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Dan Taylor's Acme Environmental Solutions is raising water-quality standards by building a vast array of modern and effective water and decentralized wastewater systems on the Caribbean island of Roatan PAGE 10

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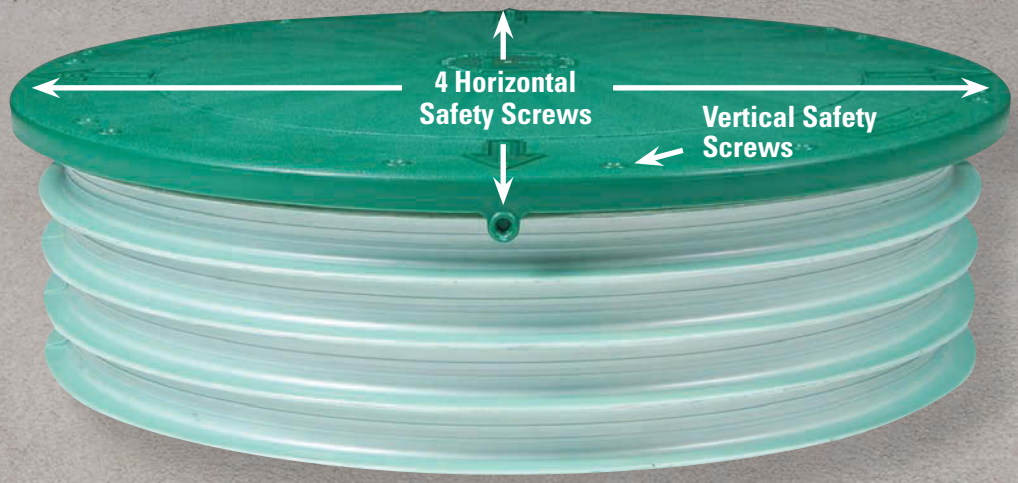

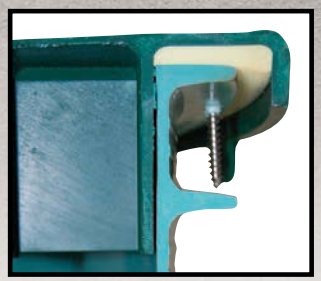

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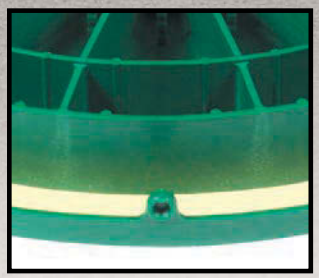

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COVER STORY

Coming Next Month: July 2014

ISSUE FOCUS: Alarms, Controls and Monitor Systems

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- Shop Talk: Better ways to track truck and equipment maintenance

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New For You

We explore onsite systems in an exotic locale, check in with a state onsite association and bring helpful equipment info in this issue

By Jim Kneiszel

I'd like to share a few thoughts and some background information on stories appearing in this issue. We've rolled out a few new features and are adding some new wrinkles that I hope you'll enjoy. As you take a look around your *Onsite Installer*, feel free to share your opinions and ideas about how we can make the magazine as relevant as possible for contractors.

Postcards from Roatan

A few years ago, I met **Dan Taylor** at the Pumper & Cleaner Environmental Expo International (now known as the Water & Wastewater Equipment, Treatment & Transport show). Owner of **Acme Environmental Solutions** on the Caribbean island of Roatan, part of Honduras, Dan is a mechanical engineer by trade. He had decided to retire to the tropical island, intent on kicking back and enjoying life. While retirement wasn't in the cards, Dan is sure enjoying himself as the wastewater authority in his new homeland.

It's no surprise that Dan's unbridled enthusiasm for the industry has led him to numerous interesting onsite installing projects on Roatan. He's come up with workable solutions to many wastewater challenges in a rugged and environmentally sensitive area. Our discussions at the Expo led to a trip to Roatan by writer **David Steinkraus**, who followed tropical tour guide Dan around the island to check out many of his jobs. You can enjoy learning more about Dan in our contractor profile in this issue, *Installing in Paradise*.

Even though your business might be located halfway across the country, what goes on in New Hampshire or any other region may show emerging industry trends that can help you.

I was happy to see Dan again at the Expo earlier this year. He said he values the trade show for education and networking opportunities, as well as a chance to meet face-to-face with onsite product vendors. He remains committed to serving his island neighbors by modernizing many water and wastewater systems, and feels a sense of satisfaction that he's helping build the future of a paradise community he loves.

I hope you enjoy the story about Dan's company. Then look for him next year at WWETT and say hello. You'll be happy you did.

Check out the equipment corner

About a year ago, we added a feature called *Machine Matters*, where we talk about an aspect of the purchase, maintenance or effective use of the tools of your installing trade. Last month, we added an alternate title for the same feature, *Shop Talk*, to reflect topics dealing more with the vehicles in your garage rather than the excavation machinery used in the field.

Whether it's maintenance schedules for your mini-excavator or how to get the most out of your pickup truck, the goal is helping you make the wisest purchase decisions, and then get the most out of your hardworking equipment. After all, having the right equipment for the job and maintaining it properly can mean the difference between small business success or failure.

This month we explore a question contractors face more and more when speccing out larger work trucks: Auto or manual transmission? Writer **Ed Wodalski** explains the features and benefits of manual, fully automatic and automated manual transmissions, then discusses typical driving conditions that will dictate your choice. Trucking experts share their opinions on transmission trends. The story is valuable for contractors who haul trailered heavy equipment or operate a vacuum truck as part of their onsite business.

What topics would you like us to explore in *Machine Matters* and *Shop Talk*? You might not have the time to research an equipment issue the way you would like. Let us help you out. Send your questions to me at editor@onsiteinstaller.com.

What's going on in your state or province?

Several months ago, we rolled out another new feature, *State of the States* (or *State of the Provinces* for Canadians), and we've enjoyed a great response from trade associations that serve the onsite industry. This month, writer **Doug Day** profiles New Hampshire's **Granite State Designers and Installers Association**, talking to outgoing chairperson **Deb Hinds**.

We learn that New Hampshire installers are busy lobbying for new regulations, working with legislators and Realtors for smart changes that improve the climate for onsite work and protect the environment. Hinds shares how the group works in concert with state pumpers and promotes industry education. Even though your business might be located halfway across the country, what goes on in New Hampshire or any other region may show emerging industry trends that can help you.

We've got a full schedule of association stories in the works. Texas and Tennessee are just a few on the horizon. If your state is currently working on

an important initiative or has some big news to announce, let me know about it and we'll schedule an interview. And while you're reviewing the States feature, take a look at our new *Associations List*, published every month, and let me know if you have an updated contact person, number or website.

Wipeout!

The decentralized wastewater industry – heck, throw in the plumbing industry and treatment plant operators as well – has been abuzz with talk about so-called "flushable" wipes. I've written about the growing popularity of wipes and what they're doing to onsite systems a few times over the past year, and the topic keeps popping up in my Google alerts. Those who build and maintain wastewater systems are growing more frustrated with product claims of flushability all the time.

In a recent blog, I talked about shopping at a warehouse store and coming upon a package of bathroom wipes that claimed to be flushable. But there were these qualifications: "Safe for well maintained sewer and septics," and "Never flush more than one wipe at a time." All along I have questioned the marketing of these products and sought out evidence from installers and pumpers that shows the claims are true. The response has been quite to the contrary.

Here's one note I received, from **Terry Broderson**, of **Broadview Septic** in Montana:

"Your article about wipes and the labeling of being flushable is right on the money. The wipes don't disintegrate … When land-applied, it makes a white mat on the ground that takes quite a while to go wherever. I land-apply and the wipes will dry up and blow away. I don't like to litter so I have to pick up the wipes and this is time- and labor-intensive. When I tell people to put the wipes in the garbage and not in the toilet, they think I'm nuts. The wording on the label should read: 'Unsafe for septic tanks as they can plug tank filter and drainfield.' Worst invention yet."

What say you? Does your field experience match Terry's? I want to hear from the system maintainers to add more professional voices to the debate over wipes.

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PROFESSIONAL CONNECTION

Membership Perks

Education. Legislative advocacy. Group discounts. All benefits of belonging to a state onsite/wastewater association, but the list doesn't end there. "It's a big community," says Belinda Rasmussen, executive secretary for O2WA. "That's what I love about associations. It's a world within a world." Another bonus? On average, association members earn $10,000 a year more than nonmembers. If that's not reason enough to join, check out some other benefits that might convince you to think otherwise. **www.onsiteinstaller.com/featured**

RULES & REGS

Onsite Contractor Handbook

Stay current on state and local onsite regulations and other newsworthy morsels with this regular online feature. This month, we give you the scoop on 21 states fighting pollution limits set by the U.S. EPA — it's a battle of federal vs. state power to regulate water quality. Don't miss any updates that could directly — and indirectly — affect your onsite business. **www.onsiteinstaller.com/featured**

OVERHEARD ONLINE

"We hear a lot of talk about water softeners always being a problem, and that's not the case. If a water softener is set at an efficient salt setting, the impact on septic systems is very limited if any at all."

— Do Water Softeners and Septic Systems Mesh? **www.onsiteinstaller.com/featured**

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Workers prepare trenches for an Infiltrator Systems drip system on Maya Key, a small island next to Roatan. The island is a tourist attraction with seals and other animals and is patronized by cruise ship passengers. (Photos by David Steinkraus)

INSTALLING *in Paradise*

Dan Taylor's Acme Environmental Solutions is raising water-quality standards by building a vast array of modern and effective water and decentralized wastewater systems on the Caribbean island of Roatan

By David Steinkraus

About a dozen years ago Dan Taylor and his wife Sam began thinking of retirement. As a civil engineer he had spent decades moving from place to place and project to project, often in Northeastern Africa and the Persian Gulf. And after years of living near the equator, this Montana native had little desire to return to a land of snow and ice.

The Taylors settled on the tropical island of Roatan, part of the Bay Islands chain in the western Caribbean, and part of Honduras, with its mainland 40 miles away. Retirement didn't quite work out to be retirement. They have some land, but their retirement home remains unbuilt. Instead, Dan Taylor is helping to build a country.

ENGINEERING EXPERTISE

The problem that set Taylor on the road to creating Acme Environmental Solutions was a lack of engineering services. He and his wife bought a piece of property with a view of the ocean and in the distance the cloud-wreathed mountains of the mainland. They intended to develop it with condos and houses, their own among them, but there was no company to do the preliminary engineering work.

