

The Leak Mystique

By Eric Herman

It's no surprise that pools leak. Most pools will at some point lose water through leaks in either the plumbing system or pool structure. What is surprising to some, however, is how nuanced and at times complex the leak detection challenge can be. Here, AQUA's Senior Editor takes a look at the leak detection niche with an eye towards the value of specialization.

Leak detection specialists often consider themselves a breed apart. Whether the task requires diving in sometimes frigid water to locate leaks in pool shells or liners, or conducting plumbing pressure tests on complex circulation systems, these professionals take pride in their detective-like skills and their shared determination to find even the smallest breach.

According to some, there's an almost adversarial relationship between specialists and leaks — it's not so much a job as a quest to find the sources of water loss every time. Doing so requires both a careful methodology and an open mind, as leaks can occur anywhere in pool or its circulation system. Many are also quick to point out that detection technology has advanced to the point where the majority of leaks can be found quickly and accurately. That is, if the person using the electronics knows what they're doing.

All of this is why leak detectors have their own brand of mystique and why we decided to contact a cadre of specialists for peek inside their often unusual work. Here's what we found.

THE POWER OF SPECIALIZATION

Although those we contacted for this discussion go about the work in somewhat different ways, they all shared the feeling that the work is best left to those who specialize in leak detection. Both the techniques and technology require an investment of resources and a level of commitment that is often beyond the interest of builders and servicers who, if finding leaks themselves, might only do so a few times each year.

"As a specialist, my job is to make the pool company look good," explains John Stinemire, owner of Excaliber Leak Detection, based in Chesterfield, Md. "I establish relationships with local builders to generate referrals. I'm an asset to them — we're not competing, despite what some might think. It's a win-win; customers learn they can trust us and the companies we work with have a reliable resource for leak detection. Some companies try to be all things to all people and they can't. You can't be an expert in everything."

Why so challenging?

"If you take a 16-by-32 foot pool losing one inch a day, that's 320 gallons. That's a gallon about every five minutes," Stinemire explains. "That's a lot of volume, but if you were to take a gallon milk container and poked a hole in it small enough to take five minutes to empty, that's the hole I'm looking for, it's very small. You have to know what you're looking for and how to find it."



“Leak detection is kind of a mission,” says Steve White of Underwater Pool Masters, Inc., West Boylston, Mass., a specialist with 44 years experience diving pools. “We do something no one else can do or wants to do. It’s unique, something that’s particular to physical and intellectual attention. You can use equipment, but often you have to physically get in the water.

“You have to be available to think about everything,” he adds, “because anything can be a leak. You have to start from scratch and you have to go through a routine to keep going down the trail.”

While there’s little question that specialists bring a level of commitment and technology to the table that non-specialists don’t have, Lance Anderson of Anderson Manufacturing, a firm devoted entirely to leak detection technology and training, believes that most anyone who wants to get into leak detection can do so with the proper resources.

“What’s most important is that you’re a logical thinker,” Anderson explains. “That you understand the nature of the problem and have the tools necessary to find the leak and understand how those tools can be applied to solve the problem. There are plenty of guys who aren’t specialists, but can become excellent leak detectors in a matter of weeks, if they apply themselves to the learning process with right frame of mind and have the right equipment.”

“Keep in mind,” he adds, “everyone who calls themselves a specialist has started out either not in the pool business or they’ve been in the business but didn’t know anything about leak detection and wanted to expand the services they offer.”

“It’s a specialty not unlike the medical profession where you have an oncologist or a neurologist who works with a general practitioner,” adds Stinemire. “We use a similar diagnostic process where you go in and can’t have a preconceived idea, you have to think beyond the norm. Often that’s only way you’re going to find it.”

“There are all sorts of wives tales out there that just nonsense; put dye in the pool and it’ll go straight to the leak,” says Paul Tosi, a detection specialist based in Norwell, Mass. “I recently found a leak in a pool where three companies had been out and couldn’t find it. I took one look at the skimmer, specifically where the concrete around the skimmer interfaced with the pool shell, and could see a small gap. The customer was impressed that I found it in just a few seconds and fixed it, while the other companies didn’t.”

