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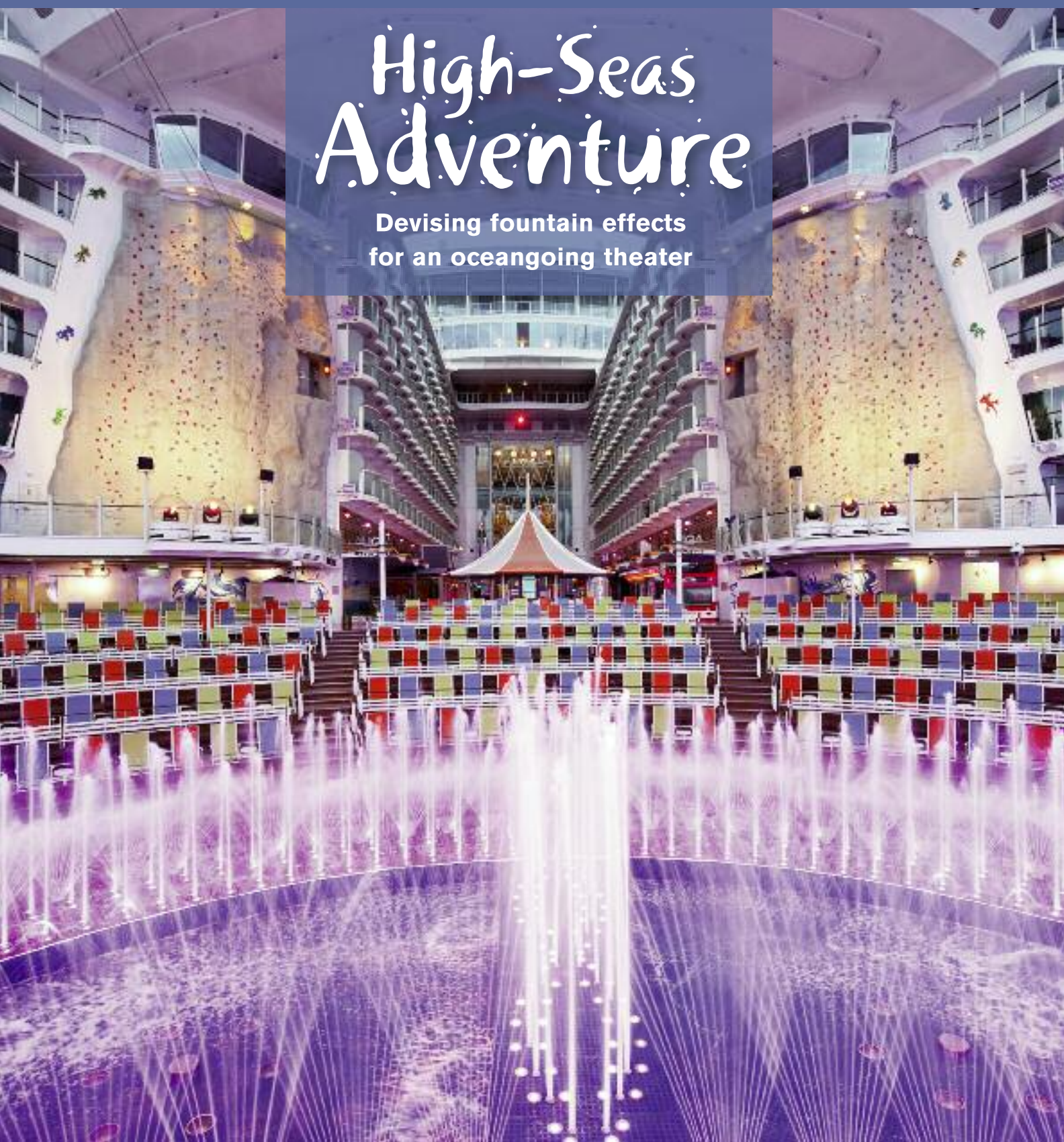

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Transferable Skills

By Eric Herman

To excel as professionals, watershapers need to develop a working knowledge of a range of technical disciplines – hydraulics, materials science and geology, for example – and know the ins and outs of structural, electrical and mechanical engineering.

No single person needs to have certified expertise in all of those fields, but it's becoming increasingly clear that anyone who enters the watershaping realm needs to be conversant in the mix of disciplines he or she must coordinate if the goal of creating beautiful environments for human activity and enjoyment is to be achieved.

This calls for leadership as well as competence, experience and good contacts among the specialists and sub-specialists who help bring projects to fruition.

As you'll see in two features in this issue, this level of watershaping expertise, this skill in devising and managing significant projects, also opens up the possibility of stepping outside watershaping *per se* to pursue opportunities beyond the industry's usual definitions.

One possible outward step is covered in the special commentary (see page 32) by Steven Peck and Damon van der Linde of Green Roofs for Healthy Cities, a Toronto-based organization devoted to encouraging the growth of the green roof industry. I don't want to steal their thunder, but Peck and van der Linde point out that the design and installation of green roofs crosses boundaries in such a way that watershapers can and should be deeply involved in their industry's future.

To this argument, let me add my own observation that the green roof industry is still in its formative stages, so the potential for watershapers to get engaged with it on the ground floor is still a possibility – a thought that intrigues me as much as it should motivate you. After all, in a marketplace where environmental concerns rank high in consumers' minds, this may be a wave that can be ridden many years into the future.

In that same spirit but on a completely different level, we also take a look in this issue at the world of decorative concrete in "Casting Nature" by Tommy T. Cook (beginning on page 54). An artist and teacher, he demonstrates here the flexibility of decorative concrete as a medium – in this case for creating custom fountains based on the delicate contours of an exotic plant – and offers just one example of the limitless possibilities afforded by the material.

Cook is a fascinating fellow I met last March at the Concrete Décor Show in Phoenix. I was there mostly out of curiosity – and was completely amazed by the potential for crossover and conceptual cross-fertilization between watershapers and decorative concrete artists. It is indeed another field in which I see plenty of room for watershapers to get involved.

In these difficult times, reaching out in new and promising directions simply makes sense. And if some of those directions rely on skills you've developed through your experiences in shaping water, well, all the better!

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In This Issue

November Writers

Steven Peck is the founder and president of Green Roofs for Healthy Cities, a Toronto-based association that serves North America's green roof and wall industry. The organization's mission is to increase awareness of the economic, social and environmental benefits of green roofs, green walls and other forms of living architecture through education, advocacy, professional development and celebrations of excellence. He can be reached via email at *speck@greenroofs.org*. **Damon van der Linde** is the association's marketing and research coordinator.

Michael Percy, ASLA, is senior landscape architect at Root Design Co., a landscape architecture, pool construction and estate-management firm located in Austin, Texas. The company's primary focus is on private commissions related to residential estates, with an emphasis on unique gardens and watershapes. A graduate of Louisiana State University, Percy has been certified by the Council of Landscape Architectural Registration Boards (CLARB) and the Texas Recreation & Park Society. Before assuming his current position, he worked at Jeffrey Carbo Studio, Mesa Design Group and HNTB Corp., refining skills in design and management of high-profile public projects that he is now applying in residential contexts.

William N. Rowley, PhD, is founder of Rowley International, an aquatic consulting, design and engineering firm based in Palos Verdes Estates, Calif. One of the world's leading designers of large commercial and competition pools, his most notable projects include partial designs for the competition pools used in the Olympic Games in Munich (1968) and Montreal (1972), and he acted as aquatic consultant for the design of the Olympic Pool Complex in Los Angeles (1984). His projects also have included a wide range of non-competition pools, including the White House pool in Washington, the Navy Basic Underwater Demolition Training Tank in Coronado, Calif., and the resort pool at the Hyatt Regency at Kaanapali Beach on Maui. Rowley is involved in a range of local, state and federal entities, consulting on construction and safety-code requirements. He is also a fellow of the American Society of Mechanical Engineers as well as the recipient of The Joseph McCloskey Prize for Outstanding Achievement in the Art & Craft of Watershaping.

Tommy T. Cook has been designing and fabricating concrete countertops and a broad spectrum of custom decorative and architectural precast concrete products for more than a dozen years. Beyond producing functional products such as countertops and custom fireplaces, he is also widely known for his use of concrete as an artistic medium and has completed numerous watershapes, sculptures and public art projects. He was founder of Cook's Custom Creations and co-founder of Absolute ConcreteWorks in Seattle and is now a full-time trainer and consultant in the precast industry, traveling the country in his recreational vehicle and providing on-site solutions. His journeys can be followed at *www.tommytcook.com.*

James Garland is president and founder of Fluidity, a Los Angeles-based watershape design firm he founded in 2002 after 20 years of work in watershape design, architecture and urbanism. He earned his Master of Architecture degree from UCLA and was licensed as an architect in 1987. By 1986, he had collaborated with WET Design (Sun Valley, Calif.) on domestic and international watershape projects and joined the company in 1993, ultimately serving as director of design and participating in projects throughout the United States and overseas. In addition to his practice with Fluidity, Garland conducts research on historic fountains and is currently writing a book on his comprehensive theory of water design. **Tom Yankelitis** is vice president of design for Fluidity and a founding member of the firm. He has spent his entire career in watershape design since receiving his Bachelor of Architecture degree from Woodbury University in 1996. He first worked with James Garland at WET Design while still a student, focusing on architecturally integrated design projects. In his current role, Yankelitis is involved with the creative and technical processes for all of Fluidity's projects. **Ritesh Khetia** is project manager at Crystal Fountains in Toronto. He graduated with a degree in mechanical engineering from McMaster University (Hamilton, Ontario) before joining Crystal Fountains in 2006. As a member of the company's consulting division, he has worked on large-scale projects in North America, Europe, Eurasia and the Middle East, including the World Voices project in the residential lobby of the Burj Khalifa in Dubai.

Aqua Culture

We rub elbows with international visitors at our trade shows, but beyond that, our outreach has been limited, inconsistent and less than effective.

Broad Boundaries

By Brian Van Bower

Not long ago, I was reminded in a big way of the importance of understanding the international nature of our industry.

It was July, and my Genesis 3 partners Skip Phillips and David Tisherman and I were on the Gold Coast near Brisbane, Australia, presenting a program at the Splash! Conference – an experience that, once again, underscored the fact that ours is not just a North American business, but is instead a global industry in which people worldwide share common issues and face similar challenges.

I'd reached this same sort of conclusion before – while attending other events through the years in Germany, Spain, France and more. Each time, I came away thinking that a big part of our industry's problem in North America is that we simply refuse to see ourselves as part of a bigger picture. Yes, we rub elbows with international visitors at our trade shows and a small number of manufacturers and distributors conduct business overseas, but beyond that, our outreach has been limited, inconsistent and less than effective.

Part of this has to do with the fact that some sectors of the watershaping realm – particularly the traditional pool and spa industry – still think too narrowly about how they are defined. For anyone who's been paying any attention, it should be obvious by now that we are all part of a broad, dynamic industry that includes and unites landscape architects and designers, architects, fountain specialists, pond and stream specialists, fine artists, waterpark professionals and pool and spa designers and contractors.

With the exception of *WaterShapes*, which set out to recognize and promote these linkages from the start, our mainstream trade shows, trade publications and trade associations are stuck in the past and denying what I see as the optimal pathway to the future. As we take aim at 2011, now more than ever it's time to change the way we look at what we do.

down under

Jumping back to Australia for a moment, I see the experience we had there as a perfect barometer of the way we need to look at things in North America – basically because, in addition to there being lots of common ground, the industry in Australia is much more tied into its country's social fabric than our industry is here.

Indeed, Australia is a place where water and aquatics in general are at the heart of the national character. (Consider the fact, for example, that what we now refer to as the freestyle swimming stroke was originally known as the "Australian crawl.") More germane to our professional lives, Australia is the original source of both saltwater chlorination and pebble pool finishes: It's hard to imagine our industry today without either of those innovations.

Whether it is distance or just old-fashioned nationalism, we've seldom seen ourselves as sharing an industry with our Australian counterparts.

All that changed for me in 2003, however, when Genesis 3 was invited to attend the first-ever Splash! event, which had been organized by *Splash!* magazine under the visionary direction of Carol Benger and her since-deceased husband Kevin. The Bengers took a huge chance with the show and went even farther out on limb by inviting the three of us. At that point, after all, we were barely known here in North America, let alone on the other side of the world.

Continued on page 12

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We attended not knowing what to expect and were absolutely blown away by the strength of the response to our program. We saw clearly that they were as hungry there for education as were the watershapers we worked with at home, and we heard over and over again that such resources were sadly lacking. After the first day of our program, word had spread so fast that the show organizers had to take down a modular conference-room wall to accommodate all the people who clamored to sit in and hear what we had to say.

We subsequently worked with *Splash!* on another tremendously successful program in Bali. The Bengers then sold the magazine and the show to Intermedia, the giant publishing company, and we weren't involved for a while. But we stayed in touch and eventually, with Carol Benger's help, we cobbled together a deal with Intermedia and Pentair Water Pool & Spa (which does big business in Australia) and returned to Australia this year.

This time around, the Aussies were waiting for us, with one after another of them who had attended our previous events regaling us with testimonials about how our presentations had changed their lives and careers. Many familiar faces reported having traveled to the United States to attend our programs – and over and over again, we were told that the industry there was *still* starved for top-flight education.

One gentleman came to us with tear-filled eyes. He had participated in one of David Tisherman's five-day drawing schools and let us know that the approach we promoted and the skills he learned had changed his life. It's easy to be cynical in our modern world, but I have to say that this level of affirmation is not only touching and humbling, but it also reveals the common need watershapers around the world have for high-quality, focused information and education.

not the first time

Our Australian experience dramatically highlighted my observation that we are separated from the rest of our global industry only by distance and that, in this day and age of instant global communication, we have no excuse for remaining so isolated from the worldwide community of watershapers: We share so many issues and concerns, and all of our needs are best served by interaction.

After all, water chemistry is a global phenomenon, as are hydraulics, structural engineering, the enjoyment of water, good design principles, art history and consumer interest in safety and the health benefits of aquatic exercise: Everything we face, positive and negative, our colleagues overseas face as well. In that light, it makes zero sense to maintain artificial boundaries or a protective sense of separation.

As I see it, the establishment of stronger transnational industry relationships is also

about opportunity and what we have to gain by opening ourselves to the global industry's collective experience. In 2006, for example, Genesis 3 formed alliances with Germany's Bundesverband Schwimmbad & Wellness (BSW) and with the European Union of Swimming Pool & Spa Associations (EUSA). As part of that commitment, we attended and participated in the Aquanale show, sponsored by BSW in Cologne, Germany, in 2007.

In many ways, our experience there echoed the Australian experience, with some interesting distinctions. First, in Europe, the aquatics industry is *fully* integrated with the health and pampering-spa industries – which makes perfect sense, because the Europeans rightly see aquatics as part of overall health and luxury industries with no boundaries at all.

Second, we discovered that while the German industry in particular is extremely well versed in the technical side of watershaping, they tend to focus on performance and execution to the exclusion of the design/aesthetic side of things. The Germans have stringent technical standards for just about everything from line velocities to finish details – and we found this tremendously reassuring because for a long while we sensed that those of us in Genesis 3 were the only ones who cared about such things.

We were so intrigued by what we learned that we've spent the years since doing what we can to translate and convert their ideas into English so that we can begin to use German standards to enhance our programs and practices here in the United States.

It's been a wonderful exchange, with our German and other European counterparts visiting us here and developing relationships that are making a real difference. And it flows both ways: Skip Phillips, for example, was the featured speaker this past February at Forum Piscine in Verona, Italy, at the request of *Piscine Oggi*, Italy's leading pool/spa trade magazine. Certainly this was an honor for Skip, but more important, it's another indicator that some of our counterparts in other countries see that there's much to learn from one another on a global scale.

It is impossible to measure the potential value of these interactions. To my mind, it's plain crazy to ignore the benefits that might emerge through forging alliances with colleagues around the globe.

imagined barriers

As I suggested at the start of this article, the problems of a narrow focus aren't limited to international relations: We also have concerns about how narrowly we define ourselves as professionals and perceive our roles as watershapers.

From the start of both Genesis 3 and

WaterShapes, my partners and I and Jim McCloskey and Eric Herman of the magazine have always shared the view that when you look at water as an element of design, architecture and landscape, you're forced to recognize that business sectors we've traditionally seen as separate are actually closely interrelated.

Case in point: This past Spring, David Tisherman was asked to develop a course for UCLA's extension program in landscape architecture that would focus on swimming pool design and construction. Once the course was announced, it filled almost immediately – about as plain an affirmation as possible that students were clamoring for the information.

To make the course as intensive and extensive as possible, David brought in guest lecturers from the industry and from academia to augment his own lectures and presentations. It went over so well the first time that he's been asked to offer the course again in Spring 2011.

There's a lot happening here, and it's interesting to pull it apart and look at what it all means.

For starters, we see students in a landscape architecture program eager to learn the fine points of working with water in the landscape. It doubtless helped that David had been extensively involved with UCLA's extension program in the past and had tremendous credibility as a winner of its Teacher of the Year Award in 1988, but it's also clear that the program's directors would not have asked about developing such a course if they didn't perceive a demand for it.

It bears mentioning once again that the course was filled with landscape architecture students – no pool designers or contractors in sight.