So Taylor formed a company to do his own work. You can see what's coming. At each step in the project Taylor couldn't find the services he needed, so he did it himself with another company, and a few workers, and a few more workers, and then he started helping other people. Acme has

Acme Environmental Solutions, Roatan, Honduras

FOUNDER:	Dan Taylor
YEARS IN BUSINESS:	13
EMPLOYEES:	23
SERVICE AREA:	Island of Roatan, the Bay Islands and the north coast of Honduras
SERVICES:	Onsite system design, installation and operation, drinking water system design, installation and operation, septic pumping and portable sanitation
ASSOCIATIONS:	National Onsite Wastewater Recycling Association, Portable Sanitation Association International, National Association of Wastewater Technicians, Honduran Secretariat for Natural Resources and the Environment, Honduran College of Engineers
WEBSITE:	www.acme-roatan.com

LEFT: When Dan Taylor and his wife moved to Roatan, Honduras, they started a residential development that would include their own home. It remains unbuilt because his business, Acme Environmental Solutions, took off, but other people in the community can use this swimming pool. Beneath the pool deck are cisterns to catch rain runoff for reuse through reverse osmosis treatment. Beyond is the Caribbean Sea.
BELOW: Under the supervision of Eugenio Torres, in the yellow hardhat, workers from Acme Environmental Solutions install a wastewater system at a private home on the north coast of Roatan, Honduras. In the ground is a DMF-05 ATU system from Durman. Because there are few standards, some of the homes in the development have minimal treatment while those served by Acme have equipment up to the standards of the developed world.

"The long-term sustainment of the turquoise waters we enjoy is a goal we work to achieve every day ... Our permitting scheme on the island allows us to design and deliver the systems that are the best for our clients, not what some out-of-date code book tells us to do. It's really a lot of fun. You can do smart things without hindrance."

Dan Taylor

grown into the premier water and wastewater services provider on the island. Taylor has 23 key employees plus a varying number of laborers hired by the job.

Working in Central America poses a much broader set of challenges than businesses encounter in North America. But the rewards are also much greater. You can hear it in Taylor's voice and see it in his face as he drives the island, waving to acquaintances and steering clear of pedestrians, chickens and wandering dogs as he bubbles over about how his company solved one problem and the next. He does what few people have a chance to do: build completely from scratch and use the best, most responsible and most creative options for any given situation.

Because of the company's technical expertise, Acme designed, built and also runs the small activated sludge plant recently installed to clean up the near shore waters at the community of West End on the island's tourist-heavy southwestern tip. It runs the wastewater and water systems at the Carnival cruise port of Mahogany Bay, and recently completed the design and installation of drinking water, wastewater and fire suppression systems for a cruise port called Banana Coast, located on the Honduran mainland. Acme also runs the desalination plant that supplements the water supply for the island community of Coxen Hole. The company has designed, built or been involved in nearly all the plants at resorts throughout the island.

Taylor has a couple of vacuum trucks and does some wastewater pumping, but the largest portion of his business has become the Engineering/Projects Division led by engineer Samuel Rivera.

SETTING THE STANDARD

Although Roatan has a strong tourist industry and a population of 60,000 to 100,000 (firm numbers are hard to come by), it is a study in contrasts between the developed and developing worlds.

Near the middle of the island is the cruise port, leased to Carnival Corp., built with modern conveniences and to high standards. Acme installed a system that took the existing pipes and channeled them into a pair of Cromaglass 12,000 gpd sequencing batch reactors that are fully aerobic but have no denitrification cycles. Water coming out of the system is sent through 2,500 feet of perforated pipe to irrigate banana trees, sugar cane and lemon trees that line the slope next to the cruise ship docks.

Acme also runs the port's water system. "The technical end of running the water system is not that challenging, but the sense of responsibility is,"

LEFT: Although Acme Environmental Solutions did not build the desalination plant for Coxen Hole (it was a gift to Honduras from the government of Spain), it does run the plant. Desalination is accomplished by a series of small-pore membranes contained in the long white tubes visible at left. Here, technician Junior Torres gives trainee Deyvin Garcia some instruction on the plant's operation. **ABOVE:** Marcia Bodden, left, and Lea Bongiorno are among the people who help keep the office running at Acme Environmental Solutions.

Rivera says. Operators check for contamination twice a day if there are no ships in port. When ships dock and pour several thousand tourists into the port, operators check the output quality every 30 minutes.

The contrast is about half a mile inland and a few hundred feet up the island's coral backbone. Santa Maria is a community of small houses on dirt streets. Drinking water comes from higher up on a neighboring property and is brought to individual blocks with lengths of 2-inch PVC pipe slung across the road like utility lines before they bend downward and disappear underground where half-inch lines supply the houses. Concrete septic tanks are molded into homes as part of their porches and foundations, and if the level in the tank gets too high there's a 4-inch pipe sticking out the side to let liquids flow away downhill.

"See that puddle in the middle of the road? That's not exactly rainwater," says Rivera.

Children play in it, and chickens drink it. Progress is coming, though slowly. An environmental impact fee assessed by the government for the Mahogany Bay cruise port was used to start a wastewater project in Santa Maria. Acme was awarded the contract to design and install the wastewater collection system as well as a part of the treatment plant. A large tank was installed that will become a trickle filter taking water from a sludge blanket reactor and diverting 20 percent of the treated water to a clarifier before it goes to either a chlorine or UV disinfection system.

Island work depends on stretched supply lines

In your mind, working on a tropical island may seem ideal. It's always warm, and it's sunny most of the time. But in order to work in a place like this, supplies and equipment must reach that island somehow. That's one of the big challenges Dan Taylor faces in operating Acme Environmental Solutions on the Caribbean island of Roatan. Shipping means either a boat or a plane, and of course the stuff onsite installers use is either heavy or has a great deal of interior volume, so if you're not careful a lot of your money goes to moving air around the globe.

Taylor has some workarounds. First, he uses septic tanks from Infiltrator Systems Inc. because they separate and nest to stack efficiently in shipping containers. When he's ordering a container of something, he buys other supplies – pipe, fittings, pumps, parts, anything to fill the voids.

"You really have to plan ahead and keep a large inventory of specialty items. It takes time to ship from manufacturer to the port and then weeks to wait on the next ship. When you add transit time and the bureaucracy of importing and customs, logistics management is real important."

Roatan has no island delivery service. It's up to Taylor's people to bring items from the dock to the company's warehouses. That's another point: If something isn't in the warehouse, you can't send a guy in a truck down to the hardware store because there isn't one (at least not a large one). With the logistics challenges, keeping complex projects on schedule can be trying.

Those Infiltrator tanks have a dual purpose. Not only are they efficient to ship, they're easy to move on land. Six men can muscle one into a hole. There are no heavy cranes available. A big crane would not fit on the island's two-lane paved main road, nor could it negotiate some of the steep roads and rough ground where Acme works.

Some jobs require more transport, sometimes over the water again. Roatan is surrounded by smaller islands called keys just a few hundred feet offshore, and Acme has to ship supplies for those jobs by small boat. To service a sewer system on a key, a vacuum truck has to be barged over. Those jobs make Taylor more than a little nervous.

With cement and river sand shipped in bulk, concrete is the material of choice for construction. Homes, condos, stores and septic tanks are built of locally cast concrete blocks.

The small community of Santa Maria is in the process of having a new wastewater system built by Acme Environmental Solutions. For years the community's treatment solution was concrete septic tanks included in houses. Overflows discharged wastewater directly onto the surface of the ground.

DESIGN FLEXIBILITY

The decision on final treatment hasn't been made, but then the rest of the plant isn't done either because there's no money. This plant was designed about seven years ago, but that design depended on numerous lift stations throughout the hilly community, and the energy cost was prohibitive. Electricity on Roatan comes from a utility company running diesel generators, and because every drop of fuel has to be shipped in, the result is power at about 44 cents per kilowatt hour. The new system Acme designed and is putting in requires only one pump to recirculate wastewater in the trickle filter. Gravity does the rest.

> "You really have to plan ahead and keep a large inventory of specialty items. It takes time to ship from manufacturer to the port and then weeks to wait on the next ship. When you add transit time and the bureaucracy of importing and customs, logistics management is real important."
>
> **Dan Taylor**

"The various codes in the U.S. make designing and installing decentralized systems really hard to do," Taylor says. "Honduras has some pretty good environmental law, but they don't have good compliance enforcement."

As a developing nation Honduras lacks the money for inspectors, but for Taylor and his staff, this absence of regulation creates one of the opportunities that make working on Roatan so rewarding. Acme can dream up smart, creative and lower-cost solutions for its customers. As long as plans pass the test of common sense with municipal officials, there are no limits.

DON'T WASTE THE WATER

Reusing water is a trademark of the systems Taylor and Rivera have designed on Roatan. Although it is a tropical island with about 90 inches of rainfall a year, Roatan is soil sprinkled over a base of old coral and clay. Some water penetrates to aquifers, but the drenching tropical rains send a lot of runoff to the sea. As the island's population grows so does demand for water, and more people bring more impervious surfaces that increase runoff. They also increase demand on the island's aquifers, which in some places are turning brackish as saltwater flows in to replace all the freshwater pumped out.

The best illustration of how Taylor addresses these issues can be found in his own development in Keyhole Bay. The partially built complex consists of condo buildings and private stand-alone homes.

Wastewater from each home goes to a 600-gallon primary treatment tank, then to a 1,200-gallon Delta DF-60 ATU. Treated effluent from a group of six homes feeds wastewater to a central clarifying tank with a float-activated pump and disk filter. Treated water goes into a 2-inch main leading back to the homes and to a Netafim underground irrigation system for planting beds.

Each condo building has a 3,000 gpd system consisting of a 3,000-gallon primary treatment tank and two Delta DF-150s in parallel. The flow is combined in the tertiary clarifier, and this water is also sent to irrigation.

When Carnival cruise ships enter port at Mahogany Bay on Roatan, wastewater from the shops and other facilities catering to tourists is sent through this Cromaglass sequencing batch reactor. It is fully aerobic but has no denitrifying cycle. After going in sequence through these two aerobic tanks, water is sent to a clarifier and then to 2,500 feet of perforated pipe to irrigate plantings beside the cruise ship dock.

Community drinking water comes from three sources: roof runoff, brackish well water run through a reverse osmosis plant and surface catchments. Each of three condo buildings is designed with a 125,000-gallon cistern, and community covenants require a minimum of one 15,000-gallon cistern at each freestanding house. Surface runoff is collected from the roads and grassy areas and from three earthen dams that control water flowing down the steep valleys from neighboring properties.

A series of 34 underground storage tanks ranging in size from 512 cubic feet to 6,144 cubic feet, and with a total capacity of about 1.2 million gallons, are connected in series along the sloping development. Each tank not only stores water but acts as a settling tank to keep contaminants from the surface runoff out of the water. Excess water flows to the ocean, as does excess water from the osmosis plant. But before it reaches the sea it's all mixed and diluted with salt water.

