunday Sandle
Barbara A. Neal

Michelle Storey
Nancy Roediger

For further information, please contact Mike Galloway at Wateridge Agency 1-800-223-6756.

# MARCH Meeting San Diego NSPI

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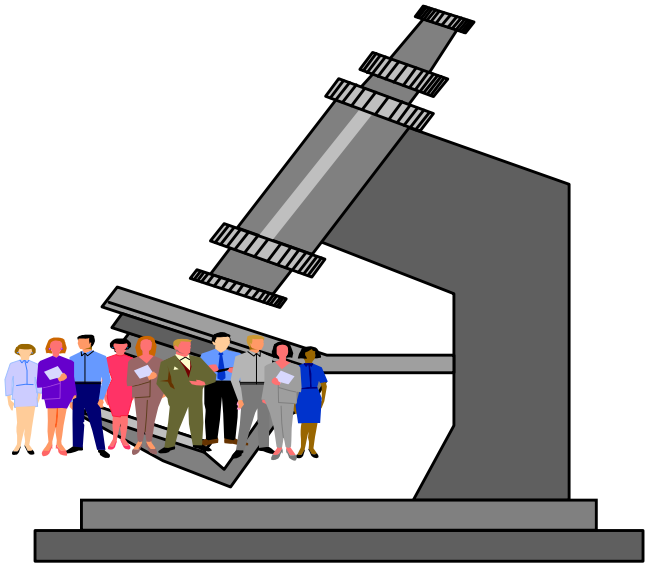

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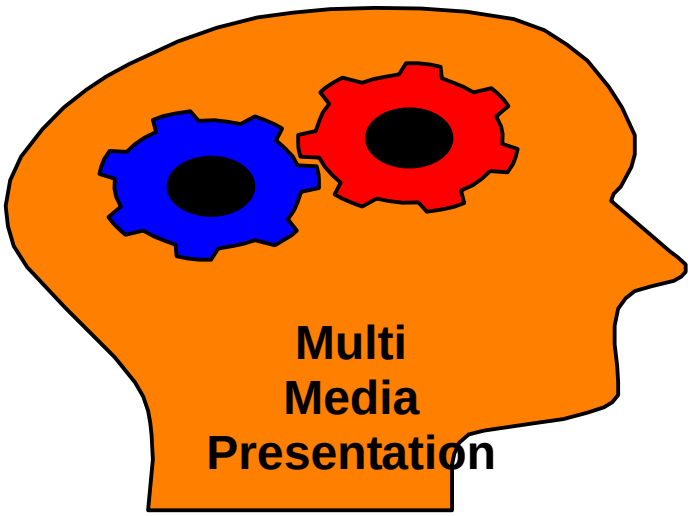


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- is time-poor
- demands accountability
- is less brand loyal
- uses the internet
- puts emphasis on price and value
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# HOTT SHOW

The National Spa & Pool Institute's Orange County Chapter is bringing the latest products and technology in the pool and spa industry to you! This is your chance to take a close-up, hands-on look at what's out there. Join us for the Hands-On-Table-Top Show.

Save The Date!

## Tuesday, March 28, 2000

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# Join Us For a 'HOTT' Time

# Understanding the Charts - Hopefully the end

*(Continued from page 6)*

Once again we ask about the assumptions (noted or not) to clear up the mystery.

Fred's chart states a pump and a flow rate. But there is only one pressure that will allow that pump to yield that flow rate. So the chart assumes that the head pressure will be relatively constant if your pipe runs are 25 feet or less. If you have good plans and good plumbers then this is not a bad assumption. If, however, you throw a whole bunch of elbows and tees into that line, then the assumption does not hold.

As the runs become longer, the assumption becomes weaker. This is because there is a greater likelihood that elbows and tees will be added in the course of the longer runs.

So we need to remember that velocity, flow rate, head pressure. pipe length and pipe diameter are related. Change one and all the rest may change as well.

Standards only mention velocity. We need to adjust all the others to get to the correct velocity. So why do we never see velocity in charts? Why is all the data that we get in Gallons per Minute? That leaves us the dirty job of calculating cubic feet per minute (or cubic feet per second.)? Why isn't the cross-section area stamped on every pipe instead of the diameter? That leaves us to calculate the area that we need to get velocity.