Such levels of pride notwithstanding, Anderson insists that the necessary skills are, in fact, readily attainable: “I suggest that everyone can become a leak detector the same way that specialists have,” he adds. “That means understanding the basic physics behind the tests they’re doing and being observant of their environment. You have to abide by the laws of logic and the principles of physics. If you understand the simplicity of those concepts and apply them to the



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situation at hand, you can be successful.”

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TAKING CHARGE

One of the keys to effective leak detection, say these experts, is to systematically examine the pool and circulation system in a way that in effect eliminates portions of the pool as you zero in on the leak. The first task, however, is to firmly establish the pool is, in fact, leaking as opposed to simply losing water due to splash out or evaporation.

Making that call often requires the tried and true bucket test. Prior to visiting the site, detectors will typically ask the homeowner, servicer or builder to place a bucket full of water in the pool, usually on a step, and then compare the water loss in the bucket to the pool itself. If the pool is losing water more rapidly than the bucket, there's a leak.

“There's no reason to spend any time looking for a leak if there isn't a leak there,” says Anderson. “The bucket test is fairly definitive; it certainly gives you an idea of the water loss due to evaporation verses a leak. Without the test you're assuming the evaporation rate, which may or may not be accurate.

“Evaporation rate can vary based on a number of different conditions,” he adds, “so you have to objectively observe and determine what's evaporation loss and what isn't. It gives you an objective comparison rather than going on assumptions. We have a device that tracks water changes to a 10 thousandth of an inch and tracks those changes on an LCD graph. That enables you to do a 15 or 20-minute test of a pool and determine what the rate of water loss is very quickly.”

Once it's been determined that a leak exists, the next phase involves identifying the general area where the leak might be hiding.

“The first thing I do is take the problem away from the homeowner. We always end those first calls with a plan of action,” says Stinemire. “I get them on board with exactly what's going on. When they hang up the phone I visualize them taking a big sigh of relief because they know it's going to be handled

“I've been in business a long time and there's not a pool yet that's had a leak that I haven't found,” he adds, “and I'm not going to let yours be the first. When I do run into situations where I'm struggling to find the leak, it bothers me. There's a point where the job stops being a job and becomes a vendetta. All leaks are obvious, once you find them.”

Experienced leak detectors testify, however, that for all of the value of technical assists, there's also no substitute for education, experience and professional integrity. All of that is why John Stinemire of Excalibur Leak Detection decided to make his business a family affair in which he teaches his daughter and grandchildren the tricks of the trade. He's pictured here with Christine Pearson (daughter, 34), Deidra Taylor (granddaughter, 17) and Ryne Pearson (grandson, 11).

LOGICAL PROGRESSION

As mentioned previously, experienced leak detection specialists simplify the task by breaking the system down into “zones” where leaks will behave differently based on their location.

“The good guys that know what they’re doing gather information from the customer to the point where they can establish sound suspicions of where they think the leak is,” says Anderson. “They go into the job with a hypothesis, so to speak. They get into trouble when they fail to do the early steps. You can either spend a great deal of time looking in the wrong place, or if you do find a leak without pressure testing, you might leave the job thinking you’ve found the problem but in fact have missed a separate leak. If you use a systematic approach, you should be able to find everything before you leave the pool.”

“I look at three zones,” explains Stinemire. “There’s the static part of the pool, the shell and anything that’s not involved in moving water to or from the pool. That will involve the lights, the sump in the bottom drain and the liner if it’s a liner pool. Then I have the suction side of the plumbing, that’s the second zone, the plumbing moving water from the pool to the equipment. The third zone is the pressure side, including the filter and anything that’s under pressure moving water back to the pool.”

“The reason I look at it that way is that they behave differently,” he explains. “If there’s a leak on the suction side, it can’t leak when the pump is on. If it’s a return line, it’s going to leak worse when the pump is on. If the leak is in the shell of the pool it will remain the same when the pump is on or off. Observing the water loss when the pump is on or off will right away indicate where to look.”