EDUCATED WORKERS A KEY

Labor is easy to find on Roatan. Skilled labor is a completely different matter. Even the simple qualification of a driver's license is not common. Workers with high school degrees are rare, so Acme has a program to develop its people. On the wall of Taylor's office is a large whiteboard listing employees, their current skills, where they should be in three years and the training they will need to get there.

Taylor and his top staff watch employees. Those who have an aptitude for working with machinery or a curiosity to know more are offered skilled work and training. The company runs its own driver training program for employees and contractors. People in contact with sewage get vaccinated for hepatitis and tetanus.

Taylor provides cost-of-living raises pegged to the country's consumer price index. He has also given his operations and business managers stock in the company. "They have purchased additional stock when it became available. It goes back to being the smart thing to do and a good way to do business. If people are owners they care; they act like the owners they are; they perform at their best," he says.

With a focus on education, Acme has another vital tool: the Pumper & Cleaner Expo (now called the Water & Wastewater Equipment, Treatment & Transport show). "That isn't just important. That's really critical for us. That's how we get our training," Taylor says. Though it's an expensive trip, he brings employees to the show. His technical staff attends Education Day seminars. Staff benefits immensely from talking informally with other professionals about how they solve problems.

Taylor also goes through every page of every issue of Onsite Installer, Pumper and the other COLE Publishing magazines, takes them apart, and passes articles on to his staff to critique and discuss in meetings.

The next challenge is transforming Acme from a small business to a medium-sized business. Taylor, Rivera and Marcia Webster, the business manager, are developing operating procedures, position descriptions, human resources procedures, standardized forms, salary categories and fair policies.

ISLAND-READY RIGS

Acme uses two vacuum trucks: a 2001 Ford F-650 with a 1,600-gallon waste/550-gallon freshwater aluminum tank and a 1999 Ford F-800 with a 1,100-gallon waste/500-gallon freshwater steel tank. The trucks were built out by Satellite Industries with Masport pumps. In addition there is a Satellite slide-in unit with a 600-gallon aluminum tank and Conde pump

(Westmoor Ltd.). This year it will be placed on a four-wheel-drive Ford F-450 to drive onto beaches for various jobs.

Trucks are small by North American standards to maneuver easily on the island's narrow, twisting, unimproved and often-steep roads. Technicians use the big truck for septic work, and the little one for servicing the company's 124 Satellite restrooms.

Acme also has a pair of Isuzu flatbed trucks used for hauling supplies and equipment and to take workers to and from jobs. There's also a half-ton diesel Nissan pickup used to ferry parts and two diesel Toyota pickups used by the engineers and project managers.

MAKING A DIFFERENCE

Taylor came into the business with knowledge of how to do water and wastewater well, and he was first to market. It has put Acme in the enviable position of setting the standards for water and wastewater development on Roatan. Many times local officials aren't comfortable approving a set of plans submitted for permitting unless they see a stamp showing that plans have been reviewed by Acme, even if a system was designed by someone else, Taylor says.

"We have to be real careful that we protect our reputation and eliminate any appearance of conflicts of interest. As long as our recommendations are seen as being for the greater good of the island and the environment, we get along just fine."

Even environmentalists (they call themselves reef-huggers) respect Acme and what it has accomplished. And it is no small problem Acme is helping to fix. The United Nations has cited the small islands of the Caribbean as a place where sanitation is lacking. Contaminated water becomes a source of disease after severe storms, and it endangers the health of the coral reefs that provide food and attract tourist dollars.

"The long-term sustainment of the turquoise waters we enjoy is a goal we work to achieve every day. We don't have to shovel snow; we get to look at the beautiful waters that others only get to dream about. But with that gift comes an immense responsibility and opportunity," Taylor says. "Our permitting scheme on the island allows us to design and deliver the systems that are the best for our clients, not what some out-of-date code book tells us to do. It's really a lot of fun. You can do smart things without hindrance."

As for the retirement Taylor was planning for … well, maybe another time. ◻

MORE INFO:

Delta Environmental Products
800/219-9183
www.deltaenvironmental.com

Infiltrator Systems, Inc.
800/221-4436
www.infiltratorsystems.com
(See ad page 3)

Isuzu Commercial Truck of America
866/441-9638
www.isuzucv.com

Masport, Inc.
800/228-4510
www.masportpump.com

Netafim USA
888/638-2346
www.netafimusa.com
(See ad page 27)

Satellite Industries
800/328-3332
www.satelliteindustries.com

Spectra Precision/Trimble
800/527-3771
www.spectralasers.com

Westmoor Ltd.
800/367-0972
www.westmoorltd.com

Jim Anderson, Ph.D., and David Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. David is Extension Onsite Sewage Treatment Educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor, as well as education program coordinator for the National Association of Wastewater Technicians. Readers are welcome to submit questions or article suggestions to Jim and David. Write to ander045@umn.edu.

I Can Do This ... Right?

Installers should be armed and ready with thoughtful answers when confident homeowners ask whether they can replace or repair their own onsite systems

By Jim Anderson and David Gustafson

Can I install my own system?

This is a question professional installers sometimes hear from homeowners who are faced with a costly system replacement. We have seen this question arise from at least two very different groups of homeowners.

One group we would characterize as being "other professionals." These may be well-meaning onsite industry members who value the work of installers, but look at a septic system and say, "How hard can it be to dig a hole, throw some stuff in and cover it back up?" Or they may be professionals outside the industry who place no value on what we do. The other group we would characterize as homeowners who are always in the "do-it-yourself" mode and look at this as just another skill to master and a project to accomplish.

For "other" professionals who do not respect everything that goes into a quality, long-lasting installation, an approach is to turn it back around and ask them how they would respond if the question involved the professional service they provide.

The simple answer to this question in most states is yes; in some area of state law, homeowners are allowed to install their own system. In our home state of Minnesota, this permission is granted in a statute outside the current code governing septic systems. In other states where we have worked, the provision is found in the septic code. Some states spell out the requirements in their statewide code and expect it to be followed at the local level. Specific requirements governing installation are often left to the most local government unit with permitting authority.

CRACKING THE CODE

How this often works: Yes, you can install the system as long as you meet all of the requirements in the state code. This includes obtaining a permit and paying the appropriate fees, evaluating the site for limiting conditions, having an approved site-specific design, maintaining all setback distances and following all installation requirements in the code. It is left to the local authority to determine how they will monitor or inspect the site for a correct install. Additional inspections – with additional fees – are usually conducted at various stages of construction.

Most local regulators who get involved with do-it-yourself projects will say it usually becomes a huge headache for them; they end up being way more involved than they should in both the design and installation processes. Often after they encounter one of these systems, the procedures are changed requiring a professional to sign off on the plan to verify compliance with current code. Situations like these tend to put the local regulator squarely in the installer's corner the next time you argue that hiring a professional is the cheapest, fastest and best route to replace a system.

So when confronted with the "do-it-yourself" question, how do you handle it? We would appreciate your thoughts and approaches, which we can outline and respond to in a future column. Here are a couple of our thoughts and ideas:

THE CUSTOMER MAY NOT BE RIGHT

For "other" professionals who do not respect everything that goes into a quality, long-lasting installation, an approach is to turn it back around and ask them how they would respond if the question involved the professional service they provide. "Even though I do not know anything about it, I think I can do just as good a job," a prospective customer might tell them.

We like to highlight that a number of professionals or professional services need to be performed beyond physically installing the system. This includes engineering and soil professionals, as well as your own installation skills that get the job done quickly and without any additional problems such as having to redo a part of the installation when it comes time for the inspection.

In the case of DIY'ers, we always start by explaining the professional tasks involved just to get started on the system replacement. We talk about the design and site evaluation work required before the project can begin. This helps because it explains some of the costs that get wrapped right into the price you charge. It helps to highlight that the extra inspections also have a cost and are time consuming, meaning their yard is going to be in a state of disrepair for a much longer time; and there is no guarantee the system will meet standards required by the local permitting authority.

MAKE YOUR OPINIONS KNOWN

One last note that goes hand-in-hand with the question is: If you work in a state where the rules or codes are silent on what an installer's qualifications should be, you should become active with your state association to change this. There should be education and experience requirements to become an installer and maintain a license. This makes the discussion with a homeowner easier if they are contemplating installing their own system. They need to hear that it takes a lot of time and effort to get up to the point of being able to install a system.

The professional credentialing also helps discourage every unqualified person who owns a backhoe from putting out a sign announcing they are an installer. This is part of raising that professional bar for the industry that we always talk about. Not every person can or should be able to install onsite wastewater treatment systems.

Solid Like a Rock

New Hampshire's Granite State group promotes a unified front for wastewater professionals when it comes to new regulations and training requirements

By Doug Day

The Granite State Designers and Installers Association (GSDI) is one organization in New Hampshire working to protect the state's water resources. Besides providing education and information to its 400 members, the group is closely connected to other organizations with similar roles, according to outgoing chairperson Deb Hinds of Hinds Septic Design Service.

Hinds has just ended her second two-year term leading GSDI and is being succeeded by John Ohler of J.W. Ohler Inc. She says building professionalism is at the heart of everything the organization does.

Contact Deb Hinds at 603/934-3113 or through wwww.gsdia.org.

What is the primary role of the organization?

Hinds: The services we provide our members help increase the professionalism of our industry, including education, keeping them informed on changes in the industry, and advising them on what's going on at the state and local levels.

We represent about 25 percent of those in the industry in New Hampshire; I wish everyone were a member. I really think you have to have some kind of connection to keep up with the changing technology and regulations.

If this is truly your career, I can't imagine not being a member of an organization because it's so valuable. It's just something you really need to do.

Who does GSDI represent?

Hinds: We represent designers, installers, pumpers, evaluators and maintenance personnel, along with others related to the industry, including local regulators. On our board of directors we have a vice chairman of installers, vice chairman of designers and a vice chairman of pumpers.

State regulators are associate members, including those in the DES [state Department of Environmental Services] Subsurface Systems Bureau and the Wetlands Bureau. They get our newsletter, are invited to our board meetings and events, and get all the benefits.

State officials have an open door for us; we can stop in or call anytime. They make time for us and have been really good at listening and working with us. The last time we went through a rule change, they came to us and we went through rule by rule to provide our comments.

How are you connected with other groups with similar goals?

Hinds: There is a smaller group, the New Hampshire Association of Septage Haulers [NHASH], which represents those involved in pumping, maintenance, installation and repair. A lot of their members are members of our association. We have a representative from the NHASH board of directors on our board. Their members also get our newsletter, so we have good contact back and forth.