And lastly, why do we use three different ways to state pressure? What is the difference between feet of head, pounds per square inch and inches of mercury? There is no difference, but because, the industry uses all three, we need one final chart, at least for this article, to memorize.

Here it is. Look under PSI. To convert PSI to feet of head then multiply by 2.31, etc. To convert feet of head to PSI multiply by .433 and so on.

| Conversion | PSI | Head (feet) | Mercury (Inches) |
|---|---|---|---|
| **PSI** | 1 | 0.433 | 0.489 |
| **Head (feet)** | 2.31 | 1 | 1.13 |
| **Mercury (Inches)** | 2.05 | 0.885 | 1 |

## Research Focuses on Leak Detection for Plastic Water Pipes

Recently completed research by the Institute for Research in Construction at the National Research Council Canada will help to locate leaks in plastic water pipes.

Most distribution systems lose a significant percentage of water as a result of leaks. According to a 1991 study by the International Water Supply Association, water loss is about 20% to 30% of production, creating a costly problem for utilities. Leaky pipes also may pose a risk to public health since leaks are potential entry points for contaminants if pressure drops occur in the pipes.

They typically use acoustic leak-detection equipment. This equipment is generally satisfactory for metal pipes. Effectiveness for plastic pipes was not known

Researchers investigated different methods for locating leaks in plastic water pipes. They used acoustic leak-detection equipment-both traditional listening devices and state-of-the-art leak-noise correlators (portable computerized instruments that locate leaks by comparing leak-induced signals measured at two points, on either side of a suspected leak). The researchers also evaluated several alternative non-acoustic technologies such as radar, thermography, and tracer gas.

**Acoustic Technologies Investigated**

Extensive field tests were conducted at an experimental leak-detection facility at NRC's Ottawa campus. Leaks from service connections, faulty joints and cracks were simulated in the test pipe. Since the pressure in the pipe and the leak flowrate were adjustable, various operational conditions could be modeled.

Five professional leak-detection teams from North America participated in blind leak-detection tests (locating simulated leaks without prior knowledge of their location.) The researchers also investigated the effect of leak type, flowrate, pipe pressure, and signal processing, as well as the acoustic characteristics of leak signals.

**Acoustics May Be Used. There Are Some Difficulties**

There are several difficulties inherent in this approach. For example, leak correlators rarely located simulated leaks when operated in automatic mode. The frequency range selected by the device was usually too high. Operators using the devices in manual mode also tended to select a high frequency range. As a result, leaks were missed because leak signals in plastic pipes are dominated by low frequencies.

The researchers found that as leak sensors, accelerometers (a type of vibration sensor used by most professional teams) were only effective for large leaks. For small leaks, hydrophones were necessary.

Interestingly, the leak-detection teams were extremely surprised when leak correlators succeeded in locating leaks that they could not hear. According to popular wisdom "if no noise is heard, there should be no leak." Human hearing, however, is not sensitive at the low frequencies that characterize leaks in plastic pipes.

The researchers identified several improvements in field procedures and equipment that will increase effectiveness. These include:

- revising automatic-mode algorithms to take into account the limited low-frequency content of leak signals, and
- using accelerometers with greater sensitivity.

**Guidelines Established for Frequency Ranges**

In addition, the researchers established guidelines for the frequency range for both hydrophones and accelerometers.

Initial leak surveys, which are usually carried out using listening devices such as rods and aquaphones, may not be effective due to the high attenuation rate of leak signals in plastic pipes. High-resolution surveys using ground microphones may be required instead, but these take considerable time to carry out.

**Other Technologies Included Thermography and Radar**

Thermography and ground-penetrating radar showed promise as alternative methods for conducting initial leak surveys. The tracer-gas method was found to be effective but time-consuming. Thus its use may be limited to locating leaks that cannot easily be found by other means.

**Additional Information Available**

A full report on this project, "Leak detection methods for plastic water distribution pipes," is available from the American Water Works Association Bookstore (toll-free number 800-926-7337).

Specific questions can be directed to Osama Hunaidi, PhD at 613-993-9720, fax 613-952-8102, or e-mail osama.hunaidi@nrc.ca.

*Edited by Joyce Jungclaus, Editor, Public Works Online*
*Reprinted from Construction Innovation, a quarterly publication of the National Research Council of Canada's Institute for Research in Construction. Condensed by Rick English*