It's clear, in other words, that people studying landscape architecture also see themselves as watershapers. As students, in fact, they've never been taught to think otherwise and see no barriers to involvement across perceived industry lines. If you ask me, I'd say this will eventually spell the end of pools and spas as a "hand-me-down" business: Saying that things must be done a certain way because "that's how daddy did it" will not cut it in the future.

Better still, David's class is not the first example of this transfer of knowledge at the college level. Genesis 3 instructor and frequent *WaterShapes* contributor Mark Holden has taught a similar program at the California State Polytechnic University at Pomona, where he's received similarly strong responses.

Educators such as David and Mark deserve praise for seeing past boundaries and recognizing that the coming generation of landscape-design professionals wants to jump out ahead of the curve when it comes to integrating watershapes into their projects. It's a movement that needs encouragement and continued support.

moving forward

While professionals in the landscape realm have found their way through the barriers that traditionally kept them out of the pool and spa business, I'm left to wonder how many professionals in the traditional pool/spa realm have moved in the other direction and sought education about landscape architecture.

My sense is that they are few in number, and this is problematic because it opens the pool and spa industry to being overrun by professionals from a related industry whose participants are college educated, well-informed and ready to move the use of water in the landscape to much higher levels.

The irony here is that the immediate, powerful response to David's class is also emblematic of landscape architecture profession's general failure through the years to include watershape-related coursework in its standard curriculum. Indeed, college-level landscape architecture programs and education organized by the American Society of Landscape Architects have long been mostly devoid of this type of education.

They too, it seems, must rethink the boundaries of what they do just to keep up with the interests of the people they serve.

This institutional blindness may completely dominate the current picture, but if the progress marked by *WaterShapes* and Genesis 3 is any indication, that picture is changing at the grassroots level – and rapidly. Frequently these days, I encounter landscape architecture and design firms that have hired pool/spa specialists. In my own pool/spa design business, I have a landscape architect, Andrew Kaner, on staff as vice president; we're currently training another landscape architect for a staff position; and we frequently work as a watershaping specialist in collaboration with landscape architects and designers worldwide.

I also see progress on additional (and unexpected) fronts, where Genesis 3 has had some success in reaching out both to the service industry (that is, those we ask to maintain the new generations of watershapes we're designing and installing) and to the building inspectors who allow our work to move forward.

On the service front, we recognized a growing rift with technicians: They claimed that we were installing watershapes without keeping maintenance in mind, while we countered by calling them too stubborn and fixed in their ways to keep up with the novelty of the elaborate and technologically sophisticated systems we were devising.

To bridge this substantial gap, Genesis 3 has launched a new Service Certification Program to bring service technicians up to speed on the fine points of watershape design and installation so they understand what we're asking them to maintain. Having

come up through the service industry, I can attest to the value of the program and only wish there had been such a thing in my early days in the industry.

no time to stop

We perceived a similar gap in information available to the inspectors who govern the ways watershapes are built in jurisdictions across the country. In far too many cases, we would encounter building officials who too easily said "no" when they ran into something unfamiliar, and we recognized that bringing them up to speed could only help the situation.

We had a breakthrough last year in Fort Worth, Texas, where we were joined for our pool-construction course by John Riley, a building inspector from nearby Frisco. So far as we know, he's the first inspector in the United States to attend such a program, and it's our hope that he will soon be joined by many more so we can see these professionals less as adversaries and more as colleagues and fellow professionals.

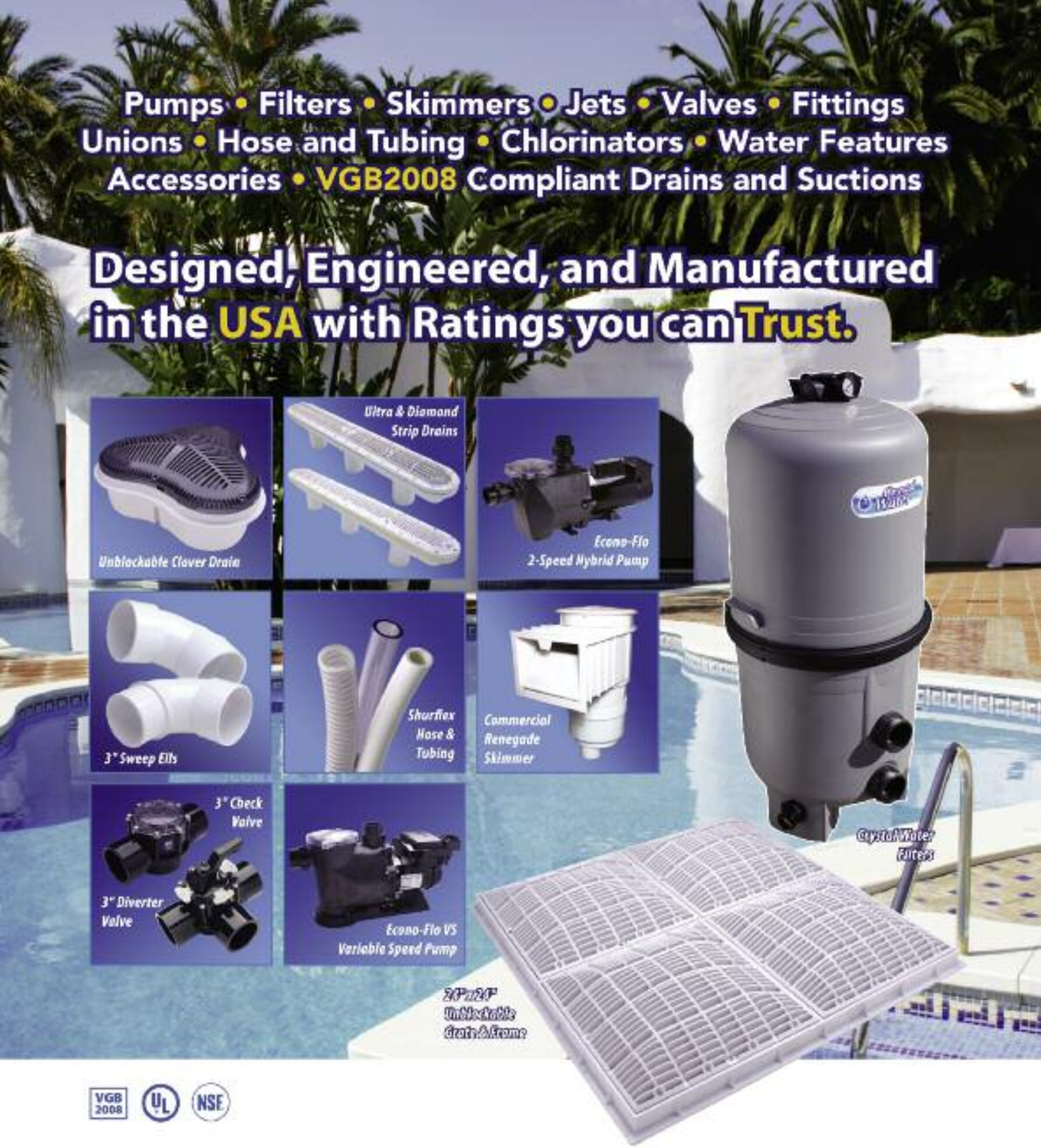
It may seem like an impossible dream, but it's well worth pursuing. The better able inspectors are to recognize the fine points of quality design, engineering and construction, the better able they will be to help us eliminate errors and substandard practices as we all work to protect the public interest. There is, in other words, simply no downside into having inspectors become familiar with the subtleties and nuances of our craft.

It's not news to anyone that times are tough and that we're mired in a miserable economy. As I've suggested in this space many times in the past, to make any progress we need to address the situation and think in new ways about the possibilities the future holds.

To me, thinking in terms of a global marketplace of business and ideas and breaking down inherited perceptions of what watershaping is all about can only help us move forward. The sooner we accept the fact that we're part of much bigger and more integrated world than we might previously have considered will only help us approach the future with greater awareness of the opportunities it holds.

If we open our eyes to broader horizons, in other words, the power of our potential will only grow as we make new connections, forge new alliances and organize what we do in ways that reflect new realities. WS

Brian Van Bower runs Aquatic Consultants, a design firm based in Miami, Fla., and is a co-founder of the Genesis 3 Design Group; dedicated to top-of-the-line performance in aquatic design and construction, this organization conducts schools for like-minded pool designers and builders. He can be reached at bvanbower@aol.com.



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On the Level

Small or large, a retaining wall needs to be installed properly in order to perform its duties into the entirety of its foreseeable future.

Up Right

By Bruce Zaretsky

Have you ever noticed how often the costliest part of a project turns out to be something that will ultimately be hidden from view? This happens quite frequently in projects involving any sort of slope, where the piers and grade beams beneath swimming pools, for example, can cost far more than the rest of the overall project.

In my own work, I've noticed this budgetary quirk most frequently when it comes to retaining walls, where providing the foundation they need to withstand the forces applied by a slope can be startlingly extensive and expensive. It's not what you'd call glamorous work, but it certainly is important – and will vanish completely from view.

Most often, we're called on to build these walls when new homes are being built on slopes. To create level areas for driveways, parking pads, patios, pools and other key features, you need to insert retaining walls and fill the voids behind them up to the desired grade. These are *not* project elements you want to revisit once your work is done, so getting everything right the first time is obviously important.

When I started in the business, I saw lots of retaining walls made from railroad ties and timbers and poured concrete, none of which are commonly used these days. I've also built many walls using natural stone: I've always loved them for their beauty and design flexibility, and we still do the majority of our work in natural stone – assuming, of course, that it fits the design aesthetic and the client's budget. These days, however, the majority of our projects are completed using pre-cast block systems.

all fall down

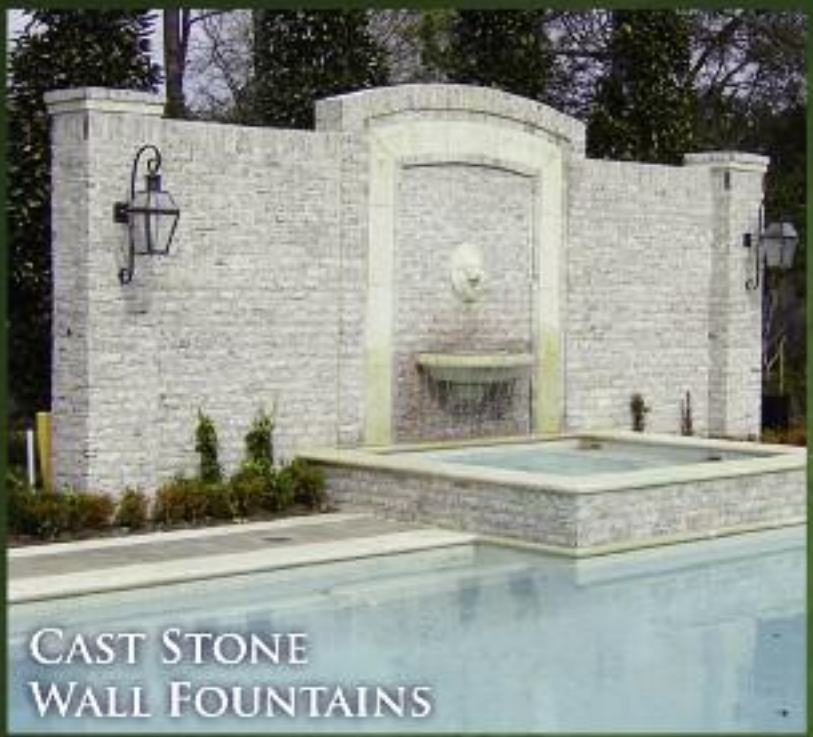
I'm among those who mourn the fading of those old-school walls, but there are many reasons why pre-cast retaining wall systems (also known as segmental retaining walls) have jumped to the fore in so many landscape projects.

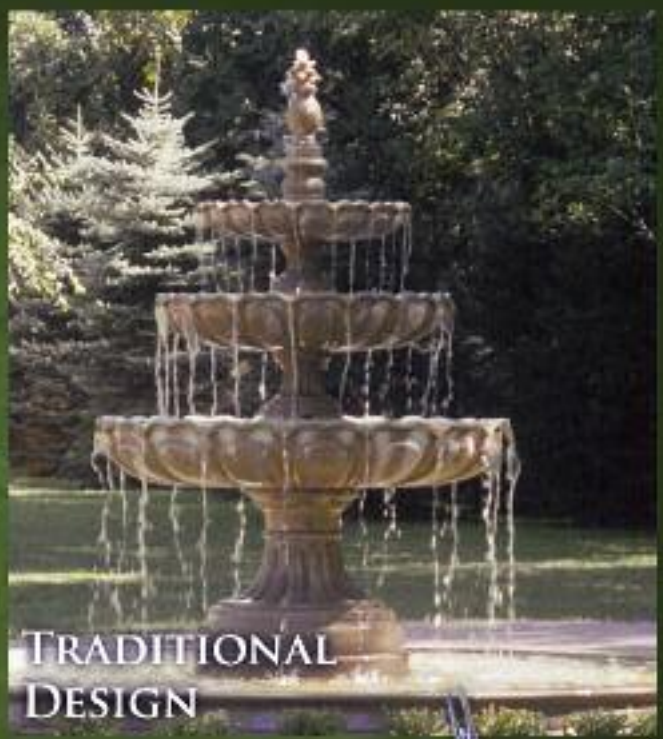
When they first emerged, those products were mostly the sterile-looking, split-faced concrete blocks seen in every strip mall or shopping mall – truly homely stuff unworthy of use in well-designed spaces. Through the past 20 years or so, however, these products have evolved to a point where they provide reasonably convincing rock faces and mosaic patterns.

Better still, unlike construction of natural stone walls that can require years of hard work to master, pre-cast systems are relatively easy to work with and can be picked up by most crews with some training and a bit of hands-on experience. The one subtlety here is that each of these pre-cast products has its unique aspects and detailing, so working with them in the field and getting accustomed to their idiosyncrasies is important.

Early in my career, I spent lots of time building small terraces, step systems and larger-scale retaining walls using pre-cast products from Versa-Lok (Oakdale, Minn.) and Keystone (Minneapolis, Minn.) – a pair I refer to as the Adam and Eve of the pre-cast industry. Both make excellent products, but as is true in so many things, a product is only as good as its installation!

Just about every day, for instance, I motor past a property where a pre-cast retaining wall is holding up a garden – but barely, as it is in its last days as a retaining wall and will soon be little more than a pile of rubble. This is a clear case of an excellent product





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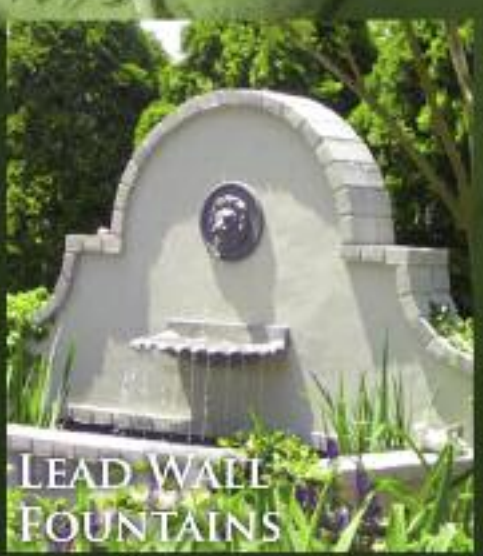

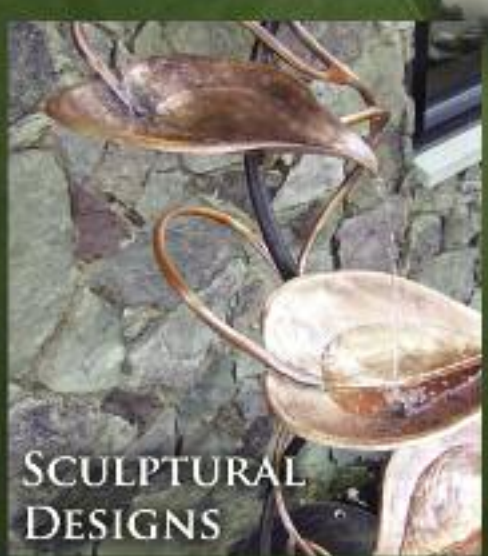

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installed the wrong way.

I recall driving by the site years ago and seeing the installation in progress. I also remember wondering why on earth they were building it with no base or any provision for drainage. It was doomed to failure even before it was complete. If it had been a big wall where failure would have been catastrophic, I might have spoken up. But this was a small wall, so I resisted the temptation to run across the site screaming "No, no, no! That's wrong!"

My point is, small or large, a retaining wall needs to be installed properly in order to perform its duties into the entirety of its foreseeable future. So let's take a look at the actual installation process and break it down into sensible steps. In this case, the walls are small and some serve as planter boxes, but the installation principles are the same here as they are on major slopes.


Figure 1

Foundations: All building projects must start with solid foundations, and retaining walls are certainly no exception.

A variety of factors come into play here. In the northeast, for example, we obsess over freeze/thaw issues, while contractors in the west worry about seismic activity and all of us worry about poor soils. Whatever the case, it's crucial with retaining walls to dig down far enough to find a solid subsoil base and then build back up with stone.

In my business, the stone we use in setting foundations is called crusher run – a mix of crushed stone and stone dust. In Figure 1, you see a large expanse of #2 crusher run used as a base for both the concrete terrace and the walls, which will be built with a product from Versa-Lok.