I am also the GSDI representative to the New Hampshire Water Council, which advises the director of the Water Division, reviews all proposed rules, and hears appeals on department decisions. In addition we have board members who serve on the Shoreland Advisory Committee, the Nitrogen Sources Collaborative Advisory Board and on the Non-Point Sources Management Plan.

What is your most important way to connect with members?

Hinds: We had our 27th annual conference and expo in March; it expanded to a two-day event about five years ago. It is open to everyone whether they are a member or not. We get more than 500 people from New Hampshire and surrounding states: designers, installers, pumpers, local and state officials and health officers.

It offers up to six continuing education credits approved by the DES Subsurface Systems Bureau that people need to continue their designers, installers and evaluators certifications, and also for wetland and soil scientists. We also offer credits for other states: Massachusetts soil evaluators and system inspectors; Maine evaluators, installers and inspectors; and Vermont designers. We also offer continuing education programs throughout the year.

We upgraded our website about five years ago and it has a lot of information. With our blogs, we are able to get information out to members quickly, such as updates to legislation and getting their professional opinions on how we should react to bills.

In 2005, GSDI started the Granite State Certified Septic System Evaluator Program to teach people how to evaluate systems using standard procedures. It is voluntary; there is no standard for evaluators in New Hampshire. What was happening with real estate deals was people with no background with septics were going in and deciding if a system was failed or good.

We run the course twice a year and have certified about 105 people. We promote to the public that if you are going to have an evaluation, you really should have it done by a certified evaluator.

"If your brother-in-law doesn't work in the industry but thinks he can install a septic system, the bill would allow him to install it if he doesn't get paid. That's a real strange bill so we're against it, obviously, and we expect it will die."
Deb Hinds

Do you lobby at both the regulatory and legislative level?

Hinds: We monitor all legislative and regulatory activity weekly and report to our Legislation and Rules Committee. The information is sent out to all members weekly and it is posted on our website.

If we are watching a bill, we've already talked to DES about their take on it. A lot of times, we go in united with them so that we're on the same page whether we are going to support or oppose the bill.

One bill we're [concerned about] would allow someone who isn't certified in the industry to install systems. For instance, if your brother-in-law doesn't work in the industry but thinks he can install a septic system, the bill would allow him to install it if he doesn't get paid. That's a real strange bill so we're against it, obviously, and we expect it will die.

Two years ago there was debate about whether you could replace a failed system with the same kind of a system without getting a permit. That was being pushed by the Realtors so homeowners wouldn't have to wait to go through the permitting process before selling a house. We lobbied against it.

But we also got together with DES and the New Hampshire Association of Realtors and came to a compromise on a rule change. We went in together and everyone was pretty much happy with the outcome. We also kept the matter in the rules rather than making a law. If you want to change a law, you have to go back through the legislature. If you want to change a rule, we can go directly to the regulators and tweak it.

But what really came out of it is that we now have a mechanism to go back and forth and talk with the Realtors. We were able to educate them about the rules and once we did, they backed off on a lot of things. Now we have communication between the two groups that we never had before.

Do you do anything to make such connections with the public?

Hinds: We do classes for people like Realtors, lakes associations or any group who wants to hear us. It's really well-received. They seem to be shocked by how septic systems treat wastewater; they think once you flush, it goes into the ground and disappears. We're continually educating people about what they should and should not do with their septic systems. ◻

SEPTIC TANKS DIRECTORY

	Brand	Material	Capacity (gallons)	Dimensions	Weight (lbs)	Compartments	Inlet (ALL)/Outlet (BLL)	Certification
CONCRETE TANKS								
Dalmaray Concrete Products Inc. 405 S Arch St., Janesville, WI 53548 888-222-4541 608-752-6507 Fax 608-752-5671 sales@dalmarayconcreteproducts.com www.dalmarayconcreteproducts.com **See ad page 39**	Dalmaray	Concrete	1,000-300-750	56"l x 96"w x 60"h	13,560 base 7,800 lid	3	47"/43"	Wisconsin DSPS
	Dalmaray	Concrete	1,000-300	118"l x 78"w x 60"h	13,009 w/lid glued 8,215 w/o	2	47"/45"	Wisconsin DSPS
	Dalmaray	Concrete	5,000	204"l x 120"w x 78"h	48,000	1	66"/64"	Wisconsin DSPS
Wieser Concrete Products, Inc. W3716 US Hwy. 10, Maiden Rock, WI 54750 800-325-8456 715-647-2311 Fax 715-647-5181 winkler@wieserconcrete.com www.wieserconcrete.com **See ad page 17**	Wieser	Concrete	1,600	84"l x 145"w x 53 1/4"h	10,250 base 6,350 lid	3	Adjustable	NPCA Certified
	Wieser	Concrete	10,000	120"l x 192"w x 126"h	35,975/section	Adjustable	Adjustable	NPCA Certified
	Wieser	Concrete	40,000	168"l x 480"w x 140"h	70,000/section	Adjustable	Adjustable	NPCA Certified
FIBERGLASS TANKS								
Containment Solutions, Inc. 5150 Jefferson Chemical Rd., Conroe, TX 77301 877-274-8265 936-756-7731 Fax 936-756-7743 sales@csiproducts.com www.containmentsolutions.com	Containment Solutions (CSI)	Fiberglass	600 - 60,000	4' - 12'				IAPMO
Quanics Inc. PO Box 1520, Crestwood, KY 40014 877-782-6427 502-992-8200 orders@quanics.net www.quanics.net	Quanics ATS-6	Fiberglass	400	72"l x 48"w x 48"h	300		Up to 4" Fittings	
	Quanics ATS-8	Fiberglass	650	96"l x 48"w x 48"h	450		Up to 4" Fittings	
	Quanics ATS-16	Fiberglass	5,000	192"l x 96"w x 48"h	1,300		Up to 4" Fittings	
Xerxes Corporation 7901 Xerxes Ave. S, Minneapolis, MN 55431 952-887-1890 Fax 952-887-1882 info@xerxes.com www.xerxes.com **See ad page 25**	Xerxes	Fiberglass	600 - 62,000 Custom Built	4' - 12'				
POLY TANKS								
AK Industries Inc. PO Box 640, Plymouth, IN 46563 800-370-3749 574-936-2542 Fax 574-936-2298 info@akindustries.com www.akindustries.com	AK Industries	Polyethylene	1,000	102"l x 67"w x 63"h	600	1 or 2		IAPMO/CSA
	AK Industries	Polyethylene	1,050	126"l x 66"w x 53"h	600	1 or 2		IAPMO/CSA
	AK Industries	Polyethylene	1,300	113"l x 69"w x 69"h	675	1 or 2		IAPMO/CSA
Den Hartog Industries, Inc. 4010 Hospers Dr. S, Hospers, IA 51238 800-342-3408 712-752-8432 Fax 712-752-8071 sales@denhartogindustries.com www.denhartogindustries.com **See ad page 15**	Ace Roto-Mold	Polyethylene	300	56"l x 95"w x 16"h	132	NA	Multiple Fittings	NA
	Ace Roto-Mold	Polyethylene	1,500	58"l x 137"w x 72"h	580	2	1/1	NSF Approved
	Ace Roto-Mold	Polyethylene	2,500	98"l x 158"w x 54"h	1,067	1	Multiple Fittings	NSF 61 Approved
Infiltrator Systems, Inc. 4 Business Park Rd., Old Saybrook, CT 06475 800-221-4436 860-577-7030 dfiorentino@infiltratorsystems.net www.infiltratorsystems.com **See ad page 3**	IM-540	Polypropylene	552	65"l x 62"w x 55"h	169	1		CSA and IAPMO
	IM-1060	Polypropylene	1,287	127"l x 62"w x 55"h	320	1 or 2		CSA and IAPMO
	IM-1530	Polypropylene	1,787	176"l x 62"w x 55"h	501	1 or 2		CSA and IAPMO

SEPTIC TANKS

	Brand	Material	Capacity (gallons)	Dimensions	Weight (lbs)	Compartments	Inlet (ALL)/Outlet (BLL)	Certification
POLY TANKS CONT.								
Premier Tech Aqua 1, avenue Premier, Campus Premier Tech Riviere-du-Loup, QC G5R 6C1 Canada 800-632-6642 418-867-8883 Fax 418-862-6642 lapa2@premiertech.com www.premiertechaqua.com	PLT-1500	Polyethylene	3,900	167"l x 92"w x 106"h	1,620	1 or 2 (or more)	83"/78"	NA
	PLT-3000	Polyethylene	8,000	308"l x 92"w x 106"h	2,881	1 or 2 (or more)	83"/78"	NA
	PLT-4500	Polyethylene	11,900	460"l x 92"w x 106"h	4,418	1 or 2 (or more)	83"/78"	NA
Roth Global Plastics PO Box 245, Syracuse, NY 13211 866-943-7256 315-579-3326 Fax 315-475-0200 jaimeep@roth-usa.com www.rothmultitank.com See ad page 31	Roth MultiTank	Polyethylene	750	51"l x 62"w x 103"h	360	1 or 2		
	Roth MultiTank	Polyethylene	1,000	51"l x 62"w x 118"h	450	1 or 2		
	Roth MultiTank	Polyethylene	1,500	51"l x 62"w x 177"h	640	1 or 2		
Snyder Industries, Inc. 4700 Fremont St., Lincoln, NE 68504 402-467-5221 Fax 402-465-1220 sales@snydernet.com www.snydernet.com See ad page 29	Nuconsept	Polyethylene	300 to 500	48"		1		IAPMO
	Dominator	Polyethylene	750 to 1,500	96"-191"l x 60"w x 51"h		1 or 2		IAPMO
	Nuconsept	Polyethylene	1,050 to 1,500	100"-140"l x 64"w x 62"h		1 or 2		IAPMO

Beside the sand filter Marcum set a 3,000-gallon recirculating tank, background, and a 1,500-gallon discharge tank, foreground. (Photos courtesy of EcoStruct)

Reining In a Challenge

EcoStruct replaces the wastewater system at the biggest equestrian camp east of the Mississippi

By David Steinkraus

The sheer size and complex demolition and build schedule for a system replacement project near Golden Pond, Ky., provided a huge challenge for EcoStruct Group of Pleasant View, Tenn. Glenn Marcum of EcoStruct and his design team – engineers Bob Pickney of Adenus and Bill Johngrass of URS Corp. – were called on to update the wastewater system for the largest equestrian campground in the eastern United States, and do it without hindering the campground's operation.