If the leak is in a plumbing line, the next step is to pressure-test the lines to identify which pipe is the culprit. In most situations, that involves isolating the various lines using leak detection plugs, then filling the line with water to see whether or not the pressure drops. Once the line is identified, the detector adds air to the line creating an air/water mixture. When the air reaches the leak, it makes a gurgling noise as it moves into water-saturated ground surrounding the pipe. At that point, the detector can pinpoint the leak using geophone listening devices.

If, on the other hand, the leak is in the pool, the next step is to search for the leak using a dye test for concrete pools, or a device known as a Leaktrac for a liner pool. In either case, these experts all agree that the first place to look is the penetrations, with light niches and skimmers being the most common starting points.

“Skimmers separating from the pool structure is a common cause,” explains Bruce Roach, a specialist based in Gaylordsville, Conn., with 35 years experience. “It might only move a 64th of an inch, but those small leaks will become bigger over time. Certainly light niches can be a big cause, as well.”

As pools have become more elaborate with features such as vanishing edges, perimeter overflows, in-floor cleaning systems and associated waterfeatures, leak detection has become more challenging. “I just worked on a pool that had 64 penetrations,” recalls Roach. “Every one of those can be the source of a leak. The basic process is the same, but the more complicated the pool system, the longer it can take.”

TECHNICAL ASSISTS

The good news for leak detection specialists is that while pools have become more complex and sophisticated, so too has the technology used to find leaks. A fully equipped specialist will carry an impressive array of listening devices, electronic leak trackers and even cameras used to search for leaks inside the plumbing.

“I learned a long time ago that this is a part of the industry you don’t go into unless you’re fully committed,” says Stinemire. “The cost of the equipment alone is outrageous. I have a camera system that enables me to find collapsed lines, leaks in skimmers, leaks in flex lines, poly lines, you name it. In addition to that, I

have a leak tracker, geo-phones, etc. Not only do you have to invest in the equipment, you also have to know how to use it. It's a significant investment in your resources and time."

Among the technological advances that have had the most impact is Anderson's Leaktrac system, which pinpoints leaks by following electrical current to ground.

"That technology really changed the way you find leaks in liners. Rather than diving in the pool and searching every square inch, you can pinpoint the leak in a few minutes," Tosi says. "We're finding little, tiny leaks that you might never find otherwise — some so small they're probably barely leaking at all. When I started, the only way to find leaks was with a dye test. The problem is you have to be just a couple inches away from the leak before it will suck the dye out of the pool. It can take hours. That technology made us what we are now. We can work four, even five pools a day. Before, when I'd be searching inch-by-inch, I'd be lucky to get one done in a day. We still search every square inch, but it's a lot quicker."

Even with today's technology, these specialists are quick to point out that there's no substitute for experience and the intuition that comes with it.

"Even with all today's sophisticated electronics, you can still get into trouble when you make a foregone conclusion and start looking for clues to fit that diagnosis," says Stinemire. "What you should do is look at the clues first with no preconceived idea of where the leak might be."

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THE COMMERCIAL CONNECTION

Finding leaks in commercial pools can be regarded as a specialty within a specialty. Steve White, who was interviewed for the adjoining discussion, has extensive experience with commercial pools, which have some important differences compared to residential work.

"With commercial pools, the pool builders are usually long gone and we're dealing with the owner directly," he explains. "They want us to both find the leaks and make the repair. I do respect the fact that when you're working with a builder, they may want to do the repair themselves. It depends on the nature of your business and the specific situation, which are all going to be a little bit different. With our commercial clients on service contracts, we're not only providing chemicals, we're also training their staff in our CPO courses and we're doing repairs, so our situation is different from those companies that are strictly leak detection specialists."

Not only are the clients different, commercial pools themselves differ from residential systems in that the circulation system runs 24/7, the plumbing is often much larger than in residential pools and the systems themselves can be complex, especially those with perimeter overflow systems. One advantage is that commercial pools are typically engineered and documented more precisely so there's less guesswork in determining where the lines are run.

"These systems often have auto-fill devices, which mask the existence of a leak," White explains. "Again it's all about detective work. With an auto-fill system you can sometimes determine if a leak exists by tracking chemical consumption, which will increase, sometimes dramatically, when fresh water is constantly being added."