We tamped three-inch lifts of the crusher run into place, running it over with a plate tamper multiple times. I want the plate tamper literally *hopping* before I'm satisfied: This tells me that the base is rock-solid and ready to support the massive weight we'll be placing on it.


Figure 2

Setting the Base: Once the terrace was poured, we covered it and began working on the walls and planters (Figure 2). The plate tamper sits atop a three-foot-wide plateau of stone on which we'll center the 12-inch-wide base blocks. The space behind the blocks will be filled with washed drainage stone, while out front we'll place another layer of crusher run to the top of the (buried) base course, which we'll then cover with topsoil.


Figure 3

Leveling: We tamp and level the base stones to within a tolerance of an eighth of an inch, then apply either #1 crusher run or concrete sand as a leveling base. We place blocks on this base, smacking them down to set them and compact the leveling base. My preference is to use the top of a mattock (seen in Figure 3). Others prefer a dead-blow hammer, but I like the mattock because the wood head won't mar the block but has enough heft that it helps me seat the blocks with ease.


Figure 4

Straight Up: In this particular project, we're setting the planter-box blocks to be vertically plumb with each other, easing access to the beds by people in wheelchairs. In almost all common retaining-wall applications, however, we will batter back the blocks with every course.

The holes and trenches in the Versa-Lok system are used to set their pins, which in this case would batter the blocks back about three-quarters of an inch. Once set, the pin drops into the trench of the block below. (Other manufacturers use similar pin systems or some sort of lip that acts as a guide in battering the blocks.) It's all quite simple if that's the look you want.

In this case, however, we were going straight up. When that's the plan, we glue each course as we go up, using a small, hand-held torch (Figure 4) to dry and warm each block so it readily accepts the construction adhesive. (While some of these adhesives claim to work well in damp or freezing conditions, I take no chances!)


Figure 5

Row atop Row: Once the blocks are set up and beaded with construction adhesive, we simply place a fresh row (Figure 5). In this case, the walls will be 24 inches tall, so we'll use four courses of six-inch block (with the first one set three inches below grade) and top the wall with a three-inch-thick cap. We string a line

along the backs of each row to ensure straightness, doing so in back because the irregular fronts of split-face blocks are unreliable guides.

Figure 6

Preparing for Drainage: Once we've placed the third row of blocks, we set geogrid across the entire planter box (see the sidebar on page 22 for details on this material).

Before we place the grid, we backfill the entire void up to this level with #2 washed stone that will allow any excess water to flow down and away from the planters to a below-ground drainage system. We isolate this stone with a layer of landscape fabric to separate the stone from the soil that will eventually fill the space behind the completed wall.

We position the grid material under the blocks so that their weight (and the adhesive or, in some cases, the pins) will hold it in place (Figure 6). With this step, we assure that there is virtually no chance of the wall blowing out.

Figure 7

Capping: As mentioned above, the walls feature three-inch-high caps. In most systems, manufacturers offer standard 12-inch-deep caps, but in this case, we used a product that was only nine inches deep to shorten the reach to the plants for people in wheelchairs or on gurneys. We cut each cap into place individually to ensure tight fits (Figure 7), then removed them, washed down and dried the top course of blocks and glued down the caps.

Drainage: The walls and planters are mostly complete (Figure 8), but to the right you can see a black pipe lying on the wall: This is the drainage pipe for the back side of the retaining wall and was flopped up to keep it out of the way while we were preparing to tie it in.

Particularly in freeze/thaw areas, the single biggest cause for retaining wall failure is lack of proper drainage. In this

Earth Anchors

With pre-cast retaining walls, geogrid is used in exactly the same way as deadmen in wooden retaining walls and auger-anchors in poured-concrete walls: Their purpose is to keep their walls from falling over as a result of the pressure generated by the enormous weight of the material behind them.

To be even more precise, the geogrid actually separates the backfill material into a sequence of smaller backfilled areas. Say, for example, that the geogrid of an eight-course wall of six-inch-thick blocks is placed on top of rows two, five and seven. This is actually a series of three walls, the first of which is 12 inches tall (that is, courses one and two), the second 18 inches tall (rows three to five) and the third 15 inches tall (courses six and seven plus the cap). Separating the larger wall in this way stabilizes the entire structure.

It is critical that the geogrid – whether it comes from Tensar Corp. (Atlanta), U.S. Fabrics (Cincinnati) or some other supplier – is placed properly between block layers and runs back beyond the angle of repose of the materials being retained.

As a rule, we figure on a 45-degree angle for average soils. This means that, at a wall elevation of four feet, the grid will reach back at least eight feet – one foot for the wall's thickness, about two feet for room to manuever behind the wall, four feet to reach a 45 degree angle, then one additional foot for safety.

If in doubt, ask your supplier: They'll be more than happy to tell you how to deploy geogrid on any of your projects.

– B.Z.

Figure 8

case, we took care of that issue by placing a perforated four-inch pipe wrapped in a fabric sleeve and sent to daylight downslope.

The entire area behind the retaining wall (with the exception of the top 12 inches dedicated to planting) was filled to the slope's angle of repose with #2 and #3 washed stone, which is so porous you can blast it with a firehose without pooling any water. This means that we are getting *all* of the water out from behind the wall – meaning there will be none there to freeze in winter.


Figure 9

Ready for Plants: With the fabric and planting soil in place (Figure 9), we're all ready for plants. One of the last steps involves cutting off the excess fabric.

Done: The newly completed garden shows off its dramatic geometry (Figure 10). WS

Bruce Zaretsky is president of Zaretsky and Associates, a landscape design/construction/consultation company in Rochester, N.Y. Nationally recognized for creative and inspiring residential landscapes, he also works with healthcare facilities, nursing homes and local municipalities in conceiving and installing healing and meditation gardens. You can reach him at bruce@zaretskyassociates.com.


Figure 10

Speaking to Authority

By Dave Peterson

The following is the text, somewhat altered for this audience, of a letter I've sent a number of health departments in the course of working on projects for my company's clients.

There is no doubt that the recent wave of legislation, codes and standards regarding suction entrapment has caused confusion – not just in the pool and spa industry, but also among lawmakers, inspectors and contractors as well as pool and spa owners. These mandates, however well intended, have all too often been confusing or contradictory and frequently reflect neither common sense nor sound engineering.

Our firm and others have been retained by numerous owners, contractors and maintenance companies to guide them through these murky waters. Along the way, I've become particularly frustrated by the apparent lack of understanding of basic physics among the authorities who have jurisdiction. In pointing this out, I'm not picking on any particular individuals or groups, because I understand that it takes many people to write, administer and enforce regulations.

The very best way out of this regulatory mess – one that complies at least with the spirit of the law while eliminating suction entrapment risks – is to get rid of main drains wherever possible.

In fact, I have no one but myself to blame for not having gotten more involved earlier in the process.

Time and again since the rules went into effect, I've run into existing drains that are out of compliance – which is not at all surprising – for which the resulting fixes are so exorbitantly expensive that abandoning the pool is often the best solution. Even with new pool construction, I've encountered plan checkers who are stunned to see plans that do not comply with the new regulations – yet recognize that it's not because designers are ignorant of code requirements, but rather that the codes themselves simply do not comport with sound engineering standards.

It is my contention that the very best way out of this mess – one that complies at least with the spirit of the law while eliminating suction entrapment risks – is to get rid of main drains wherever possible in both existing pools and in new construction. Non-compliant drains on existing pools could be abandoned, while new projects may be designed without suction outlets.

drains and suction

To appreciate this argument fully, we must first consider the history of main drains and then the physical characteristics of water itself. On both levels, it is clear that main drains are genuinely obsolete. (And just because there are some existing pools where skimming is too inadequate to allow for the complete elimination of suction outlets, that's no excuse for not applying modern design principles to new projects!)

If we go back in time about 90 years, many pools of that era used a fill-and-dump or fill-and-draw method of maintenance. At the time, water was not seen as the critical resource it is today, and effective pump and filtration technologies were still both being developed. (Pressure sand filters were not commercially available until the 1950s, for instance, while diatomaceous-earth filtration came to prominence in the '60s and cartridge filters took hold in the '80s and '90s.)

The fill-and-dump process is an obvious solution to a lack of

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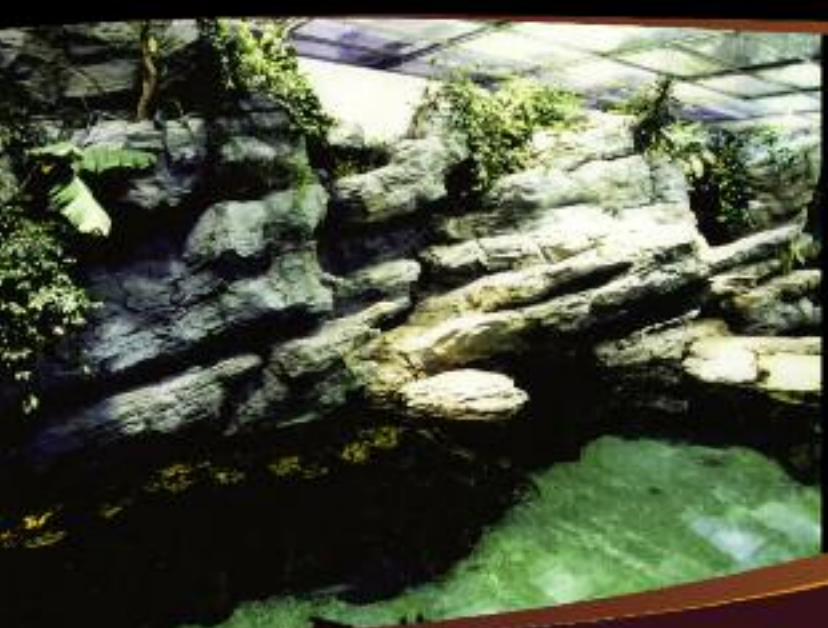

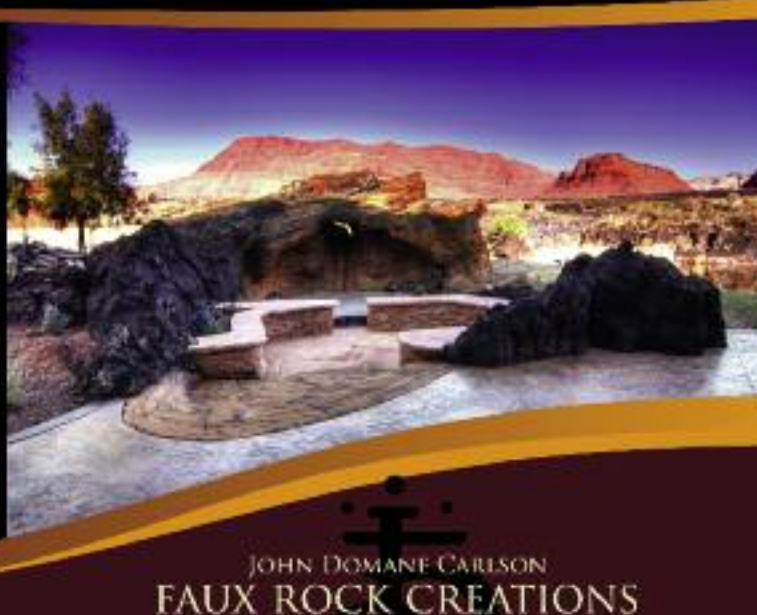

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suitable water-maintenance technology – and is much easier to implement if the pool can be completely drained via a port set in the deepest part of the pool, more or less like a bathtub drain. This is why the term "main drain" was applied at the dawn of the modern pool industry and why it has stuck for so long, even though these outlets have for generations been connected to pumps for recirculation and now have nothing to do with draining pools.

So why are main drains obsolete?

First, from an ecological standpoint, draining pools is to be avoided as much as possible because water is a limited resource. Second, in a functional sense, the benefits of these outlets at their typical locations are questionable in light of recent studies, physics analysis and common sense. Third, from a grossly practical perspective, pools are rarely (if ever) drainable via gravity from floor-located ports because pools are usually buried in the ground deeper than are nearby sewer lines or storm drains.

Discussions of that third point can get interesting. In fact, I've actually had health officials tell me that the pool pump is used to drain the pool – an incorrect statement that defies physics. While it is true that a pool pump can be used to drain a pool *partially*, it is only a matter of time before the pump loses prime and stops functioning.

After all, in most installations the equipment sits on a pad at deck level, which means the pump's suction port is at least a foot above the nominal waterline. The friction loss on the suction side of the pump averages about five feet of head loss, which means the pump "feels" as if it's lifting deck-level water from a depth of about six feet when set at deck level. A pump used in this sort of application is only designed to lift water seven to eight feet, so this leaves us with only about two feet of available drawdown in the pool.

A good pump might do a little better, but we are not likely to find a typical pool pump capable of draining a pool that's five feet deep or deeper. This isn't a manufacturer's dodge: This is physics and the limitation it puts on pumps subject to atmospheric pressure, pump design and tolerances – and we can't change it.

This is why every maintenance person I know carries a submersible pump on his or her truck. If main drains truly worked as drains, why would this expense be necessary? It's not just because submersibles give us the ability to run the drained water through a filter or direct the discharge to a specific location – the soil, perhaps? – instead of dumping it down the sewer or into a storm drain.

physics in action

Now let's look at the second reason we should consider main drains as obsolete – that is, physics and specifically how it relates to maintenance.

For starters, it is generally clear that we really do not need drains or suction outlets for pool maintenance. Historically, the belief has been that floating debris is removed by a skimmer or gutter system and that sinking debris eventually moves toward and is pulled into an outlet or outlets set in deepest part of the pool. We now know, however, that debris is *not* sucked into these outlets: It must be pushed there, and "there" can be anywhere, including the skimmer alone if that's what is desired.

Again, the laws of physics cannot be changed. Just as with the fundamental constraint that limits how high a pump can lift water to drain a pool, water itself has properties that cannot be overcome.

When physicists and engineers talk about forces that govern water's behavior (or that of any other material), we often categorize them as *compressive* (pushing together), *tensile* (pulling apart) or *shear* (sliding with respect to each other). Liquid water has a unique ability to support compressive forces, but not tensile or shear forces.

Imagine two water molecules sitting on a table. If the molecules are touching each other and you push one into the other, you would expect both to move in the direction pushed. This is an example of compression. But try as you might to compress the two molecules into a smaller volume, water is essentially incompressible, so displacing the first molecule by one foot will displace the adjacent molecule by one foot.

In terms of pool operation, a return inlet jutting through the wall of the pool applies a compressive force to the molecules and they will move. (This is why the flow through a return inlet can be felt several feet away.) Displace the molecules at the pool wall by a few feet and the molecules in line will be displaced by an equal amount. Eventually, however, these molecules will slip out of line and the jet's influence gets wider and weaker. Nonetheless, the compressive physics are undeniable.

Tensile force is different. Imagine the same two molecules on the table, but that this time you're trying to pull one away from the other. The water is not "sticky," so the molecule left behind just sits on

Equalizing Pressure

In many projects, skimmer equalizers are used to protect pumps from low water levels and from the possibility of the skimmer line being blocked by leaves or other heavy debris. When installed, these suction devices should be done in split pairs as a safety measure.

In my book, skimmer equalizers are usually unnecessary. Water-level issues are better addressed through installation of an autofill device, while in the case of blockage the worst that can happen is damage to the pump – a far less serious consequence than an entrapment incident. Moreover, blockages aren't much of an issue at all with indoor pools, although the requirements are the same.

I say get rid of them wherever possible and, more important, fix the code!

– D.P.

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the table by itself. It is not dragged along by the molecule you've moved, meaning that displacing one molecule has no effect on the adjacent molecule.

Back in the pool, when a suction outlet removes molecules at the outlet cover, it is not "pulling" in adjacent molecules: As each molecule is captured and removed by the pump, hydrostatic pressure on the remaining molecules forces them to fill the void. In other words, it is compressive force that squeezes molecules into the voids left by the departing molecules, not any tensile force. And the molecules could just as easily be debris or pathogens as water if they happen to be in the vicinity.

suction at work

Through the years, studies have shown how physics governs the flow of water in pools. At my company, we've checked into these phenomena on our own, dusting the floor and drains of a pool with silica sand and then turning on the pump.

What we've observed is that the sand within an inch of an eight-inch-diameter anti-vortex cover eventually gets pushed into the outlet by the compressive force of the molecules filling the vacuum left by the departing water – but that's *it*. There's still sand on top of the cover and sand throughout the pool, and it will stay there until it is disturbed by return inlets that impart their compressive forces throughout the vessel.

And let's not forget shear forces. Imagine those two lonely molecules sitting on the table again: If you slide one along the other you are imparting a shear force, but the water molecules are not sticky so the second molecule does not move beyond maybe rotating a bit. This is not the same as, say, a pile of straw, where sliding one piece out will likely drag others along with it: That simply doesn't happen with water. In effect, suction outlets fail because of water's inability to support shear and tensile forces.

To be sure, I've oversimplified a bit in laying out these examples by saying that water molecules aren't sticky. Water molecules *do* bond together due to weak electrical attractions, but those forces – which we see as adhesion and cohesion when we overfill a glass of water – are negligibly weak compared to the compressive, tensile, and shear forces that influence water's behavior in watershapes. In that context, in other words, it's safe to say that water is not sticky.