> "Some of the best help came from people who had been camping there for 20 years and had seen some of the changes."
>
> Glenn Marcum

Wranglers Campground, part of the Land Between the Lakes National Recreation Area and owned by the U.S. Forest Service, was created in the 1970s by the Tennessee Valley Authority. The property lies between Kentucky Lake, a flowage of the Tennessee River, and Lake Barkley, which

SYSTEM PROFILE

Location:	Golden Pond, Ky.
Facility served:	Wranglers campground, Land Between the Lakes National Recreation Area
Design-build team:	Glenn Marcum, EcoStruct; Bob Pickney, P.E., Adenus; Bill Johngrass, P.E., URS Corp
Installer:	EcoStruct Group LLC
Site conditions:	Silty loam and silty clay loam
Type of system:	Recirculating sand filter with drip irrigation
Hydraulic capacity:	30,000 gpd

is a flowage of the Cumberland River. Both empty into the Ohio River. This bit of geography turned out to have implications.

The campground has silt loam and silty clay loam soils and about a 50-foot elevation change. Distance to the lakes is about a mile. A couple of intermittent streams carry 3 to 4 inches of water in dry weather.

PROJECT CHALLENGES

As the campground was developed and expanded, crews used nonstandard materials and apparently no coordinated design. As a result, the old system was greatly undersized for the now 70-acre property with 213 campsites, four communal bathhouses with toilets and showers, a gatehouse, a general store, a horse barn and farrier service, several horse-washing stations and a dump station for RV tanks. The camp draws about 75,000 annual visitors and more than 100,000 in October for a large rodeo.

"They're in the middle of nowhere with old power lines and an old power grid system. Losing power out there happens all the time. All it takes is one storm and a falling tree."
Glenn Marcum

ABOVE: Marcum, at right on the plow, and a worker install Netafim drip irrigation tubing.
BELOW LEFT: The campground sand filter almost complete. This photo shows the top piping.
BELOW RIGHT: Early construction on the sand filter.

To meet this need, the team in 2010 designed a 30,000 gpd system with a recirculating sand filter, drip irrigation system, STEG and STEP collection system and backup generators. Total collection system tankage installed was 45,000 gallons.

The horse-washing stations presented a peculiar problem. Horses shed their winter coats of hair in late March and early April. Wash stations were previously tied directly into the old leachfields, which were plugged by hair. Where possible Marcum disconnected stations from the main system and gave them dedicated leachfields. Stations that had to be tied into the new wastewater system because of their location were fitted with settling chambers.

Aside from nonstandard materials, there were no drawings showing the location of the old system components. "Some of the best help came from people who had been camping there for 20 years and had seen some of the changes," Marcum says. Crews took great care in digging, but sometimes that was not enough.

As workers were digging up an old septic tank at one of the bathhouses, staffers told EcoStruct the electrical service came from the other direction. It didn't. The bucket of an excavator caught the power cable lying across the top of the existing buried tank and not encased in conduit. When the operator swung the bucket, he ripped the electrical box off the bathhouse wall. "There were sparks flying. It was very scary," Marcum says.

It took immense coordination to complete the job with the campground open. A bathhouse job typically started the prior week with a series of phone calls to coordinate timing. On Monday, as the last weekend campers packed and left, the crew would do preparation work at the selected bathhouse. On Tuesday morning workers shut off the water, pumped the old septic tank dry, dug it out, broke it up and hauled it away.

New tanks and a 90-ton crane were delivered. Each bathhouse received a pair of watertight concrete tanks: A 5,000-gallon primary tank, which empties into a 3,000-gallon secondary tank connected to the collection system. All tanks on the project came from Jarrett Tanks of Ashland City, Tenn. Workers set the new tanks in place, made hookups and tests, and backfilled. All this was accomplished through the end of the day on Wednesday. Thursday was a contingency day, but by Friday the bathhouse had to be ready for the weekend.

WORKING IN WATER

Geography became important in the spring of 2011. Severe flooding occurred in Missouri and southern Illinois where the Mississippi and Ohio rivers join – not too far from the campground. The U.S. Army Corps of Engineers closed its dams to reduce water flow, and some of that water backed up into EcoStruct's project. System installations had to be planned around the lakes' water elevation, and daily reports were provided to

One of the 4-inch collection lines leading effluent to the sand filter. Next to it is a power line. Lines had 30 inches of cover at minimum.

EcoStruct. It was never more than 5 inches and affected only one bathhouse when a crew was setting new tanks.

Marcum also took precautions to make sure those new concrete tanks would not float. A secondary off switch with a float prevents the lift station pumps from draining the tank below 70 percent full. The combined weight of concrete and effluent will keep the tank in the ground even if its exterior is covered with water.

Three-quarters of the campground waste is collected by gravity flow. For the other quarter, effluent flows by gravity to a lift station where Sta-Rite pumps connected to 2-inch force mains feed the sand filter. The longest linear run of gravity collection pipe is 3,500 feet. The total pipe run is 4,000 feet, using 6-, 4-, 3- and 2-inch SDR 21. Slopes on the gravity pipes are 1 percent or a bit more, and every septic tank installation has filters to block solids from entering the collection pipes.

The sand filter is 55 feet by 112 feet 6 inches, with between 4 and 5 feet to groundwater. Marcum zoned the filter by splitting it in the center with a low wall. Half the filter is connected to a recirculation system fed from a 3,000-gallon tank. The discharge tank is also 3,000 gallons, with Arkal disc filtration between the pump house and the drip field.

An Adenus Technologies PLC computer runs the system. Toggle switches allow manual operation of everything, but on the outside of the panel is a touch screen, which Marcum encourages operators to use. The system can also be operated remotely with an iPad, he says. The drip field consists of 43,200 feet of 1/2-inch Netafim pipe, divided equally into nine zones with a loading rate of 0.15 gpd. Floats in the recirculation and distribution tanks tell the computer the water conditions so it can alter the pumping cycle automatically.

KEEPING THE PUMPS ON

Marcum's solution for the Forest Service was comprehensive in more ways than one. "They're in the middle of nowhere with old power lines and an old power grid system," he says. "Losing power out there happens all the time. All it takes is one storm and a falling tree."

To make sure the system is always operating and campers are able to use the toilets and showers they paid for, EcoStruct installed a pair of 50 kW Generac diesel generators. Automatic switches sense whether grid power is present and turn the generators on or off accordingly. The generators have fuel for 24 hours and have split duties. One runs the well house and one of the bathhouses. The other runs the wastewater plant, another bathhouse and the gatehouse.

One thing that can defeat all the machinery is people, and the horse owners were yet one more challenge. It's one thing to have a drip field. It's another thing to have a dozen horses walking across the field when it's wet and the ground is soft. Marcum's team fenced the whole 6 acres of drip field to keep it undisturbed. They fenced the sand filter as well.

When the project was done, Marcum gave the campground a full set of pictures on a USB flash drive in addition to a set of as-built plans. There won't be any wondering about component location, and it will aid in future maintenance and repairs, he says. After all the challenges and struggle, the result of the project may be judged by what didn't happen. "They never lost a rental on a site, and they were obviously extremely happy about that," Marcum says. ◻

MORE INFO:

Adenus Wastewater Solutions
888/423-3687
www.adenus.com

Arkal Filtration Systems PEP Filters
704/662-3133
www.arkal-filters.com

Generac Industrial Power
888/436-3722
www.generac.com

Netafim USA
888/638-2346
www.netafimusa.com
(See ad page 27)

Pentair Water/STA-RITE
888/782-7483
www.sta-rite.com

Going Big

The curtain is raised on large-capacity two-piece Infiltrator Systems tank

By Craig Mandli

Infiltrator Systems officially unveiled the IM-1530 large capacity, injection-molded two-piece plastic tank at the 2014 Pumper & Cleaner Environmental Expo International in February.

"This is the biggest tank we've ever made," says Jim Bransfield, director of marketing for Infiltrator Systems. "It essentially follows the same design as our other tank models, and is produced from recycled material."

According to Bransfield, the IM-1530 provides exceptional strength in a two-piece design that efficiently nests for shipping and allows for local assembly. A versatile design creates a wide range of installation options, including shallow, multiple and serial tank configurations. The new product replaces Infiltrator's TW-1250 and TW-1500 tanks, and falls in line with the company's conversion from single-piece rotomolded to two-piece injection-molded units.

"One of the biggest strengths of this design is its shipping efficiency," says Bransfield. "Because the two halves can nest together, it can be shipped efficiently anywhere in North America. That feature allows us to service a huge area in a cost-effective way."

The IM tank line also includes the IM-1060, which was introduced at the 2012 Expo, and the IM-540, which was introduced in concept at the 2013 show. According to Bransfield, the IM-1530 rollout enables the company to provide an appropriately sized product for all single-family residential applications.

Jim Bransfield, left, director of marketing for Infiltrator Systems, and Carl Thompson, right, vice president of sales and marketing, pull the cover off a new IM-1530 tank at the 2014 Pumper & Cleaner Environmental Expo International. (Photo by Craig Mandli)

"This tank finishes out the line for us," says Bransfield. "These tanks have the plastic and wall thickness in the places where structure is needed."

All IM tanks feature integrated heavy-duty lids designed to work with Infiltrator's TW Riser System, structurally reinforced access ports, reinforced structural ribbing and fiberglass support posts to provide additional strength. Inboard lifting lugs are designed for easy handling and delivery. No special installation, backfill or water filling is required. The IM-1530 can be installed with 6 to 48 inches of cover, and can be pumped dry during pumpouts.

"This tank is a great fit for large-family residential homes," says Bransfield. "It is designed for homes that have four bedrooms or more, and with construction of those types of homes on the upswing nationwide, we're excited to get this tank on the market."

The IM-1530 has a working capacity of 1,509 gallons and total capacity of 1,765 gallons. It has 0.2-inch walls, is 176 inches long, 62 inches wide, 55 inches tall and weighs 501 pounds. It is suitable for use as a septic tank, pump tank or rainwater (non-potable) tank.

"It is our hope as a company to be able to convert all our tank sales to our IM Series," says Bransfield. "It was a huge undertaking for our company to convert to these two-piece mid-seam tanks, and we're very excited with not only the quality of the product itself, but also the feedback we've gotten on them."

As for the future, Bransfield says Infiltrator technicians are already working on ways to expand the company's technology into other sectors of the industry.

"We have a mission of creating new tanks and bigger tanks," he says. "We ultimately want to apply our technology to other market opportunities."

800/221-4436; www.infiltratorsystems.com.

ABOUT THE AUTHOR
Dennis F. Hallahan, P.E., is technical director for Infiltrator Systems Inc. He can be reached at dhallahan@infiltratorsystems.net. The National Onsite Wastewater Recycling Association is the only national association dedicated to representing and educating all segments of the onsite/decentralized industry. For more information or to join, visit www.nowra.org, or call 800/966-2942.