So how do suction outlets remove debris? The answer is that they only do so if we push debris to them and that the best way to do so is with good circulation via return inlets. This also means that the suction outlets don't need to be at the deepest point of the pool or even

Dealing with Reality

As mentioned at the start of the accompanying text, most of this narrative comes directly from letters I've written to various health departments to help clients solve problems related to compliance with provisions of the Virginia Graeme Baker Pool & Spa Safety Act. Many of these clients work with pools built in apartment complexes in the 1960s.

The stories are strikingly similar: At some point in the pool's history, someone noticed an increase in water consumption and called in a leak-detection company that found the problem in the main drain. (Typically, pools of that era were built with copper pipes, and my suspicion is that, through the years, trichlor tablets had eaten holes in the copper.) To remedy the problem, someone simply plugged the drain, reinstalled its cover – and nobody was ever concerned about the non-functioning suction outlet.

Some of these pools had operated for 15 or 20 years or even longer with perfect water quality by the time the VGB Act prompted a new round of inspections. These pools all worked: Indeed, detailed chlorine residual tests conducted at multiple depths, locations and times have shown that the water circulates and mixes adequately. Furthermore, none of these pools had ever been cited for failing to meet health department standards despite inspections being done by various personnel and even by multiple jurisdictions.

As I see it, these watershapes offer compelling evidence that pools can operate without main drains or suction outlets while still containing healthy water. The problem is that the same health departments that had given passing marks to these pools in the past are now requiring owners to install main drains at the deepest parts of these pools for the ostensible purpose of draining and recirculation.

The copper pipes in these old pools still have holes in them, of course, so the only solution is to start all over with a new main-drain installation in a split-pair arrangement. This requires expensive demolition of the pool floor and some of the walls, plus extensive work on the decking along with trenching and plumbing tasks. In 2010 dollars, these costs are often greater than the original pool's total price tag. And all of this is done to add an unnecessary suction outlet hazard to a perfectly functioning pool: After all, code requires it, and no government employee has the authority (or wants to take the risk) of making an exception for these pools.

What's worse, I've been told by numerous builders that when they see these disabled drains, they simply cover them with a new, approved cover and add a safety vacuum release system (SVRS). Yes, just adding this device to a completely disabled line seems to be enough to enable an inspector to approve and reopen the pool as "VGB compliant" – despite the fact that the pool does not meet the antiquated health code requirement for a main drain!

I've always been honest about the projects I'm involved with, but I keep encountering builders and technicians who are willing to bend the truth – and health departments seem to be in denial about what's happening. Let's simply put an end to this game and revise the codes to allow pools to operate without main drains or suction outlets!

– D.P.

on its floor. In fact, we have built pools without *any* suction outlets, and their water is perfectly clean because the debris eventually finds itself at the weir of the skimmer.

Of course, sand isn't buoyant enough to get up to the skimmer, but this sort of debris does not seem to affect water clarity or chemistry the way lighter, more deleterious material might. We handle such debris with weekly vacuuming or deploy an automatic pool cleaner for a few hours a week.

back to basics

To bring this discussion to a conclusion, it is my belief that outlets are not needed at the deepest part of a pool – and maybe not at all.

This is an important concept for many reasons. First, there are many pools – even heavily regulated commercial pools – that *never* had suction outlets yet perform well from maintenance and sanitation standpoints. Second, given all the attention on suction-outlet safety, the safest of all pools would be one in which the hazard is completely eliminated. Why, then, do some health officials insist on owners spending tens of thousands of dollars to retrofit existing pools with unnecessary, ineffective suction outlets? Is it only because an antiquated code requires them?

I believe it's time for *everyone*, from lawmakers and local authorities to watershapers and pool owners, to recognize that we do not need main drains. In fact, we would all do well to eliminate them wherever possible and effectively say goodbye to the suction entrapment risks that come along with them. WS

Dave Peterson is president of Watershape Consulting of San Diego, Calif. He's been part of the watershaping industry since 1994, starting his own firm in 2004 after stints with an aquatic-engineering firm and a manufacturer. A registered civil engineer, he now supports other watershape professionals worldwide with design, engineering and construction-management services and may be reached via his web site, www.watershapeconsulting.com.

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Commentary

Green Horizons

Although they're occasionally the focus of media attention in North America, green roofs and their potential benefits are still relatively unknown quantities unless you happen to be a landscape architect or architect. In this commentary, Steven Peck and Damon van der Linde of Green Roofs for Healthy Cities aim to expand that base to include all watershapers – professionals, they say, who can play key roles in spreading the influence of these systems.

By Steven Peck & Damon van der Linde

Just think of it: There's a design approach that improves energy efficiency, reduces the urban "heat island" effect and provides much-needed green space in places where opportunities for natural stress relief are rare and much welcomed, yet it's not something that has caught hold in North America the way it has in Europe and elsewhere.

We may be biased in our roles as advocates for the systems in question, but given all that they can do, we have to wonder why green roofs aren't being installed with *far* greater frequency.

True, they are garnering more and more attention and are definitely up-and-coming in the construction marketplace, with 16.1 percent growth in 2009 and reports of similar expansion in 2010. But given the fact that this technology may be the most beneficial of all "green" approaches, it's a wonder it hasn't seen even more dramatic growth.

In observing the situation, we've reached a simple conclusion: While the green-roof concept has won the hearts and minds of landscape architects and architects, what's missing is the practical component of the picture – that is, the involvement of professionals who know what's involved in making waterproof systems work.

The missing piece, in other words, has to do with getting watershapers involved.

Forms and Functions

The use of plant material on rooftops dates to the beginnings of civilization: Consider the Hanging Gardens of Babylon, for example, which draped over the sides of a huge ziggurat. For all that, however, green roofs come across as a real oddity in the here and now.

To shed some light on the technology, let's run quickly through some definitions and suggest a working vocabulary that will help watershapers get started.

A *green roof* is a contained space set atop a man-made structure as an extension of what would otherwise be a blank, existing roof. The greening of these spaces typically involves the installation of quality waterproofing and root-containment systems along with drainage systems, filter cloths, lightweight planting medium and the plants themselves.

Within and around that planted landscape, these spaces can take on any of the characteristics of a park-like terrestrial space, complete with all manner of walkways, waterfeatures, lighting, garden art, shade structures and more.

This green space can be at, below or above grade – that is, atop subterranean parking facilities at ground level or perched high atop a skyscraper – but in all cases the plants are not put in the ground as they are conventionally but instead are placed in a medium con-

tained on top of a structure. In some cases, these systems are modular, with a drainage layer, filter cloth, growth medium and plants prepared offsite as movable, interlocking grids; in others, system components are installed separately, as in any conventional landscape.

Green roofs are also categorized as being either intensive or extensive, basically depending upon the depth of growth medium. If that material has a depth of six inches or less, it's seen as an *extensive green roof* and is prized for its lower weight, cost and maintenance factors – although it sustains a less diverse mix of plants. By contrast, *intensive green roofs* have more than six inches of growth medium (and therefore greater weight, cost and maintenance) while enjoying greater plant diversity.

Maintenance of these systems is crucial. Once the plants have become established following installation, the relatively simpler extensive green roofs generally require two to three inspections per year for weeding and to ensure that the drains are clear. For their part, intensive green roofs may require weekly maintenance, irrigation scheduling, regular pruning and as-needed replanting.

In both cases, irrigation systems require periodic maintenance and may have to be winterized and/or emptied with the arrival of cold temperatures. In addition, the waterproofing assembly will require periodic inspection and maintenance.

Vast Upsides

Once installed, all types of green roofs have certain things in common, but mostly they are defined by their differences. In fact, green roofs vary wildly, and each one is probably worthy of a separate article or case study.

Where everything comes together, however, that's when you begin discussing their benefits, which accrue no matter the setting or whether you consider it from the perspective of those who own the structure or who live and work around it. Some of these benefits are huge, obvious and profound, while others are both surprising and subtle.

For their part, building owners and occupants will see reduced heating and cooling costs, reduced impermeable surface areas (an increasingly important part of the design process) and the intangible value of open garden space. In addition, by expanding the space available for use, they increase the value of a property to all who have access to the roof.

On the flip side, the general public in the area around these buildings (not to mention the local government) benefits from reductions in stormwater runoff and the heat-island effect as well as improved air quality and provision of wildlife habitat.

To date, most of the consideration has leaned in favor of the public benefits. Already, in fact, municipalities are advancing the cause by supporting green roofs in their building codes. By contrast, interest in the benefits on the private side has been slower to develop, probably because of the higher investment required to make these systems work.

As a consequence, most of the driving force behind green-roof development to date has come from the public side of the equation. Helpfully, lots of municipalities are making investment in green roof systems less burdensome by forming public/private partnerships that incentivize green-roof development and shed greater light on the advantages of these systems within the private sphere.

At this point, in fact, it's all about exposure, education and performance: As these systems become more common and as their characteristic benefits become more widely known and they rack up longevity as public resources, they'll gain the sort of acceptance that will lead to rapid expansion of the concept and further refinement of the technology.

What we know as advocates of these systems is that their use must become more widespread if we are all to derive full benefit from their ability to mitigate the urban heat-island effect and reduce stormwater runoff. Those are the biggest and most impactful benefits green roofs have to offer, and these systems need to exist on a much more widespread basis if municipalities and the people who live in them are to enjoy the advantages.

On this level, advocating green roofs has in some respects become a political exercise in addition to being a practical, educational pursuit.

Getting to Work

Beyond all that, however, what we face is a need to have skilled practitioners working with these systems as designers, engineers and installers – and that's where watershapers in particular enter the picture because of their familiarity with methods for containing and controlling water and guiding it where it needs to go.

Functionally, a green roof is not unlike a pool or pond in that it is a water-retaining system that must be waterproof to prevent damage to the structure it surmounts. The additional wrinkle here is that the water needs ways to flow through the system, where it is captured by drains and carried away.

Some of the benefits of green roofs are huge, obvious and profound, while others are both surprising and subtle.

In effect, what the overall system does is slow water down rather than retain it the way a pool or pond does.

This retentive quality is important because many older cities have combined sanitary and storm sewers whose capacity can be overwhelmed by heavy precipitation. In capturing and (temporarily) storing stormwater, green roofs reduce immediate runoff volumes and limit the occurrence of sewer-overflow events. This in turn diminishes the quantity of untreated wastewater that enters bodies of fresh water in the aftermath of substantial storms. Moreover, by reducing peak flows during storm events, green roofs reduce local incidences of flooding.

Studies have shown that green roofs perform remarkably in these contexts:

Indeed, they retain between 65 and 85 percent of stormwater runoff compared to conventional roofs (with the range depending on whether the green roof is extensive or intensive). Excess water can also be collected on the roof or at grade in cisterns and used later for irrigation, thus reducing the green roof's use of potable water.

Because the flow is slowed, smaller roof drains can be considered on some green roofs, thereby lowering the cost of installation and further controlling the volume of water ultimately released into the sewage system. In addition, the plants and growth medium act as filters, cutting pollutant concentrations and thereby improving the quality of water that flows into sewers.

All of these concepts should be familiar to watershapers on some level: You have expertise in designing and building waterproof structures; you're familiar with hydraulics and drainage issues; and you know the materials involved in the construction of these spaces. It's a kindred endeavor, in other words, and it's one in which your practical skills and know-how have great value.

Policy Drives

As mentioned above, we at Green Roofs for Healthy Cities (Toronto) are advocates for these systems and are doing all we can to drive the technology's success. At this point, we see our best potential in forging alliances between the public and private sectors.

This is one of the reasons we spend so much time in studying the role of green roofs in the LEED rating system and are pleased to note that the addition of a green roof can contribute as many as 15 credits, depending on the design and the green roof's level of integration with other building systems.

Whether used on their own or combined with other green approaches (such as solar power or constructed wetlands or recycled building materials), green roofs can contribute LEED points in several key categories, including reduced site disturbance, protecting or restoring open space, reducing urban heat islands, stormwater management, water-efficient landscaping, innovative wastewater technologies and innovation in design.

What this adds up to is tax benefits enjoyed by green-roof owners that help to offset the higher initial cost that comes with installation of these systems – just the kind of incentive that will spur industry growth as LEED qualification gains in significance.

In Europe, private/public sector alliances are much further along than they are in North America, probably because governments there have become actively involved with legislative and direct financial support. That boost gave the European movement a kick-start it hasn't enjoyed here, but we're catching up as best we can.

Indeed, a number of jurisdictions (Chicago, New York City, Washington, D.C., and Portland, Ore.) have estab-

Wildlife Resources

It's not something that immediately comes to mind, but another benefit of green roofs has to do with the fact that they provide habitats useful to wildlife on a number of levels.

Atop buildings, for example, they host birds and various forms of insect life, while on grade they serve a diversity nearly as great as any terrestrial parkland. And if you project it out to a time when green roofs are common and widespread, it's not much of a reach to see a prominent role for them in providing wildlife with substantial living space – not as a replacement for natural areas, but certainly as welcome relief in urban spaces.

In that context, green roofs might become part of larger systems that complement green corridors and wildlife passages through urban sprawl. If established with trees, shrubs and grasses, they'll serve the needs of insects, birds, bees and butterflies, functioning as settled islands or serving as stepping stones for transient populations in need of food, water, shelter and cover.

– S.P. & D.v.d.L.

lished policies in support of green roofs on both public and private buildings, while Toronto recently mandated a requirement for green roofs on all new buildings and commissioned a rooftop park for its city hall.

Working in another direction, some jurisdictions have begun to implement stormwater-related utility fees that help raise capital to improve stormwater-management systems. The fees, which keep going up, are typically assessed to property owners based on the impermeable surface area of their property – a real incentive to taking steps such as installing green roofs to reduce those surfaces.

The Gift of Green

The one point we haven't considered so far is the fact that green roofs can be beautiful spaces. While it's great that they save energy, reduce storm runoff and benefit wildlife, the fact that they can also greatly beautify unsightly rooftops provides a host of psychological benefits to people who live and work in their vicinities.

For all their material benefits, there may in fact be none more important than the ability of green roof designers and builders to create serene, beautiful spaces where people can relax. There's a wonderfully unexpected joy at finding a naturalistic environment atop a building – and surrounding views take on all new meanings when enjoyed from a green oasis.

As we see it, the greener our building tops become, the better life will be everywhere. To make this happen, the water-shaping industry needs to get involved!

A Call for Professionals

As the green roof industry in North America continues to expand, the need for trained professionals who are familiar with green roof design, implementation and technology has never been greater.

That is why in January 2007, participants in the green roof industry gathered together to develop a set of occupational standards for Green Roof Professional (GRP) accreditation.

To become a GRP, the individual must pass tests in a wide range of subjects covering design, installation, waterproofing, drainage, plants and growth media. The program is designed to establish accredited professionals as key members of any green roof team, fostering a multidisciplinary approach that gives them a vocabulary that cuts across all of the professions that get involved in these projects, from suppliers and manufacturers to designers, engineers and subcontractors.

For information, contact Green Roofs for Healthy Cities at (416) 971-4494 or visit *www.greenroofs.org*.

– S.P. & D.v.d.L.

The Finishing Twist

In the long-awaited conclusion to our coverage of a grand, comprehensive exterior-design project in Texas, landscape architect Michael Percy guides us through a property where his firm dealt with every conceivable detail, from the entry drive and graciously secluded courtyard to the beautiful swimming pool with its unusual spiraling backdrop, the lavish dining and recreation areas and the wonderfully hidden rock-lined spa.

By Michael Percy

Among the most gratifying of all projects are those in which designers are able to forge links between different areas of a property, creating an unfolding, choreographed experience that generates notes of anticipation along with reassuring sensations of comfort and familiarity.

In our work at Root Design Company (Austin, Texas), we've found that water is a powerful tool in defining those sorts of connections within a property, whether it is used in bold ways, as with fountains or swimming pools, or as subtler secondary or tertiary elements including runnels or small waterspouts.

In the project depicted here, we used multiple watershapes within architectural spaces that organize those settings and bring motion and continuity to the overall space. It all ties together visually, with each path leading to intriguing destinations that serve as rewarding visual experiences for anyone who visits.

As we see it, the key ingredient in this project was our client, who understood what was involved in developing this comprehensive sort of program and encouraged us to think big right from the start. We always appreciated the rare opportunity he gave us to conceptualize and integrate all of the available exterior spaces with a distinct progression of experiences in mind – a freedom that led us to develop some wonderfully expressive design solutions.

Scene Setting

When our company's founder Ben Dozier and I first discussed this project in *WaterShapes*' September 2009 issue (see "Luxury with a Twist," page 34), the project was already nearing completion (We wrapped up our installation work toward the end of October.) We also maintain the property, however, so we've been on site regularly ever since, continuing to make minor adjustments the owner has requested, mainly in the form of additional plantings.

In the first article, we focused entirely on the design and construction processes, saving images of the completed project for a return visit once the plants were established and our design intent was fully realized. Of course, given the client's restless creative spirit, it's possible our work may never be completely "finished." But even so, we have the sense at this point that the home is ready for public viewing.

As suggested above, the client deserves a great deal of credit for the success of the project. In addition to affording us the chance to work the site from wall to wall, he constantly challenged us with long lists of ideas (and a few preconceptions) about how certain spaces should be used. There was patience on both sides of our conversations as we sorted things out and did all we could to define spaces with clear, distinct functions in mind.