Tank Technology

Materials, design and construction of septic tanks improve to meet the demand for durability and watertightness

By Dennis F. Hallahan

Change is one of the few constants we can expect. The onsite industry's simplest device, the tank, is not exempt. The septic tank is the heart and lungs of an onsite wastewater treatment system. Once taken for granted, the tank has seen much change on the regulatory, manufacturing and applications fronts.

Change No. 1: Tank materials

Tank materials are essential to proper function of the tank and leakage is a major concern with tanks in onsite wastewater systems. As regulators recognized the importance of the tank in the performance of the overall system, it was also recognized that the tank must be watertight to prevent surface or groundwater from entering and causing hydraulic overload of the drainfield system and/or flushing solids out and causing the drainfield to be plugged. Conversely if effluent leaks out then untreated water can pose a health threat to surface or groundwater. Some states have enacted rules, which include water tightness testing.

While concrete is still the most common material for wastewater tanks, use of plastic and fiberglass tanks has become more common. Plastics and fiberglass are inert to wastewater constituents, a benefit for product longevity, and they are lighter, making them ideal for difficult-access sites.

Due to new manufacturing technology, plastic tanks now offer increased strength as compared to plastic tanks of the past. Plastic tanks that are manufactured by the rotational molding process are typically a one-piece tank and thus minimize leak potential. Additionally, plastic tank designs have been introduced with a new technology of continuous gaskets, which are common in the pipe industry, and the inclusion of a fixed, permanent connector system to lock the seam in place.

In the case of concrete tanks, evolution includes tanks with top-seam joints to minimize the chance of leakage and the inclusion of additives or sealants to deter corrosion caused by hydrogen sulfide gases.

Change No. 2: Manufacturing process advancements

In most areas of the United States and Canada, codes still only state that a watertight tank shall be provided, but this is beginning to change, as some recent code alterations require testing to ensure tank watertightness. Best manufacturing processes and technological developments have been developed to meet the new requirements. These include the National Precast Concrete Organization's *Septic Tank Manufacturing Best Practices Manual*,

ABOVE: A concrete tank is shown with a top seam and cast-in access risers.
BELOW: A plastic tank is lowered into a trench. A continuous gasket is physically locked in place to ensure watertight conditions. (Photos courtesy of Infiltrator Systems Inc.)

which explains, "With the increasing regulatory demands for structurally sound and watertight tanks, it is critical for precast concrete manufacturers to continually raise the bar on quality."

Advances in plastic manufacturing processes, including injection molding or rotational molding, have increased tank strength and durability due to the ability to include corrugations and ribbing to strengthen the tank. Interior structural bulkheads can now also be included to increase tank strength. Using the injection molding process enables manufacture of larger tanks (1,500 gallons) that offer many benefits. The walls of the tank have a consistent wall thickness and the process allows for a stronger and lighter tank. And the tanks can be manufactured in halves, allowing nesting for increased shipping density.

Change No. 3: New uses for tanks

In septic system applications, the need for compact systems for small lots and for systems in environmentally sensitive areas is serving as a catalyst for tank innovation including increased safeguards to ensure watertightness. Applications such as rainwater harvesting for non-potable and potable use are coming to the forefront of the tank design arena. Economics and the higher costs of a depleted resource like water are helping to increase the popularity of diverse tank designs and related applications. Also, a variety of needs for pump tanks, stormwater runoff storage tanks, and agricultural and chemical storage are catalysts for new tank designs.

THE BOTTOM LINE

Tanks serve many uses. While their function as storage vessels has not changed, every other thing surrounding the topic of tanks has changed, including the types of usage, the materials used, and the rules and regulations surrounding tank applications.

industrynews

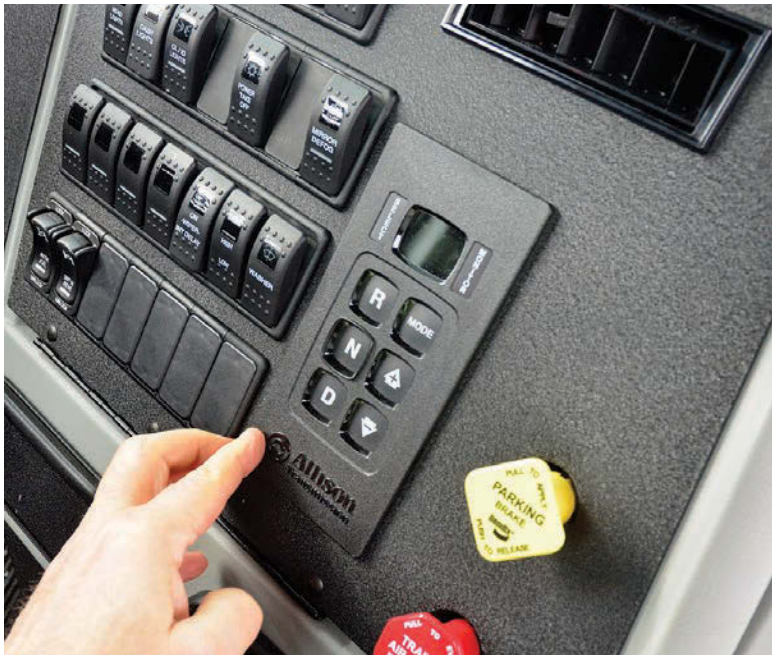
Global Pump names business development director

Global Pump, a Mersino Company, named Victor Krotikov business development director for the European Union/Commonwealth of Independent States.

Victor Krotikov

Franklin Electric names chief executive officer

Franklin Electric named Gregg C. Sengstack chief executive officer. He replaces R. Scott Trumbull who retired in May. Trumbull will remain the company's nonexecutive chairman.



Is the Manual vs. Auto Debate Over?

Improving reliability, better gas mileage and zero learning curve for new drivers are selling points in a shift toward auto transmissions for bigger work trucks

By Ed Wodalski

In the age-old debate of manual versus automatic transmissions in commercial trucks, Brian Stroetz, vacuum truck sales representative for Western Star dealer V & H Trucks in Marshfield, Wis., believes automatics will soon be the transmission of choice.

Far from extinct, Stroetz says manual transmissions still hold an edge, but automatics are gaining fast. "I don't think they're outselling manuals yet. [But] I would say it's about even, where it used to be 2-to-1, manuals over automatics."

One reason manuals still might hold an edge is cost. While an automatic can add $12,000 to the initial purchase price of a truck, Stroetz says much of that can be recouped when it comes time to sell. "You're paying more for it up front, but you get more for it on the back end," he says.

IN-TOWN CONVENIENCE

Paul McCain, owner of Burns Sewer & Septic in Victorville, Calif., says that although his nine trucks – including two vacuum rigs – have manual transmissions, he actually prefers an automatic transmission, especially for in-town driving.

"The drivers that I have are all driving manuals anyway and they're all good drivers, so I wasn't going to pay the extra money to get an automatic," he says. "Now if I had inexperienced drivers, I would probably go [with automatics]. Inexperienced drivers actually snap the driveshaft because they pop the clutch or they ride the clutch too much; they don't shift the truck right."

Stroetz says driver inexperience is costly. Repairing a manual transmission can cost $4,000 to $5,000, while an automatic might run $10,000. "If you just talk about the transmission itself, it's more expensive to repair an automatic, no doubt about it. But if you throw in the cost of a [$3,500] clutch, then it evens itself out."

While automatics enable fleet owners to hire from a larger, less experienced labor pool, safety is another factor to consider, especially in city traffic.

"You want your drivers to be concentrating on the road and what's going on around them versus what gear they're in," Stroetz says.

TRANSITION TIME?

Ease of driving is one reason why Woody's Septic Tank Service of Holly Hill, Fla., has an automatic in all but one of its vacuum service trucks.

"The way it's going, not everybody knows how to drive a manual," says company manager Myron Berrian. "Every driver drives differently. While we do have drivers who stay with their vehicles constantly, we also have drivers that switch trucks quite a bit, and if you have a driver overworking the clutch, you have to replace it. With the automatics we don't have to worry about that."

<< OPPOSITE PAGE LEFT: Manual transmissions, such as this Eaton Fuller, place full control in the hands of the driver. (Photos by Ed Wodalski)
<< OPPOSITE PAGE RIGHT: The fully automatic Allison transmission relies on computer technology for optimum performance.

>> Computer-guided automated manual transmissions (AMT), such as this Eaton UltraShift, eliminate the clutch pedal.

Fuel economy – a longtime selling point for manual transmissions – no longer is a factor, says Stroetz, who gives the edge in performance to automatics. Today, computer-driven, tech-savvy automatics calculate the optimum time to gear up for maximum performance. "With a manual you still have to keep that rpm at the sweet spot for the best economy and shift at the right time to maximize that out."

As for dependability, Stroetz says new technology, especially in the last five years, has improved the reliability and longevity of automatics. "Twenty years ago they weren't nearly as good as they are now."

For those not ready to make the switch from a manual to a fully automatic transmission, manufacturers such as Eaton and Detroit offer an automated manual transmission (AMT) option that can cost $6,000 to $7,000. In the case of Detroit's DT12, the AMT combines a traditional clutch-actuated manual gearbox with a computer-controlled shift actuator and clutch. The best shift patterns are selected electronically for optimal power or fuel efficiency. With computer-controlled shifting and clutch engagement, only two pedals are needed to operate the truck: brake and accelerator.

"If you want to wear your left knee out by double-pumping a clutch pedal, be my guest. Me? I'd rather blow out my left knee with my horrendous golf swing."
Todd McCann

VARIABLE-SPEED CRUISE

Detroit's 12-speed AMT also features variable-speed cruise control that enables the engine brake to regulate speed. With the engine brake set to off, drivers can choose from three settings on the cruise control limit switch on the dash.

Low is designed for steep grades, slowing the truck at a threshold of 3 mph, for example. Medium is for rolling hills, braking the engine at a higher threshold of 6 mph. Off is for flat terrain or for areas with noise restrictions. The engine brake is disabled while in cruise.

Geared toward more novice drivers, the Detroit ATM includes safety features including hill start aid that prevents the truck from rolling backward on uphill grades of 6 percent or forward on a downhill grade.

According to TruckingInfo.com, ATMs offer superior fuel economy (between 1 to 2 percent) over automatics, partly because they transmit power through metal gears and not hydraulic torque converters. And when compared to manuals, ATMs shift better than inexperienced drivers.

GETTING A WORKOUT

Todd McCann, whose insights and sometimes humorous views of the trucking industry can be found on abouttruckdriving.com, says one argument he hears is that trucks with automatic transmissions allow too many untrained drivers into the industry. "There is some truth to that," he writes. "After all, every minute a student spends learning to shift gears, they're also getting actual drive time behind the wheel. If you take out the process of learning to shift, you can be in and out of a truck driving school lickety-split. You know, they're absolutely right about this one, although that's really a philosophical argument, not a technical reason to hate automatics."

The way McCann sees the manual versus automatic debate: "If you want to wear your left knee out by double-pumping a clutch pedal, be my guest. Me? I'd rather blow out my left knee with my horrendous golf swing."

If you would like your wastewater trade association added to this list, send contact information to editor@onsiteinstaller.com.

Serving the Industry

Visit your state and provincial trade associations

By Doug Day

Alabama

Alabama Onsite Wastewater Association; www.aowainfo.org; 334/396-3434

Arizona

Arizona Onsite Wastewater Recycling Association; www.azowra.org; 928/443-0333

Arkansas

Arkansas Onsite Wastewater Association; www.arkowa.com

California

California Onsite Wastewater Association; www.cowa.org; 530/513-6658

Colorado

Colorado Professionals in Onsite Wastewater; www.cpow.net; 720/626-8989

Connecticut

Connecticut Onsite Wastewater Recycling Association; www.cowra-online.org; 860/267-1057

Delaware

Delaware On-Site Wastewater Recycling Association; www.dowra.org

Florida

Florida Onsite Wastewater Association; www.fowaonsite.com; 321/363-1590

Georgia

Georgia Onsite Wastewater Association; www.onsitewastewater.org; 678/646-0379

Georgia F.O.G. Alliance; www.georgiafog.com

Idaho

Onsite Wastewater Association of Idaho; www.owaidaho.org; 208/664-2133

Illinois

Onsite Wastewater Professionals of Illinois; www.owpi.net

Indiana

Indiana Onsite Waste Water Professionals Association; www.iowpa.org; 317/889-2382

Iowa

Iowa Onsite Waste Water Association; www.iowwa.com; 515/225-1051

Kansas

Kansas Small Flows Association; www.ksfa.org; 913/594-1472

Kentucky

Kentucky Onsite Wastewater Association; www.kentuckyonsite.org; 855/818-5692

Maine

Maine Association Of Site Evaluators; www.mainese.com

Maine Association of Professional Soil Scientists; www.mapss.org

Maryland

Maryland Onsite Wastewater Professionals Association; www.mowpa.org; 443/570-2029

Michigan

Michigan Onsite Wastewater Recycling Association; www.mowra.org

Michigan Septic Tank Association; www.msta.biz; 989/808-8648

Minnesota

Minnesota Onsite Wastewater Association; www.mowa-mn.com; 888/810-4178

Missouri

Missouri Smallflows Organization; www.mosmallflows.org; 417/739-4100

Nebraska

Nebraska On-site Waste Water Association; www.nowwa.org; 402/476-0162

New Hampshire

New Hampshire Association of Septage Haulers; www.nhash.com; 603/831-8670

Granite State Designers and Installers Association; www.gsdia.org; 603/228-1231

New Mexico

Professional Onsite Wastewater Reuse Association of New Mexico; www.powranm.org; 505/989-7676

North Carolina

North Carolina Septic Tank Association; www.ncsta.net; 336/416-3564

North Carolina Portable Toilet Group; www.ncportabletoiletgroup.org; 252/249-1097

North Carolina Pumper Group; www.ncpumpergroup.org; 252/249-1097

Ohio

Ohio Onsite Wastewater Association; www.ohioonsite.org; 866/843-4429

Oregon

Oregon Onsite Wastewater Association; www.o2wa.org; 541/389-6692

Pennsylvania

Pennsylvania Association of Sewage Enforcement Officers;
www.pa-seo.org;
717/761-8648

Pennsylvania Onsite Wastewater Recycling Association;
www.powra.org

Pennsylvania Septage Management Association;
www.psma.net;
717/763-7762

Tennessee

Tennessee Onsite Wastewater Association;
www.tnonsite.org

Texas

Texas On-Site Wastewater Association;
www.txowa.org;
888/398-7188

Virginia

Virginia Onsite Wastewater Recycling Association;
www.vowra.org;
540/377-9830

Washington

Washington On-Site Sewage Association;
www.wossa.org;
253/770-6594

Wisconsin

Wisconsin Onsite Water Recycling Association;
www.wowra.com;
608/441-1436

Wisconsin Liquid Waste Carriers Association;
www.wlwca.com;
608/441-1436

NATIONAL

Water Environment Federation;
www.wef.org;
800/666-0206

National Onsite Wastewater Recycling Association;
www.nowra.org;
800/966-2942

National Association of Wastewater Technicians;
www.nawt.org;
800/236-6298

CANADA

Alberta

Alberta Onsite Wastewater Management Association;
www.aowma.com;
877/489-7471

British Columbia

WCOWMA Onsite Wastewater Management of B.C.;
www.wcowma-bc.com;
877/489-7471

Manitoba

Manitoba Onsite Wastewater Management Association;
www.mowma.org;
877/489-7471

New Brunswick

New Brunswick Association of Onsite Wastewater Professionals;
www.nbaowp.ca;
506/455-5477

Nova Scotia

Waste Water Nova Scotia;
www.wwns.ca;
902/246-2131

Ontario

Ontario Onsite Wastewater Association;
www.oowa.org;
855/905-6692

Ontario Association of Sewage Industry Services;
www.oasisontario.on.ca;
877/202-0082

Saskatchewan

Saskatchewan Onsite Wastewater Management Association;
www.sowma.ca;
877/489-7471

Canadian Regional

Western Canada Onsite Wastewater Management Association;
www.wcowma.com;
877/489-7471

productnews

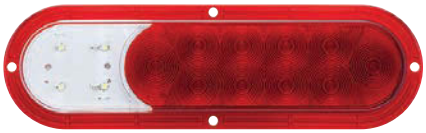
Grundfos Sewer Chewer grinder

The Sewer Chewer grinder from Grundfos Pumps is designed for wastewater and sludge-handling systems. It features a ductile iron frame and high-pressure pipe flanged seal. Submersible up to 90 psi, the grinder has a NEMA 4X FRP controller and PLC keypad operator interface. **800/921-7867; http://us.grundfos.com.**

Franklin Electric constant pressure pumps

SubDrive QuickPAK constant pressure pump systems with TRI-SEAL hydraulics from Franklin Electric use variable-frequency technology to deliver constant water pressure while performing multiple tasks, such as running a dishwasher and watering the lawn. Systems include submersible pump, NEMA 1 and NEMA 4 enclosure options and radio frequency interference shielding. Able to work with small or large pressure tanks, applications include residential water, landscape irrigation, water treatment and geothermal systems. **260/824-2900; www.franklin-electric.com.**

Optronics combo lamp



The 9-inch, half-inch-thick STL68 Combo Lamp from Optronics International is a combination LED stop, tail, turn and backup light that mounts to the vehicle surface. **800/364-5483; www.optronics.com.**

Isuzu 2014, 2015 N-Series diesel models

Isuzu Commercial Truck of America introduced its lineup of 2014 and 2015 model year N-Series diesel trucks. The 2014 NPR ECO-Max features increased frontal area, enabling non-air-deflector models to handle bodies with inside heights up to 85 inches. The 2015 NPR-HD, NQR and NRR models feature the 4J 3.0 liter, four-cylinder turbo-diesel engine with Denso air conditioning compressor, along with 19.5-inch Bridgestone M895 low rolling resistant tire for improved fuel efficiency. **866/441-9638; www.isuzucv.com.**

Septic Tanks and Components

By Craig Mandli

Septic tanks come in a wide variety of sizes and construction materials geared toward the specific site placement. Here are several tank options, along with forms, risers, lids and filters to give installers a myriad of choices.

SEPTIC TANKS

Polyethylene septic tanks

Polyethylene septic tanks from **Coon Manufacturing** are produced using rotational molding technology to create seamless, one-piece units. They are resistant to chemicals and provide a long life expectancy. They are molded with ribs, and are available in 500-, 1,000- and 1,500-gallon sizes, with the two larger sizes available in one or two compartments. Optional manhole extensions and lid/riser combinations are available to accommodate different grades of landscape. **660/485-6299; www.coonmfginc.com.**

Concrete tank with anti-floatation collar

Concrete septic tanks from **Crest Precast** have an anti-floatation collar cast into the tank base to prevent floatation of septic, pump and holding tanks in high-water areas. This collar eliminates the need for ballast block tie-down blocks. **800/658-9045; www.crestprecastconcrete.com.**

Two-piece plastic tank

The two-piece design of the **IM-1060** septic tank from **Infiltrator Systems** allows for easy shipping and reduces freight costs. It has an integral heavy-duty lid that connects with the TW Riser System, structurally reinforced access ports, reinforced structural ribbing and fiberglass support posts to provide additional strength. Inboard lifting lugs make delivery and handling easy, and no special installation, backfill or water-filling procedures are required. The tank can be installed with 6 to 48 inches of cover, and can be pumped dry. **800/221-4436; www.infiltratorsystems.com.**

Large-capacity in-ground tank

Heavy-duty and lightweight, large-capacity rotomolded polyethylene in-ground tanks from **Premier Tech Aqua** were developed specifically for water storage and wastewater treatment use. The tanks are well-adapted to North American climates and are suitable for a large variety of commercial, community and municipal applications, including rainwater harvesting and fire water storage, septic tanks, equalization tanks, different types of bioreactors (MBBR, MBR, SBR) and complete process lines. Easy to handle and available in 4,000- to 12,000-gallon capacities, they are delivered ready to use. **800/632-6356; www.premiertechaqua.com.**

Polyethylene water tank

Polyethylene water tanks from **Romotech** have gallon indicators and translucent walls for level viewing. Larger rounded tanks are equipped with molded-in legs for tank support. Tank sizes range from 8 to 525 gallons. They are made from natural, FDA-approved polyethylene material that is UV-stabilized for outdoor storage. All tanks have slots for tie-down straps (straps not included), and are equipped with a 3/4-inch bulkhead fitting. All 8- to 125-gallon tanks are equipped with a 5-inch lid, while 325- to 525-gallon tanks are equipped with a 12-inch lid. **574/831-6450; www.romotek.com.**