Indeed, he proved to be a tremendous collaborator who worked with us step by step as we decided what to include and what to leave out – a classic design-editing process through which we defined all of the spaces around the two-acre site. By design, the Hacienda-style property works on two scales, blending into the wide-open, arid landscape of the Texas plains on the one hand while offering private spaces and even a sense of separation from the outside world on the other – especially in the large, wonderful courtyard encompassed on three sides by the rambling house.

With no further ado, let's revisit the property and, this time around, let the photographs do most of the talking.

Grand Entrance

The sense of unfolding begins when you arrive, passing through a massive wooden gate off the street that leads to a motorcourt centered on the home's entry and two grand, Spanish doors that stand about 12 feet tall.

As you stand at those doors, the sound of water immediately comes into play: To their right is a ten-foot-diameter semicircular pool fed by a penetration through the wall. This sound of water in motion is an irresistible invitation to step inside.

Hidden Sanctuary

Passing through the doors, you're greeted by a terraced, 70-foot-long courtyard bisected by a runnel that flows from the far end of the space all the way across to the small pool it feeds through the wall. The runnel leads to a central waterfeature backed up by a large live oak around which the home had been built.

Three sides of the courtyard are flanked by elevated loggias that provide a variety of views of the central space. It's so sheltered and well-protected that we were able to plant a variety of palms, fruit trees and flowering species that we typically can't get away with using here in Central Texas.

Pool with a Twist

From the fountain's end of the courtyard, visitors get a glimpse of the interior space as well as a view of the perimeter-overflow pool and the spiraling hardscape feature next to it in the backyard. The twist in the latter structure stands as the functional and visual hub for the entire property with its winding path, thoughtful plant selection and cascading waterfeature.

The twist was one of those ideas that come late at night, emerging from the subconscious – in this case as the central feature that ties into everything around it, a curvilinear hub that spins out into and moderates all of the yard's rectilinear forms.

As we saw it, this was a necessary visual break: If we'd set the wall up as a bunch of right angles, it would have served to do little more than segment or even fragment the surrounding spaces. By contrast, the sweeping curves now set the rest of the spaces up in natural orbits around a central focal point.

Wide-Open Space

Directly beyond the twist, we placed a large, formal lawn enclosed by a low stone wall – a perfect place for kids to play catch or kick around a soccer ball. The lawn is manicured to fairway quality, treating the visitor to an unexpected stretch of open space.

As reported in the previous article, we had planned on locating a sculpture at one end of the lawn in a semicircular area. We stepped away from that idea, however, sensing that it would serve no great purpose and would in fact be an element of clutter that would distract from the pastoral quality of the space. In addition, it serves as a great place from which to hit golf balls onto the adjacent putting green.

Outdoor Opulence

Looking from the house out to the right of the pool, you see a stand of palm trees that create a gentle barrier and hide a dining space that features a nine-foot stone wall and a huge arbor that shelters a table and chairs.

The wall is constructed of reclaimed stone and seems to be the ruins of a previous settlement now best suited to outdoor entertaining. The space features a grand, stone fireplace flanked by a mature olive tree that deepens the sense of antiquity.

At this writing, the grapevines on the arbor have yet to grow in as they eventually will. When they do, we anticipate that this already beautiful space will take on another spark of elegance that will make it even more wonderful both for entertaining large groups and for quiet family conversations.

Client Contact

As with all of our projects, the one seen here is truly a reflection of our client's personality: This is what pushes us to make each of our designs unique.

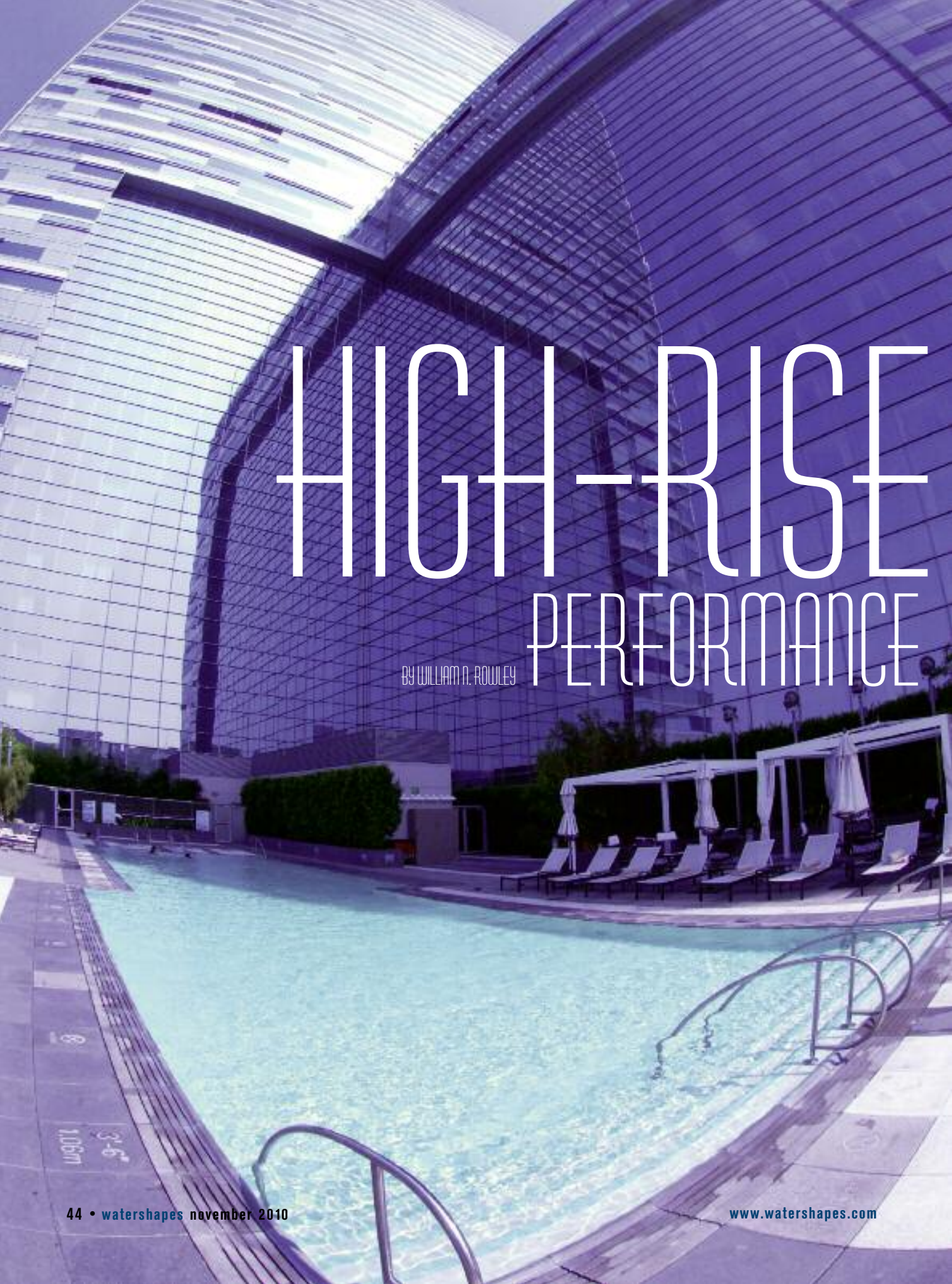
In this case, design solutions evolved as we moved through the construction phases, so we had to be nimble to meet all of the client's needs and desires. To facilitate this sort of responsiveness, we operate most of our projects under cost-plus contracts: It's an open-book approach that allows us to navigate through design changes while keeping clients fully engaged in construction decisions and aware of the costs.

– M.P.

Relaxation Station

The perimeter of the property is softened with native plantings that eventually terminate in a wall-enclosed space adjacent to the master bedroom – the most private space in the entire landscape and one in which we conjured a tropical oasis replete with deep green foliage, beautiful flowers and luxurious aromas.

In the center of the space is a spa lined with natural rock. Made using a 14-foot-long gunite shell, it was filled with rocks so large that the actual spa well accommodates a maximum of just four people. It's a private paradise – and the owners tell us it's their favorite destination in the entire property.



HIGH-RISE PERFORMANCE

BY WILLIAM N. ROWLEY

THE PROCESS OF INSTALLING SWIMMING POOLS IN HIGH-RISE BUILDINGS PRESENTS A NUMBER OF CHALLENGES NOT FOUND IN STANDARD IN-GROUND PROJECTS, NOTES COMMERCIAL POOL SPECIALIST WILLIAM N. ROWLEY. TO ILLUSTRATE THAT POINT, HE DISCUSSES WHAT WENT INTO CRAFTING TWO SPECTACULAR POOLS FOR LOS ANGELES' NEW L.A. LIVE COMPLEX, WHERE SPECIAL CONCERNS ABOUT LEAKS, NOISE, WEIGHT, MAINTENANCE AND BASIC PROJECT EXECUTION ALL CAME PROMINENTLY INTO PLAY.

There's no denying the difficulty of building a high-quality inground pool, but the welcome fact is that the earth can conceal a range of little imperfections, from small leaks to minor structural defects.

When you build a pool or some other watershape *above grade* as an integral component of a multi-story building, however, everything you do is magnified because the work is always exposed. Essentially, you lose the margin for error that might be possible with an inground installation.

This past spring, work was completed on two high-rise watershapes our firm engineered as part of L.A. Live, a multi-purpose, entertainment-oriented complex situated near the Staples Center and the Los Angeles Convention Center in downtown Los Angeles. The pool/spa combinations were placed on the fourth and twenty-sixth floors, and although they have simple rectangular forms, they represent the absolute state of the art in above-grade design and construction.

We at Rowley International (Palos Verdes Estates, Calif.) were thrilled to be part of the project, which includes retail stores, theaters, restaurants and a 54-story skyscraper – the largest built in Los Angeles in more than 20 years. The site was being developed by the Anschutz Entertainment Group (Los Angeles); designed by the global architecture firm Gensler through its office in Santa Monica, Calif.; and built by general contractor Webcor, a high-rise specialist (Culver City, Calif.).

In all, structures in the $2.5 billion complex encompass 5.6 million square feet spread across and above the 27-acre site. The pools were part of the skyscraper, which houses a J.W. Marriott hotel as well as a Ritz Carlton condominium complex.

The watershapes, of course, were just a minuscule component in the overall project, but they're located on large exterior decks and are meant to serve as key amenities and social hubs. The fourth-floor pool is part of the Marriott property, while the twenty-sixth-floor pool is for residents of the Ritz Carlton condominiums.

LOFTY LEAKS

It's well known in the engineering and construction trades that work on above-grade watershapes requires greater all-around levels of expertise than does an inground residential or commercial installation. As a result, architects, general contractors and clients – particularly those who have experience with these sorts of projects – tend to be selective about their working partners.

Our firm has extensive above-grade experience, so Gensler invited us to become involved with engineering the systems. In addition, we were pleased to be asked to oversee the installation and make sure everything went exactly according to plan.

They wanted us to be involved not only because of our track record and awareness of the specific areas where above-grade work is different from inground work, but also because nothing we were going to encounter would come as a surprise the way it might to a firm that hadn't tackled this sort of project before.

The first and perhaps most obvious point to consider in working above grade is that *all* pools leak to one extent or another. No matter how hard we all strive to create vessels that are completely watertight, leaks are virtually inevitable. With an inground pool, these minor emissions are likely to go unnoticed and detected because they don't cause any real problems.

All of that changes in a pool suspend-

ed above grade in a building where leaks, no matter how small, are *completely* unacceptable. Obviously, you don't want water dripping down into enormously expensive living, work or utility spaces, nor do you want to run the risk that a leak in one place will travel along beams or other structural elements and cause damage at some distance from a hard-to-detect source.

This is why all of our above-grade pools, including these two, are built inside concrete containment vessels. These outer containment vessels – ten inches thick and designed with the least possible number of well-sealed penetrations – are designed as integrated structural components of their buildings. For their part, the shotcrete pool shells are six to eight inches thick and include the normal complement of penetrations for

Among the paramount concerns in above-grade construction are weight and leaks, which we accommodated here by using foam wherever we could to reduce the volume of concrete required to build the shells and by placing the watershapes within concrete containment vessels to minimize possible issues related to sealing all of the necessary penetrations.

plumbing and lighting.

With their number kept to a minimum, it's possible to be rather maniacal about sealing penetrations to the containment vessel. It's also desirable to have the plumbing and electrical runs go as directly as possible to the equipment room to minimize chances of traveling leaks.

In our projects, we use plastic water stops to seal penetrations. For the L.A. Live pools, however, the waterproofing consultant had us use stainless steel pipes and fittings at every penetration – the reasoning being that the waterproofing material would create a better seal with stainless steel than with plastic. (This meant that we also had to bond each fitting to meet electrical codes.)

The other key point is that it's difficult to make concrete totally waterproof. We

The equipment rooms for these commercial pools and spas are notably complex – a fact that put an absolute premium on developing highly detailed installation plans and making everything as orderly and clear as possible to simplify any downstream maintenance that might be required.

used a concrete mix that was meant to exceed a compressive strength of 4,000 pounds per square inch – which in a perfect application can come close to being watertight – but we could take no chances.

Take the gutters, for example: We knew we would not be covering their surfaces with plaster, so we eliminated the possibility of any moisture penetration by coating the shotcrete with a high-performance waterproofing agent from C.I.M. Industries (Peterborough, N.H.).

SILENT AND CLEAN

In almost all above-grade projects, space is at a premium, meaning that the vessels are either partially or entirely suspended in areas otherwise devoted to human occupation – adjacent to hotel rooms, a restaurant or perhaps a health club. This means, among many other things, that you need to be conscious of noise.

We've encountered situations in the past where noise from either the plumbing or from people swimming in a pool can create a din that invades adjacent spaces. Experience tells us that remediating such problems can be both difficult and expensive.

As luck would have it, the pools at L.A. Live are *not* located immediately adjacent to hotel-guest or tenant living spaces, so the sounds of aquatic activity aren't an issue. This left us to deal solely with the

CONCRETE OPTIONS

Often in above-grade projects, we'll advocate the use of stainless steel panels instead of shotcrete for the pools we place inside our concrete containment vessels. This eases the waterproofing task while keeping down the overall weight.

In this case, however, we were building to the owner's specifications, and they insisted on concrete. We managed to keep the weight down by using foam spacers within the shell wherever we could.

– W.N.R

Seen from the top of their 54-story host building, the watershapes offer jewel-like invitations to relax and enjoy the water, the broad decks and the southern California sunshine.

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noise of the systems in operation, where again our experience leads us to deploy two measures we use on all of our above-grade projects.

First, we design systems with flow rates no greater than three feet per second – meaning we use big pipes and small pumps. The oversized plumbing can be a problem in the sorts of tight spaces you find in these environments, but when you make it clear to everyone involved why it is necessary, we find consistent co-operation – particularly when we point out that the slow flow rate also contributes to energy efficiency.

Second, instead of using conventional pumps with 3,600 rpm, two-pole motors, we specify models with 1,200 rpm, six-pole motors that were provided in this case by Paco Pumps (Brookshire, Texas). The combination of the lower rpm pump/motor with the larger plumbing results in significantly increased up-front costs, but these systems have the advantage of operating in near silence. Indeed, when the pumps are running, you can stand right next to them and have a comfortable conversation and in fact need to place your hand on the units to make sure they're running.

The above-grade setting also influenced our approach to chemical treatment. Normally, we would specify chlorine feeders and sodium hypochlorite for sanitization in pools of this size. The owners, however, did not want large quantities of chlorine moving to the equipment rooms, so instead we installed saltwater chlorination systems from ChlorKing (Norcross, Ga.)

Typically, commercial pools don't use saltwater chlorination because health departments are either unfamiliar with the technology or simply haven't embraced its benefits. True to form, local officials initially balked at the idea, but with a great deal of careful cajoling, educating and negotiating, we were able to secure approval.

For pH control, we use carbon dioxide instead of muriatic acid – again to avoid transporting hazardous chemicals through the building. My original idea was to piggyback our feed lines onto the carbon dioxide system used by the building's bars and restaurants, but we were unable to make it happen.

Perched on the twenty-sixth floor and commanding outstanding, long-distance views of the city, the upper pool and spa serve as social centers for residents of the high-rise condominium complex.


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The watershapes may be simple in form, but they come with nice details – including the elegantly sweeping rails, the stone grates for the perimeter-overflow systems and the use of depth markers and warning signs that align with the aesthetics of the setting about as well as they can.

ADEPT ADAPTATION

In most pools of this size, we'd also typically select high-rate sand filters and set up automatic backwash cycles. In this case, however, there was nowhere to route the backwash effluent at an adequate flow rate. To solve this problem, we went with banks of oversized cartridge filters from Pentair Water Pool & Spa (Sanford, N.C.), providing large mop sinks in each equipment room to allow for cleaning the cartridges.

One area in which we were able to spin off the building's system was in heating the pools. We worked closely with the mechanical contractor, Murray Co. of Rancho Dominguez, Calif., to set up heat exchangers that would transfer waste heat generated by the building's heating, ventilation and air-conditioning system. This saved us having to install conventional pool heaters that would have required venting (and additional space).

As for the pool itself, if there's one way in which above-grade installations are generally easier it's in setting up their gutter systems. At L.A. Live, both pools use systems of grated, pre-cast concrete gutters and full-perimeter overflows. Designing and installing these systems was facilitated by the fact that the deck itself is a raised set of pavers. As a result, the gutters, which are sized to accept the full surge capacity, are integrated with

FROM THE BOTTOM UP

At the client's insistence, the above-grade pools described in the accompanying text were made using shotcrete.

An obvious question I raised early in the project had to do with how we were going to get the shotcrete up to the twenty-sixth floor, where one of the watershapes was to be located. (The other was to be on the fourth floor, so I knew a standard shotcrete rig would do the trick.)

The answer was swift and easy: The project managers from Webcor (the general contractor) assured me that they could pump it up there, no problem. And they weren't kidding.

Before we shot the pool, Webcor installed a six-inch standpipe from ground level up to the twenty-sixth floor. When the time came, they attached it to one of the biggest pumping rigs I've ever seen. This rig lifted the material vertically to the right level, at which point it was attached to a long hose that reached across the broad deck to the pool's location.

To make this work, Webcor wanted the material to be extremely viscous to ease pumping, so the concrete mix was extremely rich. That was fine by us, as we were happy to increase the concrete's compressive strength to help prevent leaks.

When the shoot was done, Webcor's crew simply disconnected the hose and capped the pipe on both ends, leaving it in place and full of shotcrete. Now that standpipe is a permanent part of L.A. Live's high-rise structure.

– W.N.R.

Continued on page 25

deck systems that effectively act as massive surge tanks.

Naturally, nothing we did on site happened in a vacuum. Throughout the process, we worked directly with various team members to resolve a wide range of issues. One of these, for example, had to do with the fact that, as originally designed, the twenty-sixth-floor pool was sharing space with a structural beam – which, of course, would be impossible.

In short order, we had to narrow the dimensions of the entire pool and resubmit the plans to the building department – just one example of our wonderful collaboration with structural engineer Eric Brown of John A. Martin & Associates (Los Angeles). We also kept in constant contact with Gensler's project principal, Warwick Wicksman, as well as numerous members of Webcor's various crews.

The level of professionalism that surfaces in projects of this scale and profile is hard to find on smaller jobs, and it's both refreshing and challenging to rise to the task and make certain we play our part in keeping things moving.

Now that L.A. Live is complete, it's also extremely satisfying to know that we've engineered the watershapes for a building that's already made a huge impression on its city.

Serving the needs of hotel guests, the watershapes on the fourth floor are larger than those on the upper level but serve the same sort of social purpose as retreats from the noise and traffic of the city below.

Casting Nature

Decorative-concrete artist Tommy T. Cook has built a reputation for being able to create almost anything from concrete using an array of highly refined and boldly artful processes. In this feature, he demonstrates a portion of that skill by describing how he uses the gargantuan Gunnera plant to craft watershapes in which replicas of the plant's outsized leaves serve as uniquely natural fountain basins and spillways.

By Tommy T. Cook

Ask anyone who's tried and it's almost certain you'll hear that replicating nature isn't easy. That hasn't stopped artists throughout history from *trying*, however, or from making natural forms an influential source of artistic imagination and ambition.

The great thing about using nature for inspiration is that it's all around us and all we need to do to draw on it is open our eyes, make good choices and decide how what we see can be used in our creative endeavors.

In my case, I'd worked in decorative concrete for a long time before nature crawled under my skin. It began when my friend Laurie Smith, a talented artist and sculptor, challenged me to look more closely at the world around me. It was easy for her to say, because she grew up in an area near Seattle that is rich in natural beauty and her own inspiring work clearly reflects the influence of her surroundings – but it took me a while.

I'd always loved nature, but I hadn't taken it seriously with respect to artistic inspiration because of my medium of choice. Indeed, my specialty then as now is architectural features such as countertops and fireplace surrounds. But with Smith's inspiration, I'm now constantly engaged in the careful study of my surroundings on every scale possible, from the grandeur of mountains and valleys to the finest details of plant and animal life.

As I travel the country practicing and teaching the ins and outs of working in decorative concrete, I find that my work is more connected to nature than ever before, that my life has improved in ways I can't easily express and my clients are responding to what I do in ways I never thought possible. It's been a good ride.

PERFECT FIT

One of the great things about working in decorative concrete is that almost anything can be used as a mold, from natural objects to just about anything you might find in a thrift store. If you can pour concrete into and then pull it out of any given object, you can use the result to create art – so much so that I now see it as an almost limitless medium for artistic expression.

I'm obviously not the first person to see concrete's potential as an artistic medium. For years, craftspeople have been taking molds of rock outcroppings and trees and transferring these "natural" forms to residential and commercial settings, often on grand scales. Personally, I've never worked in artificial rock: My projects tend to be more intimate, so I end up using maple leaves to shape soap dishes, for example, or make countertops that look like sections of natural stone.

One of my favorite inspirations (one that will be the focus of the rest of this discussion and an idea that came directly from Laurie Smith) represents a perfect introduction to my technical approach and demonstrates just how natural forms can be repurposed as art pieces.

In this case, the result is an unusual fountain.

Smith grew up in an area near Seattle where her father worked in the parks and recreation service. As a result, she spent her life in steady contact with the natural settings that became the primary inspiration for her art. After we'd worked together for a while, she introduced me to the Gunnera plant, a member of the rhubarb family and one of her favorite subjects.

Indigenous to South America, the Gunnera grows well in moist, temperate environments and thrives in Seattle's climate. I was immediately impressed by its huge leaves, which can grow to be up to 12 feet across, have fascinating textures and seemed to me to be the perfect subject for molding into concrete replicas.

In the course of my career, I'd often made structures that used water as a decorative element, including an array of traditional fountains, waterwalls, runnels and more. Smith was already using smaller Gunnera plants as living basins and spillways, and we began taking about using my knowledge of concrete to replicate much larger leaves. Seattle is graced with lots of driftwood, and I saw it as a complementary way to lend support to the large, naturalistic compositions we were envisioning.

Once I worked my way through some interesting technical challenges, we were on our way.

SAND CASTING

The approach we used to capture Gunnera leaves in concrete stands as a great example of what can be done with decorative concrete through simple, time-tested techniques – in this case, sand casting.

Once we select the leaf for size and shape, we sculpt a pile of sand to the approximate contours we want with respect to the depth of the basin and the elevations of the spillways, then place the leaf atop it, face down. We then encase the leaf in glass-fiber reinforced concrete.

Once the concrete sets, we pull the casting off the sand base, carrying the leaf with it. Once the leaf has dried up, we peel and blast it away, then begin the process of finishing the raw surface to the desired colors and appearance. It's our preference to make the leaves look as natural as possible, but that's ultimately the client's call.

The first step, of course, is selecting leaves for the desired fountain effect. If I'm making a large, multi-tiered fountain, for example, I'll select leaves in graduated sizes while visualizing how they'll work and fit together. Obviously, this part of the process isn't an exact science: Mainly what I'm after are leaves with structures that give me the basic shapes and internal features I need.

Early on, I learned that freshness definitely counts: From the time I remove a leaf from a plant, I have about 24 hours to use it as a mold before it dries out and becomes brittle and impossible to use. (It's possible to soak the leaves in water and keep them moist, but there are limits to what can be done to extend the working time.)

The sculpting process begins with a big pile of sand that will serve as the mold's backing. We keep the sand slightly damp so it will hold its shape, then start by carving it into the rough shape of the leaf we want to replicate. In some spots, we'll work with specific contours and edges, perhaps slightly adjusting a line here or there, curling this edge or that to hold water, or flattening certain areas to form spillways.

When I'm satisfied with the result, we'll lay the leaf upside down onto the sand and pour the concrete directly onto the leaf. After allowing it to dry for several days – until the concrete is firm and the leaf completely dried – we will flip the cast leaf and use compressed air to blow away the dead natural leaf.

This presents us with a one-of-a-kind, single-use casting. Yes, we could make a rubber mold off of it and mass-produce leaves in concrete, but my clients have always seen uniqueness as a key value, so we use the castings only once.

Note that we make our Gunnera castings off the *backs* of the leaves rather than the fronts: Even though the cast surface will be *presented* as the front, we flip the leaves because their undersides have more dramatic detailing than their tops. In particular, we use the pronounced ridges on the leaves' undersides to add definition to the final product, although we ultimately work these surfaces in such a way that perhaps only a botanist would be able to perceive what we've done.

In most cases, we simply smooth the undersides and leave them unfinished, knowing they'll never be seen anyway. But in cases where there will be double-sided visual exposure, we'll use pieces of smaller leaves to make impressions and lend texture to their other sides.

CONCRETE PROGRESS

As mentioned above, all of this became fairly systematic once I had figured everything out – but that wasn't the situation when I made my first leaves and fountains.

At first, I used traditional decorative-concrete techniques and worked with a classic seven-sack mix: 70 percent sand, 30 per-

Down the Road

I'm among those in the concrete industry who have come to believe that glass-fiber-reinforced concrete will eventually replace steel-reinforced concrete in many applications.

That may seem a radical idea, but ongoing research backs me up and I've spoken with enough experts to become convinced (along with many colleagues) that the days of using steel in decorative concrete are numbered. And I am told this is true even in some purely structural applications – something to watch with interest as the future unfolds.

– T.T.C.

cent gravel and a 94-pound bag of Portland cement. This was applied over a sheet of six-by-six welded wire, so by the time we were through, the leaves had to be about two inches thick to support their own weight.

This was clearly not the best solution, as it took a crew of seven or eight burly gents (in my case, bikers from my motorcycle club) to lift a single large leaf. Even worse was that the heavy leaves required the use of stronger and more visually intrusive structural supports within the fountains, making it virtually impossible to achieve natural-looking results.

I've long since converted all of my work to glass-fiber-reinforced concrete (GFRC), a material in which specially designed glass fibers replace gravel as the primary aggregate. The beauty of GFRC is that, properly applied, it is several times stronger than standard concrete, requires no steel reinforcement and can have significantly thinner profiles – in this case producing leaves that are no more than three-quarters of an inch thick. This has been a huge step in the right direction.

With the casting method settled and systematic, we've been able to focus much more attention on finishes and detailing and on making the leaves' surfaces look as natural as possible. In fact, it's our goal to have people walk up to these fountains and be surprised to discover they're made of concrete. This alone is one of the best rewards I can receive in presenting my artwork.

Of course, we also accommodate clients with different desires. Some, for example, want the leaves to stay in their gray concrete color or prefer a look in which we select a color we integrate with the concrete mix and include no additional coloring or detailing beyond that. We'll never argue the point, because we appreciate the fact that sometimes it's enough just to give the impression of the leaves and let these compositions stand on their own as pure artistic exercises. Moreover, as artists, we sometimes need to step back

These compositions can take on any number of forms, partly because we make no reusable molds and each casting is one of a kind, but also because we can arrange leaves of different sizes in simple structures with just a few levels or create grander cascades with multiple tiers and water paths.

and give clients what they want, even if we might want something else.

Personally, I don't think these unaltered pieces pop as much visually as their fully detailed counterparts, so we always prefer to go as far as we can to infuse them with a natural appearance.

We use acid stains as coloring agents. I love this material because the interactions of the hydrochloric acid, heavy metals and free lime in the concrete bring subtle variations and visual texturing to the surface. And that's true even when the stain is sprayed on in a heavy, mass application.

What it ultimately boils down to is countless hours spent with tiny artists' brushes, painting veins and adding darker colors where the leaves contain more chlorophyll and then feathering that green out into the broader flesh of the leaf. We might use only two or three shades of green, but with meticulous care, the subtle variations come close to what is seen in nature.

Practice makes perfect, but this is invariably hard, painstaking work that offers no shortcuts. We've spent years getting good at it, and in addition to steady hands and keen eyes, we've found you need an almost maniacal commitment to expressing the finest details.

UNIQUE ASSEMBLIES

Using our one-off approach, every leaf we make is as unique as the client who wants this sort of fountain and the places in which they ask us to place them. So we start fresh every time, using various combinations of leaves in overlapping configurations to create our gentle cascades.

As noted above, we use driftwood as structural supports, doing all we can to make the impression that the leaves have actually sprouted from these trunks. To make this impression work, we go to great lengths in sourcing and selecting just the right burls or stumps to act as yet another aesthetic element of these compositions.

Through the years, we've run into a couple of clients who just want the leaves, saying they have the desire, skill and nerve required to assemble their own fountains. As we see it, this is utterly wonderful: Simply by making these amazing leaves available in a permanent form, we're inspiring these clients' artistic, creative impulses and giving them an opportunity to explore these forms the way we have.

Not bad for a bit of sand casting – and a true hallmark of the (largely untapped) expressive ability of decorative concrete!

A Hit on the High Seas

One of the most unusual watershape systems ever built, the AquaTheater on the recently launched Oasis of the Seas is the first theatrical waterfeature ever installed on a cruise ship. In this special two-in-one article, Fluidity's James Garland and Tom Yankelitis begin with a description of the ideas and the design process that led to creation of this shipboard super-fountain, then Crystal Fountains' Ritesh Khetia discusses the engineering and systems-integration solutions that make it all work.

Part 1: Setting the Course

By James Garland & Tom Yankelitis

Theatrical vitality has to do with structuring stories and creating dramatic narratives that establish sensations of expectation, surprise and reward. It also involves the development of sympathetic, interesting characters as well as engagement in "the moment" – the feeling that a special and wonderful entertainment experience is unfolding before the audience in a specific time and place.

Mastering all of that is a tall order under ordinary circumstances, so you can imagine how we felt in trying to help make it happen on the exposed, unpredictable stern deck of Oasis of the Seas – a prestigious ship that currently claims the title of world's largest cruise liner.

Fluidity – a Los Angeles-based water design studio – pursues unique, progressive projects for an international clientele that includes architects, landscape architects, civic institutions and real estate developers. Through the years, we'd had considerable experience with theatrical waterfeatures, but none of us in the company had ever even been on a cruise ship before, so we could only guess at the difficulties the project would entail.

We were initially contacted by Wilson Butler Architects, a

Boston firm with long experience in theater design, about working with its client, Royal Caribbean International (Miami), and the shipbuilder, STX Europe (Oslo, Norway), to define some of the ship's architectural features. Wilson Butler had worked on previous Royal Caribbean projects and, given their theatrical inclination, were positioned to propose a concept as radical as the AquaTheater and still be taken seriously.

For our part, however, we were pretty leery of what we saw in the rough sketches. Even though the drawings were seductive and Scott Butler is a particularly persuasive individual, it was immediately obvious to us that they had set aside real problems in water action until a specialist consultant became involved. What we saw was, well, *optimistic*.

Diving In

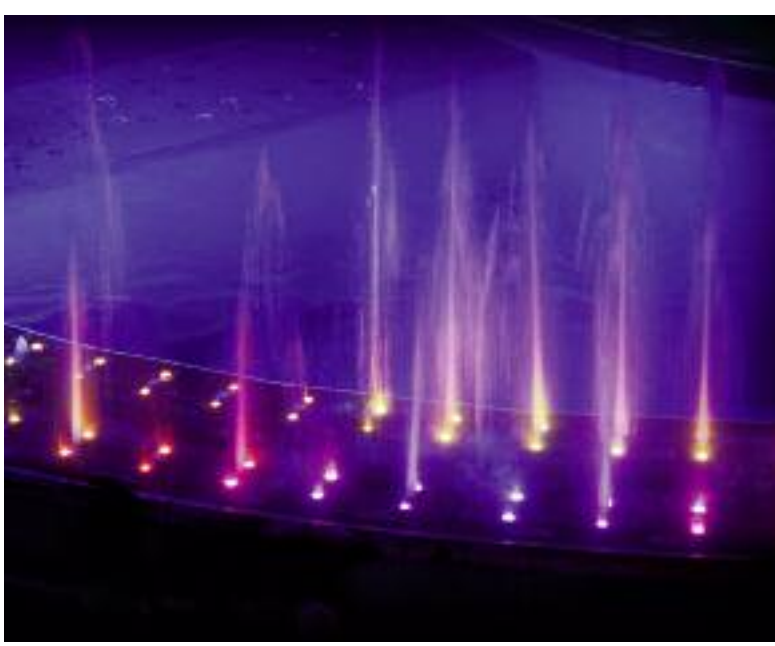
So, with due respect, we turned the job down, the thought being that the project was unrealistic and would only get us in trouble while unfairly raising everyone else's expectations. But Scott Butler declared that the AquaTheater would be built – with or without us – and kept pressing us to participate. This was flattering, of course, but only after much hesitation did we finally decide to sign on.

The space dedicated to the AquaTheater and its fountain displays is truly spectacular, but its exposed position on the stern deck of a huge oceangoing vessel presented the project team with an enormous array of technical issues, concerns and challenges in design, execution and operation.

Looking back, we can hardly believe we might have missed this experience!

We immediately started our research, learning quickly that Oasis of the Seas had been conceived to set new industry standards for over-the-top fun, luxury and sheer size. With 225,000 tons of displacement, 16 decks, 2,700 staterooms, space enough for 5,400 guests and amenities of every imaginable kind, the ship is indeed a grand and complete oceanic resort.

Fresh entertainment, we found, is a crucial ingredient to anyone's success in the



cruise business and results in competition within the industry that steadily drives product development. Although the AquaTheater was an unexpected twist, it seemed an obvious choice for exploration given the popularity of land-based aquatic theatricals. It would definitely be costly, but if the shows were good, it would increase the notoriety and popularity of the new ship and help position it far ahead of the crowd.

As we moved forward, we had lots of ideas about how to get the most out of the waterfeatures and the show concept. We were aided in this by a charmingly useful scale model Wilson Butler had built, with amphitheater-style rows of seats curved around the water stage, terrific sight lines and the ship's white nautical architecture as a backdrop. And it all faced a stupendous ocean panorama.

We came aboard in 2006, at which time the ship's construction was at the keel. We visited the shipyard to gain an understanding of how such massive structures are built and evaluate how their processes might affect ours. We were fascinated to learn how modular the construction process was: Complete steel sections are welded one against another with all interrelated components *perfectly* aligned – structure, plumbing, conduits, decks, bulkheads and everything else lined up and welded tight. The margin for error is preternaturally slim, with little if any allowance for improvisation.

It was later resolved that large portions of the waterfeature systems would be built into one of the stern's below-deck modules, while the smaller, delicate components would be retrofitted up on deck after the ship had taken form.

Into the Deep

All of this was interesting, but as we moved forward we had to confront and work our way through a very long list of practicalities.

We learned, for example, all about what happens to their swimming pools when ships pitch from side to side and roll front to back – basically producing a great deal of sloshing over the coping. We examined how others had addressed this issue, found some solutions we liked more than others and decided there was definitely some room for improvement.

This led us to lots of late-night "thought experiment" sessions in which we speculated about certain dynamic conditions and how things might pan out. Safety was always a concern: Performers had to be protected from racks of display equipment, for example, and the basin had to be designed in such a way that when the watershape was being used by day as a swimming pool, there wouldn't be the slightest concern for hurting the passengers – or about them somehow damaging the display equipment.

In due time, all of this steady thinking about shipboard breezes, wind wakes, rolling pools and the like put us in a position where we could use well-established fountain technologies in association with special design details and, ultimately, advance our design process with some confidence.

As noted just above, one of the requirements for the AquaTheater was that it should accommodate recreational swimming (and scuba-diving classes) during the day, later becoming a richly animated fountain capable of water or water-and-music presentations. Then there were to be show times, when the watershape would transform into a theatrical stage for mixed-media shows: This was to be a big shipboard event on most nights and was to include a troupe of professional acrobats and divers interacting with the water, lighting, music and narration.

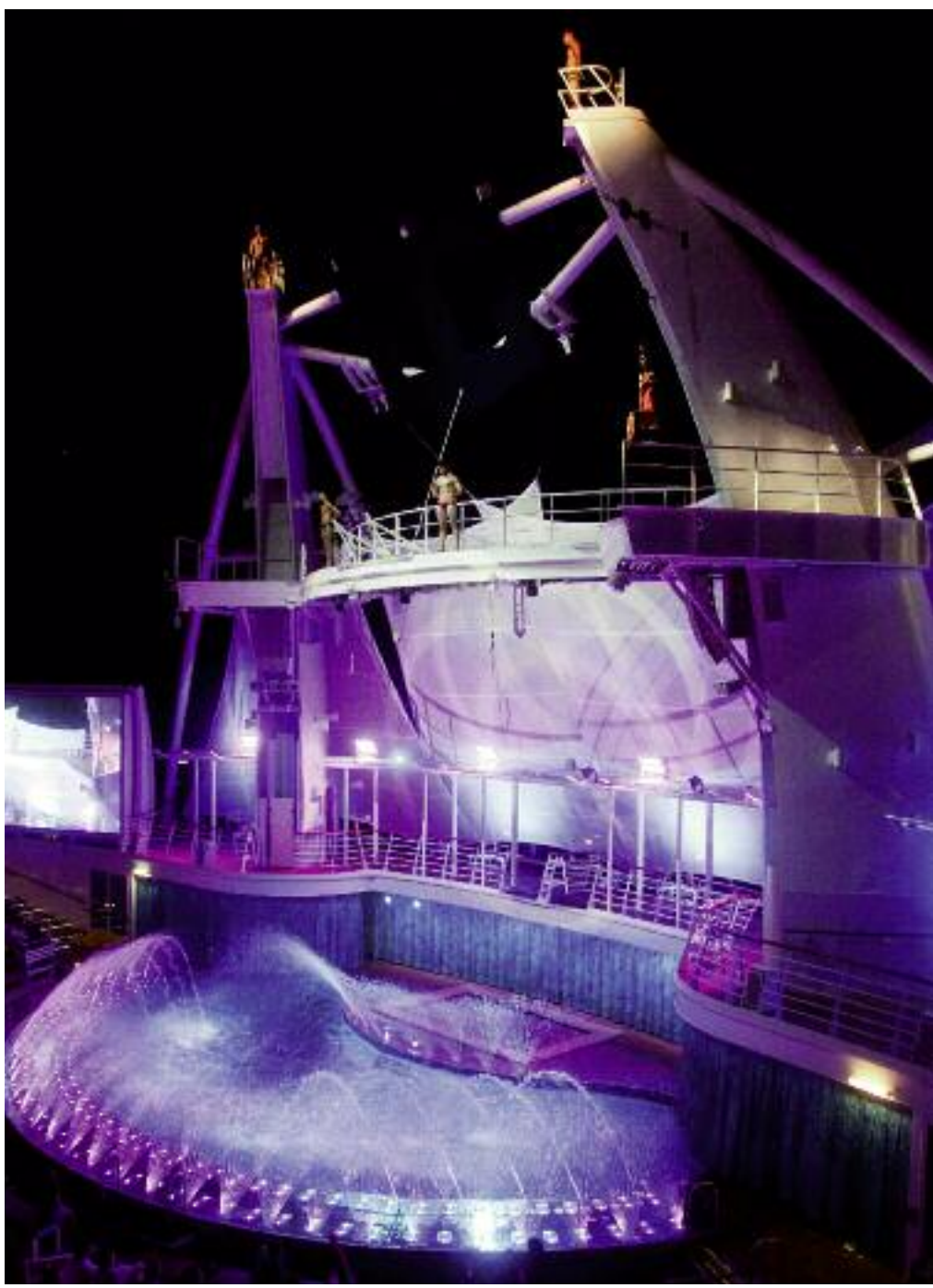
Part of laying out the design involved listing what items we could rely on and then figuring out how to make the most of those elements. This profoundly influenced us, because much of what we take for granted in land-based displays (horizontality, the direction of gravity, still water bodies, prevailing winds)

Our exploration of the physical performance of water under shipboard conditions led us to a number of conclusions about the kinds of water effects we could use and what had to be done to make these systems approximate what could be achieved in a terrestrial display fountain.

would be different aboard ship. At the same time, we knew that pumps would work, variable-speed drives would still be flexible, pipes and wires would still be functional – and we began to recognize that thick streams with low head pressures would perform better than other kinds of jets.

Testing anything was out of the question, of course, as there was no way we could build a realistic mockup short of getting someone to lend us a flight simulator's motion-control platform. So we engaged in a constant, intellectually thrilling sequence of thought processes that took what we knew about water, physics and theatrical presentation down to first principles and gradually enabled us to build all-new systems from the ground up.

We could predict, for instance, that winds would be a significant problem for rain screens, mist systems and geysers. We also knew that forgiving splash zones would need to be arranged, including some amphitheater seating that would be designated as "you'll get wet" areas. And we recognized that grouped geyser arrays and wind-resistant arcs of water would work, although they'd need special programming to fill the programs with visual energy.



Sea legs

We also knew that, no matter what we did, rocking ship motions would slosh water out of the pool and onto the decks. Any water that escaped and flowed across the deck had to be considered as contaminated and lost as a result of the special health codes applied to passenger ships. A whole line of thought experiments went into ac-

commodating these motions and minimizing water loss.

In some cases, we were able to dismiss concerns as negligible. Coriolis effects from ship's maneuvers, for example, could be ignored as an issue because the ship's turning radius was so broad. Similarly, acceleration was unlikely to be a problem because the ship's mass was so great that reactions to changes would be comparatively slow.

But other issues required ingenuity. Some wave action, for instance, could be contained by breaks and baffles if the turbulence was not too great. If the seas were too rough for those systems to be effective, we recognized that we could raise the center theatrical lift and effectively divide the pool in two, thereby reducing slosh volume and height.

Still other issues were insoluble, including backdraft gusts from winds that flowed along the side of the ship and whirled about the stern before dissipating: We knew that these unpredictable gusts would likely increase splash and scatter it over larger swaths of the seating areas.

As we worked our way through these exercises, we noted that increases in mass and reductions in energy of the water displays could compensate for momentary wind abrasion and the ship's motion to some degree. We also recognized that there could be no weirs as such – but that waterfall or cascade patterns could be effectively simulated with controlled-spread manifolds.

All of these water-action limitations also had to inform the theatrical scripts and effects, including the lighting. Light beams could not be too narrow, for example, or they might miss their targets. As a result, wattages had to increase to make up for lost focal strength, leading to use of more lighting fixtures and to greater maintenance and energy costs. And all of this meant that baffles would be needed for the fixtures to shield the audience from glare generated by the wider lens apertures.

We were working within a theatrical environment with all of the lighting gear required for live performance, so there was a lot going on and we were able to repurpose some of the fixtures to serve the water displays. All of these functional issues had to be considered individually and in combination – a complicated, intricate process but one that seemed more feasible the further we worked on the project and made allowance for numerous operational caveats and fallbacks.

By the time the design was complete,

All through our design process, we had to be aware that, while the AquaTheater was in some sense a large display fountain, it was also a theatrical setting in which performers would interact with the water with thrilling acrobatic and aquatic skill. We also had to keep the audience in mind, which is why we recommended designating seats near the water as 'splash zones' that are generally well occupied – sometimes eagerly.

more than 200 individually controlled streams had been planned for the watershape's event and motion effects. These displays were all coordinated with lighting arrays, and everything was conceived and designed specifically for the shipboard context.

Integrated into the stage's large-format, 80-foot proscenium (along with an arsenal of theatrical gear) are ten- and 18-meter fixed diving platforms and a three-meter diving board. Beneath the pool's surface are three more platforms – underwater elevators that rise and descend in smooth, silent mechanical action as needed for the performances.

The Working Team

In pulling everything together on the technical side, we worked exclusively with Crystal Fountains (Toronto). It was our belief that the level of coordination required for success of a project this complicated would be more in reach if Royal Caribbean engaged them as a single, full-service supplier.

It proved to be a wise course: We developed a detailed conceptual design and, when the time came, passed it along to Crystal Fountains, which coordinated with all the various teams to ensure efficient installation and commissioning efforts.

As our involvement came to an end and we prepared to pass the baton, we participated in a sequence of coordination meetings with Crystal Fountains and STX Europe and came away with a strong sense that all would be well. We stayed in touch as the installation moved along and offered periodic suggestions, but we were confident that our colleagues shared our vision and would do a splendid job – and that both Royal Caribbean and Wilson Butler would be pleased with the results.

We learn something on every project – which certainly happened here – and feel well prepared to tackle similarly outsized challenges in the future. For now, however, it's tremendously rewarding to know we played a valuable supporting role in the creation of one of the world's most unusual watershapes as well as one of the most spectacular theatrical settings ever built.

Part 2: Taking the Journey

By Ritesh Khetia

We were contacted about the Oasis of the Seas project in March 2007, when the team at Fluidity, the Los Angeles-based consultancy, called to see if we were interested in working with them on a huge theatrical watershape on the world's largest cruise ship.

You don't get calls like that every day, and suffice it to say our interest was piqued.

By that point, they had developed a fairly detailed concept plan and were ready to move into the system-development phase. We stepped in not only as equipment supplier for the fountain systems, but also as electrical and mechanical designers. Although the technical details were still in the works, the combined project team had already agreed on the overall system scope and what its primary functions would be.

It all started as a CAD drawing of a large, kidney-shaped pool with some locations indicated for primary system components and the number and types of water effects they wanted – together with some notes on the placement of the vertical jets and their approximate heights as well as on what they called "fan jets," which later would be known as "finger jets."

It began us on our path, but plainly there were lots of dots to connect in giving it all substance.

Fresh Adventures

Any project of this scope is an educational process for everyone involved, from the architects and shipbuilders to the owners and all of the consultants and suppliers.

In our case, for example, we at Crystal Fountains had never done a project that involved live performers. We've done musical waterfeatures that put on shows and saw some commonalities, but by and large this was unfamiliar ground with respect to performance characteristics – and topping it off, we'd never worked on systems for a cruise ship!

The first thing we had to do was figure out which of our existing products would fit the design criteria and then decide which effects we could create using modified components and which we'd have to develop from scratch.

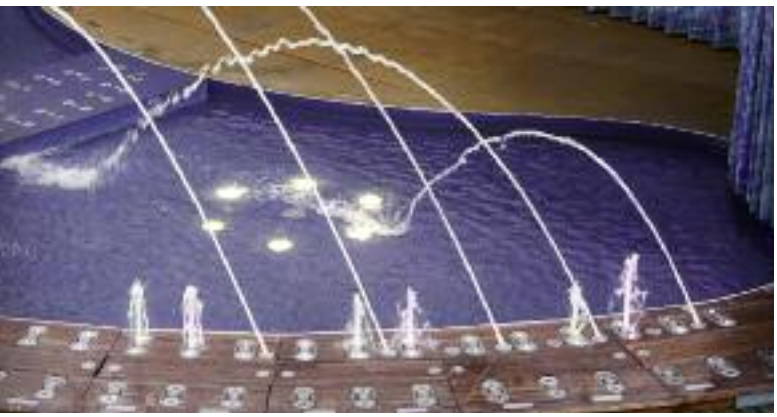
On the shelf, for example, we had the right kind of vertical sequencing jets and a geyser system, but we had nothing on hand that would serve as the arcing jets they wanted – nor did we have the finger jets or a rain curtain for video imaging. They also wanted another look we didn't have on hand: a bubbling effect that would make the entire pool look like a boiling cauldron.

We soon recognized that about 80 percent of what would be going into the system would be brand new and that even the stock items we had would all have to be modified to some extent. In some cases, the modifications had to do with using different materials – that is, marine-grade stainless steel and bronze instead of our usual metals – because part of the design scope was about creating systems that would function in either chlorinated or saltwater environments.

In several cases, we had to consider placement as well, figuring out ways to flush-mount equipment in the decks or on the lift systems that we didn't ordinarily use that way. Indeed, everything on the project had to be toe and finger friendly, with no holes big enough to entrap performers. This meant that there could be no apertures of more than a half-inch in diameter.

As for the abovementioned finger jets, Fluidity had called for a solid sheet of water in a fan shape. That was not possible given the half-inch aperture limit, so we had to compile the effect from a number of individual streams using jets we had in our catalog. But we had never intended those jets to be either programmable or interactive, so we had to integrate them with our existing ChoreoSwitch technology and organize them in a fan pattern.

Here again, we had never intended



In developing the nozzles and spray systems for the AquaTheater, we soon recognized that almost everything would be brand new. A primary driver here was the fact that, because performers (and bathers) would be moving across the deck surfaces, no aperture could be larger than a half inch in diameter. So instead of using off-the-shelf fan jets or geysers, for example, we had to assemble arrays of small jets to replicate the effects.

these jets for flush-mounting, and making them so took a surprising amount of engineering and system development.

Throughout this period, we were in constant contact with the architects at Wilson Butler. On a number of occasions they, along with representatives from Royal Caribbean International and the shipbuilders at STX Europe traveled to Toronto to visit our test facility for numerous product and system demonstrations.

On Board

In the traditional process of developing water effects, the process breaks into a creative stage followed by a design/development process, component production, installation and commissioning.

In this case, however, the fact that we were interfacing with the shipbuilding process threw this flow out of sequence. Normally, for example, once we develop and select all of the components, it's time to design an appropriate control system. Instead, this time we had to develop the control systems first, which required an amazing amount of educated guesswork.

The reason for this shift had to do with the fact that ships are built from the bottom up and the control systems had to be installed in a module three decks below the theater space. That meant we had to deliver our control systems in July 2008, almost a full year before we were scheduled to complete the component packages. To say this put a strain on our

usual way of doing things would be putting it mildly.

It wasn't as though we had much room to maneuver: Not only did we have to coordinate with the shipbuilder on scheduling control installation, we also had to anticipate and specify in advance the full extent of the electrical service we'd need as well as such details as temperature control factors.

To be sure, programming sequenced fountains was nothing new to us and we could see our way through much of this challenge with relative ease. But what made things interesting was anticipating the requirements for controls that would also be used in programming for live performance – something we hadn't done before.

The main detail we had to accommodate here is that control can't be completely automated. With sequenced fountains, it's a matter of setting up various programs and selecting one or another with the push of a button. Given the human element, however, there was a need to interface our control equipment three decks below with a show-control booth overlooking the theater, thereby giving topside technicians the ability to adjust things on the fly to accommodate the needs of a given performance.

Although we had been thinking about equipment from the start, we even had to alter our normal process when it came to selecting pumps. We wanted the system to have maximum performance flexibility, so we specified variable-frequency-drive pumps and calculated what we'd need with respect to horsepower to drive various effects.

We did not go beyond that to specify anything by make or model, nor could we get specific with locations and plumbing configurations: We had to turn all of that over to the shipbuilder as performance specifications and leave it to them to deliver the specified flow rates to the indicated components.

The fact that we were in constant contact with the entire project team as all of this unfolded was obviously important on every level.

Smooth Sailing

Communication was, in fact, the key to this project's success. Shipbuilding at this level is an incredibly precise and disciplined process, and by staying on the same page with all of our colleagues, we managed to avoid any significant problems as various phases came together. With only very minor exceptions, in fact, everything worked out as planned.

It is certain that those of us who worked aboard the ship could not have accomplished as much as we did without amazing support from our coworkers in Toronto. This was not an easy project by anyone's definition, and the fact that we were all working as a corporate unit made all of us responsive and helped us develop a whole suite of new approaches and technologies in remarkably rapid order.

What's so fun about this type of work is that, for all of the technical discipline required from concept to completion, it's still a work of art in service to brilliant ideas generated by our colleagues at Fluidity and Wilson Butler. Also, knowing that we played a part in creating something totally new that will be enjoyed by huge numbers of vacationers for years to come is hugely satisfying.

By the way, an exact replica of the Oasis of the Seas called Allure of the Seas is currently under construction in Turku, Finland. This sister ship includes another AquaTheater with only a few minor modifications to the fit and finish of our components – but features exciting additions with respect to programming, choreography and interactivity with the performers.

Being asked to participate in a second round of development for this sort of theatrical endeavor is about as great a compliment to what we all accomplished as any I can imagine – and will result in an exciting treat for even more vacationers on the high seas!

The grandeur of the setting, the beauty of the displays, the special nature of the challenges and the pride that comes with doing something that has never been done before all combined to make this project enormously satisfying for everyone on the project team – and makes us all look forward to doing it again!

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In the Spotlight

For live links to the companies featured here, go to **www.watershapes.com/spotlight**

Filter System

NEPTUNE-BENSON (Coventry, RI) has published an expanded brochure on its Defender filter system. Available in print and digital versions, the piece highlights the system's regenerative-media technology, which virtually eliminates water losses associated with backwashing by discharging spent media directly to waste, and offers detailed illustrations of the product's features, functions and benefits.

Variable-Speed Pump

HAYWARD POOL PRODUCTS (Elizabeth, NJ) has introduced the EcoStar variable-speed pump. Designed for unparalleled efficiency and convenience in applications including pools and spas as well as waterfalls, fountains and other waterfeatures, the devices can be programmed with up to eight custom speed settings and are compatible with a wide variety of control systems.

Decorative Glass

AMERICAN SPECIALTY GLASS (North Salt Lake, UT) has published literature on how to use its glass products. The 16-page, full-color booklet illustrates how the products are used to add color to landscapes, terrazzo finishes, countertops, aquariums, fire pits and swimming pools. It also depicts the forms in which the 100-percent recycled products are available – as nuggets, chips and jelly beans.

Portable Mixer

CS UNITEC (Norwalk, CT) has introduced the PortaMix Hippo 70F mixing station for the quick mixing and accurate placement of construction materials. Designed to boost productivity while reducing labor costs and physical effort, the system allows one person to mix, transport and pour grouts, mortars, texture coatings, sealants, adhesives and other self-leveling compounds and construction materials.

Continued on page 74

In the Spotlight

For live links to the companies featured here, go to **www.watershapes.com/spotlight**

Artificial-Rock Waterfalls

RICOROCK (Orlando, FL) has introduced the Blue Ridge Series, a line of waterfall/boulder systems that do not require mortar or coloring skills to install. Fully finished in four color patterns in sandstone or limestone, the five boulders in the series can be supplied with optional notched lips that extend far enough over a pool's edge to hide the coping without extending below the waterline.

Surface-Treatment System

AQURON (Rockwall, TX) has introduced a collection of products designed to seal and waterproof cementitious and stone surfaces in and around watershapes to stop problems related to water intrusion before they start. The system includes CPSP, a concrete pool-shell protector; MGS, a mortar and grout solution; Invisi-Shield, a stone and concrete sealer; and Invisi-Dec, an elastomeric deck coating.

Aquatic Grates

LAWSON AQUATICS (Naples, FL) offers the Drain the Deck system. Designed with a 25-percent water-flow gap for efficient drainage of surfaces around pools, spas and fountains, the modular, interlocking system is easy to install and strong enough to withstand light vehicle traffic. The product comes in ten-foot-long sections in six standard colors and can accommodate a radius as small as four feet.

Robotic Pool Cleaner

WATER TECH (East Brunswick, NJ) offers the Blue Sapphire, a robotic cleaner that cleans the average large pool in as little as two hours. The unit's rotating brushes cling to surfaces as they are cleaned, vacuumed and microfiltered and are made of polyvinyl alcohol, making them dirt-, chemical- and algae-proof. It also has a guidance system that focuses on cleaning only the dirty parts of a pool.

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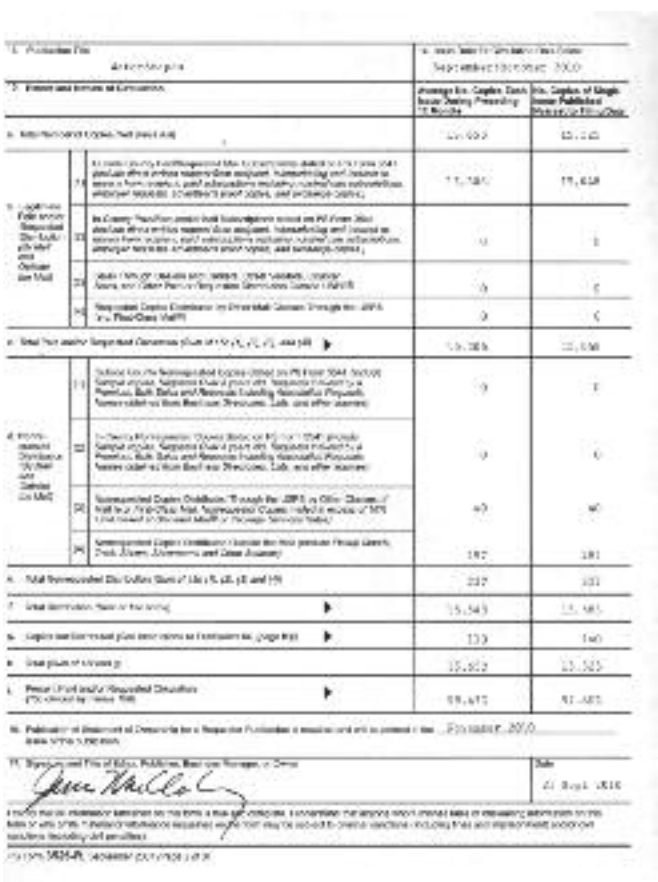

Concrete-Surfacing Catalog

BRICKFORM (Rancho Cucamonga, CA) offers literature on its architectural concrete products and materials. The 48-page, full-color brochure covers the company's line of engineered texturing products, colorants, resurfacing systems, sealers and finishing and maintenance products. It also includes information on ordering texture skins and a full range of made-to-order tools and accessories.

LED Pool Lights

PENTAIR WATER POOL & SPA (Sanford, NC) has introduced IntelliBrite 5g LED pool lights that feature five fixed colors: blue, green, magenta, white and red. Designed to consume just 45 watts (about half of what typical LED pool lights require) while producing remarkable light levels, the units can be programmed for color shows and have a lens that can be rotated to provide wide or narrow beam patterns.

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In the Spotlight

For live links to the companies featured here, go to **www.watershapes.com/spotlight**

Concrete Coating

W.R. MEADOWS (Hampshire, IL) offers Bellatrix, a concrete coating that protects concrete with its penetrating and film-forming properties. The environmentally friendly, VOC-compliant material applies easily and offers increased stain suspension and resistance against most contaminants found in poolside areas. It is ideal for use on pool decks where a clear, high-gloss concrete protection system is desired.

Rainwater Collection

ATLANTIC WATER GARDENS (Mantua, OH) has introduced the Clean Rain Ultra downspout diverter. This all-in-one rainwater filtration system collects water from downspouts, cleaning and filtering it for use in ponds, streams, gardens, pools and hot tubs. Multiple steps deflect leaves, debris and insects, and a diverter prevents contaminants in the first water coming off the roof from being collected.

Commercial Pool Heater

LOCHINVAR (Lebanon, TN) has updated the XLP Commercial Pool Heater. Already known for high efficiency and heating capacity, the device now features a smart user interface for even greater control. The system consists of a stainless steel heat source piped to a saltwater-approved cupronickel heat exchanger with a shell-and-tube design that heats the pool water indirectly for a longer service life.

Deck Renovation Coating

ARTISTIC PAVER MFG. (North Miami Beach, FL) has introduced a line of coping designed specifically for use in renovations of old, cracked decks. The product installs directly on top of the existing overpour or coping material, offering a new look without removal of the old, existing deck. It comes in 4-by-12-inch pieces with extensions of 3, 4 or 5 inches and is available in a range of colors and styles.

Know What You've Been Missing?

Since early May, we've been sending out biweekly editions of WaterShapes EXTRA!, our FREE digital newsletter, to our magazine subscribers who've provided their e-mail addresses to us.

If you're among those who have yet to sign up, you've missed insightful commentaries from Lyle Lavietes, Jeff Freeman and Dave Garton; compelling interviews with Jon Mitovich, Eric Herman and Mike Farley; and informative, Web-exclusive articles by Scott Cohen, Paolo Benedetti, Mark Holden and Dave Garton—and we're only getting started!

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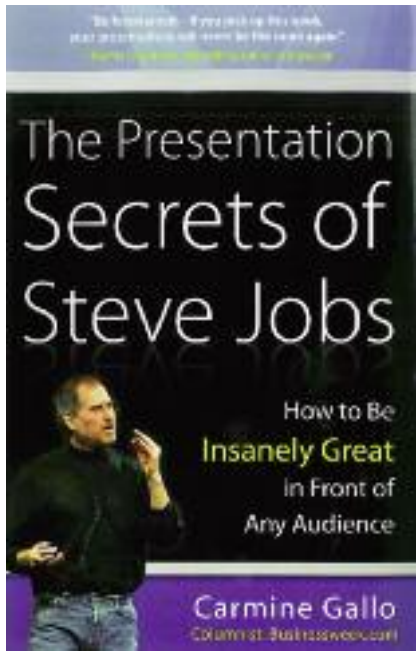
Book Notes

Presentation Secrets

By Mike Farley



You hear it all the time these days: *Now* is the time to improve all aspects of what you do for a living.

I've taken that message to heart and, in striving to upgrade all facets of my work as a watershaper, have come to a somewhat shocking realization: For all of the countless presentations I've made to clients, I've never taken a critical, disciplined look at that part of my job.

In college, of course, I was forced to make presentations about class projects, but the focus was always on the design and *not* on the presenting. Indeed, my instructors reinforced the point that it wasn't *how* you presented ideas, but instead the merits of the ideas themselves that mattered.

I've now come to believe that's not true. Yes, ideas matter a lot, but there's also great weight in the way you communicate them.

With that in mind, I recently picked up a copy of *The Presentation Secrets of Steve Jobs* by Carmine Gallo (McGraw Hill, 2010). Gallo is a columnist for *BusinessWeek.com* who was assigned to focus on Steve Jobs, the genius behind Apple Computer's iPOD, iPAD and iPHONE along with other ground-breaking inventions going back to the early 1980s. Most relevant here, Jobs is famous for the presentations he makes to introduce these products – a subject Gallo covers in helpful detail.

At first, one might ask how on earth Jobs' approach to presentations applies to watershaping. After all, his are meant for mass consumption, while ours are aimed at extremely small groups of people, namely, homeowners in the market for a pool or spa. What I discovered in reading this brilliant book is that not only is his approach relevant, it's also *transforming*.

In my work to date, for example, I've always focused on a clear, dispassionate exposition of facts – company credentials, basic design principles and heavy doses of technical stuff including structural details, equipment selection and whatever else happened to be on the table that might prompt a decision.

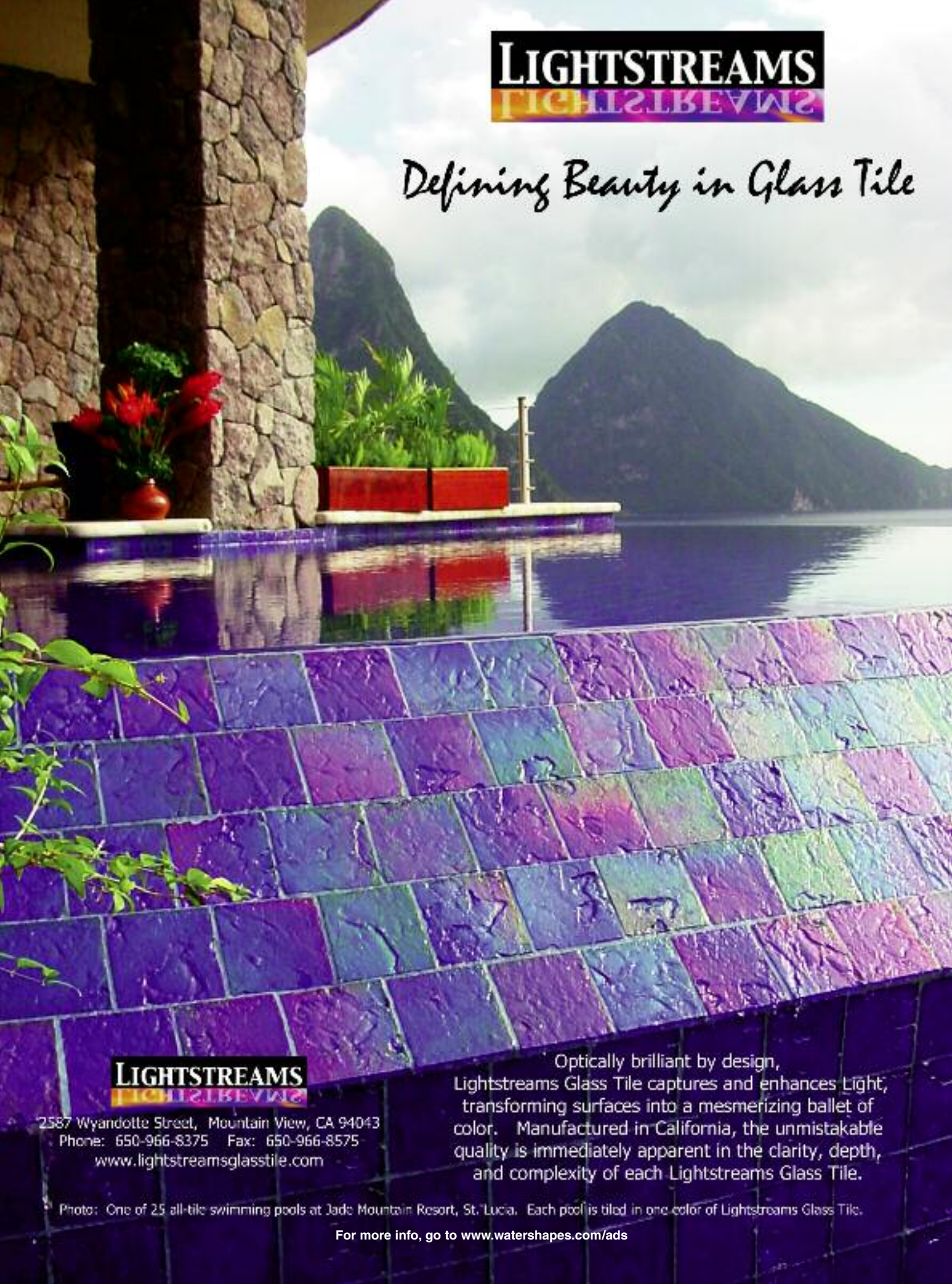
Having read Jobs' take on the process, however, I've come to see that I've been off the mark – in some cases, badly so. In contrast to what I'd been doing, he makes a compelling case for selling the impact a product has on people's lives, pointing out accurately that most will want to know how their purchasing decision will directly affect them. Translating that to watershapes, it's not about the steel schedule, but about the family experience or the memories to be generated by using our products. That's a huge shift in focus, to say the least.

Jobs advocates simplicity, brevity and clarity in presentations along with the need to convey enthusiasm and judiciously use supportive video and testimonial material. He stays away from hardcore technical information – something I've always relied on – in favor of the more subjective elements of selling. He also advises against using lists of bullet points, suggesting instead that sales presentations should be organized as three major points, with stories and interesting information used to back up each one.

Finally, he strongly recommends practicing and making videotapes you can carefully review to identify areas that need adjustment. This really knocked me on my heels: For all the presentations I've made – and as much as I know how important they are to my work and how dynamic they should be – I've never, ever rehearsed the process, nor have I ever been advised to do so by anyone in this business.

The book is filled with high-level food for thought, to the point where it struck me that courses on presentation preparation and skills should be a basic part of our education as designers. So read Gallo's book and consider what it says about your own approach to presentations. My guess is that, like me, you'll step back and want to rethink things in a big way, almost certainly for the better. WS

Mike Farley is a landscape designer with more than 20 years of experience and is currently a designer/project manager for Claffey Pools in Southlake, Texas. A graduate of Genesis 3's Level I Design School, he holds a degree in landscape architecture from Texas Tech University and has worked as a watershaper in both California and Texas.



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