Versatile tank

The **MultiTank** from **Roth Global Plastics** can be used for water cistern, pump, holding, rainwater or septic tank applications. This is possible due to its inner layer of FDA-approved virgin HDPE, two inside layers of polyethylene for improved stability, plus one outer layer of black and UV-stabilized polyethylene. Features include CSA, NSF and IAPMO certification, a COEX-4 multilayer co-extrusion process, a low-profile design that means less digging and avoidance of a high-water table, lightweight construction, a multi-port inlet/outlet convenient for field piping, the ability to enter and exit the tank on the ends or sides, two 24-inch manways to provide easy access for maintenance and service, a cylindrical shape that requires no water for backfill, a threaded riser system and watertight seamless construction. **866/943-7256; www.rothmultitank.com.**

Low-profile septic tank

Low-profile **Dominator** septic tanks from **Snyder Industries** can be buried without water being used for ballast and strength, and can be backfilled with native soils as long as those soils are trash-free and free-flowing. They can also be used as holding tanks, and pump tank versions are also available. They are one piece, with no seams that might leak or structurally fail after installation. They are available in 750-, 1,000-, 1,250- and 1,500-gallon sizes, as one- or two-compartment tanks. Their monolithic structural design provides ideal top load strength, and a manway

isolation design keeps manholes from distorting during backfill and pumpouts. They are available in 1,200- and 1,700-gallon water cisterns. **402/467-5221; www.snydernet.com.**

Spherical concrete septic tank

The **Turtle Tank** spherical concrete septic tank offers a large surface-to-volume ratio, load capacity and high compressive strength. It has the minimum wall thickness accepted by government standards and utilizes a minimum amount of steel, as the arched shell design takes tensile forces and turns them into compressive forces. It can be fitted with a divider if a two-stage tank is required. It is constructed in two bell-shaped halves sealed together with butyl rope and mortar. Its self-supporting shape allows for relative ease of transport and installation, and to be installed regardless of the angles of existing piping and/or drainage field. Inlet/outlet fittings can be modified slightly as per provincial or state standards. They are also designed for the inclusion of an effluent filter. There is only one clean-out required, and both inlet and outlet are accessible from it. **250/863-8372; www.turtletanks.com.**

SEPTIC TANK FORMS

Heavy-gauge tank mold

Hydra-Strip septic tank molds from **Norwalk Precast Molds** combine heavy-gauge material and the company's Hydra-Strip technology. The hydraulic operation combined with parts being linked mechanically insures smooth, jam-free stripping of the mold. Molds are available in a wide range of sizes and configurations, and can be built to meet state, local or provincial regulation. **800/251-8409; www.norwalkprecastmolds.com.**

Concrete septic tank form

Air-release septic tank forms from **The Shaddix Company** produce concrete tanks with required capacity, sufficient strength to hold the weight of the concrete without bowing, slick internal skins free of pits, properly placed inlets and outlets, and clamps to hold firmly during the pouring operation. They are quick to set up and break down, as a quick squirt of air separates the inner core from the outer form. They can be safely handled. **256/338-4987; www.theshaddixcompany.com.**

RISERS

Riser access system

Access systems from **Quanics** provide easy access to septic tanks, dosing tanks and basin assemblies. They are available in polyethylene and PVC materials in 22-, 24-, 26-, 30- and 36-inch diameters. The interlocking design is available in 6-, 12-, 18- and 38-inch height increments. Risers and lids interlock with a neoprene gasket and twist lock design. The risers may be cast in the tank or retrofitted to an existing tank by using a retrofit tank adapter. The PVC access system can be custom cut for any height from 6 up to a maximum of 120 inches. Sections of riser may also be joined using a specially designed coupler and adhesive. Risers come equipped with UV-resistant tight-fitting lids and include stainless steel tamper-resistant fasteners. Optional insulation may be added. Watertight pipe penetrations can be achieved by utilizing rubber grommets available in sizes from 1/2 up to 4 inches. **877/782-6427; www.quanics.net.**

Septic safety lid riser

Septic tank lid risers from **Tuf-Tite** feature internal supports or ledges to support internal plastic safety lids. The ledges will support the company's plastic internal safety lids or a variety of internal safety devices made by others, such as concrete, fiberglass or rope netting. The riser lids come with all necessary mounting hardware including safety screws. **800/382-7009; www.tuf-tite.com.**

LIDS

Septic tank lid

Seal-r septic tank lids from **BrenLin Company** create a strong seal between the septic tank and the riser, eliminating water infiltration between the riser and the tank. They are made of durable materials, range from 12 to 42 inches, and can be personalized with a service provider's company information. The 42-inch lid meets growing demand for bigger risers to accommodate new technology equipment. **888/606-1998; www.seal-r.com.**

Polyethylene septic tank cover

Polyethylene septic tank covers from **Hedstrom Plastics** fit standard 18- and 24-inch double-wall corrugated pipe. Gaskets and safety hardware are included, and a safety net is available. Covers can be filled with sand on site for added weight. Foam-filled lids are available upon request. Covers can be customized with service provider company name and are available with a tank adapter. **888/434-5891; www.hedstromplastics.com.**

Lightweight fiberglass riser lid

The 24-inch solid fiberglass **DuraFiber** riser lid from **Orenco Systems** has a flat-style lip for PVC and HDPE pipe. It weighs 10 pounds, but resists damage from lawn equipment and can withstand a 20,000-pound load. Its design allows flush-to-grade installation, and features a cored centering ring to align and fit the lid snugly to the riser, as well as a urethane gasket to help keep the lid-to-riser seal watertight. It has a nonskid surface with a molded-in caution statement and a customizable center insert for a logo or additional information. Lids are also available as Landscape Lids in three patterns designed to blend into their surroundings – grass, river rock and bark. **800/348-9843; www.orenco.com.**

24-inch septic lid

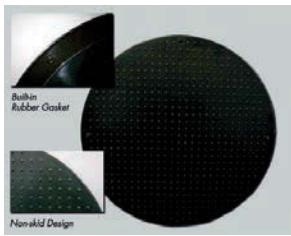
The 24-inch septic lid from **RotoSolutions Inc.** is made of heavy-duty, rotomolded plastic and weight-rated for 3,500 pounds. **800/868-0973; www.rotosolutions.com.**

(continued)

Locking riser lid

Locking riser lids from **Sim/Tech Filter** are mainly for use on frequent-access systems. Screws are not used, but instead there is a six-point locking web that is engaged and disengaged with the use of a push release tool. The web locks and holds the lid in place in the same motion. The lid eliminates the problems of missing screws and worn-out screw holes. It is also fast and easy to access the tank, while young children cannot remove it. The lid is designed to fit 24-inch-diameter Sim/Tech Risers or double-wall corrugated pipe or ultra-rib pipe. **888/999-3290; www.simtechfilter.com.**

Nonskid, fiberglass septic riser cover



The nonskid, kelp green fiberglass septic riser cover from **Topp Industries** is designed to fit most 24-inch-diameter risers and corrugated pipe. The cover is noncorrosive and can withstand a 2,500-pound wheel load. The built-in cover gasket provides a watertight and gas-tight seal. Bolt holes are predrilled for easy assembly. Stainless steel hardware is included. **800/354-4534; www.toppindustries.com.**

FILTERS AND COMPONENTS

Multiple-level effluent filter

The **ML2-416** effluent filter from **Bear Onsite** has multiple levels of filtration combined in a single cartridge, allowing it to clean up the discharging effluent from a septic tank, while providing adequate gas flow in and out of the tank. It includes an initial screen with 30 linear feet of vertical 1/7-inch openings and another 4 linear feet of 3/16-inch openings, then a fixed secondary screen utilizes polarization with 100 linear feet of 1/16-inch horizontal openings. The cartridge fills half of the UNI-Tee Baffle, allowing open area for the exchange of gases such as hydrogen sulfide and oxygen within the septic environment, and creates a large flow-path below the water level so that a high percentage of solids reach terminal velocity within the baffle and fall back into the tank. **877/653-4583; www.bearonsite.com.**

Effluent screening device

SaniTee effluent screening filters from **Bio-Microbics** protect absorption areas and systems functions from premature clogging and failure due to the release of non-settleable solids and/or nondegradable flushed materials. Installed directly in the outlet tee of the tank, their keyhole weirs provide consistency of flow despite surges, and angled slots resist blinding and prevent clogs inside the filter housing better than bar and mesh-type screens. They can be sized to screen flows from 500 to more than 20,000 gpd, and prevent floatables, large amounts of FOG and/or solids from leaving the tank, and help to extend the life of the system, reduce clogging material and improve flow conditions. Their easy, slip-in installation design and swabbing for clean-in-place maintenance make it easy to maintain. **800/753-3278; www.biomicrobics.com.**

Effluent filter

The **WW1 Effluent Filter** from **Clarus Environmental** is used in residential applications where the maximum flow is less than 1,500 gpd. It features a screen that remains in the outlet tee while the actual cartridge is removed for servicing. This bypass protection keeps solids in the tank and out of the drainfield. The filter's pleated design provides 132 linear feet of 1/16-inch filtration and encourages top-down filtration that results in longer service intervals. A twist lock mechanism prevents the filter from floating out of the tee, and a locking tab keeps the bypass sleeve in place during servicing. A rubber gasket ensures all effluent passes through the filter, not around it, and fits in standard 4-inch outlet tees. Two or more filters may be connected with a manifold for higher flow applications. **800/928-7867; www.clarusenvironmental.com.**

Vented pump enclosure

The **High Vent Air Pump Enclosure** from **Polylok** measures 24 inches long by 15 inches high, and utilizes an air vent (independently tested to 330 cfm) on a 24-inch flat cover with mesh air inlets to dissipate heat and extend the life of the air pumps. Its green-colored UV-protected weather-resistant enclosure blends with the environment and can be used above or below grade in new or retrofit applications. Accessories include risers to adjust height to fit most applications, and a full line of air pumps ranging from 1.41 to 5.29 cfm. **877/765-9565; www.polylok.com.**

Submersible pump filter

The **No-Vault Pump Filter** from **Septic Services** fits a variety of submersible pumps to improve pump performance. It is made of stainless steel and PVC plastic so it will not corrode. It's also lightweight to make pump placement or removal from the tank easy and quick. It has a self-adjusting seal to help keep debris out of the filter interior, as well as a 3-inch sludge shield at the bottom for added protection against clogs. It has an easy-to-clean surface, and the entire unit may be disassembled for thorough cleaning if required. **800/536-5564; www.septicserv.com/store.**

"Rules and Regs" is a monthly feature in *Onsite Installer*™. We welcome information about state or local regulations of potential broad interest to onsite contractors. Send ideas to editor@onsiteinstaller.com.

Illinois Sets Surface Discharge Permit Requirements

By Doug Day and Sharon Verbeten

As of February, new or replacement surface discharge septic systems in Illinois require a general permit from the U.S. Environmental Protection Agency if they discharge to the "waters of the United States," to conform to national standards. The EPA says its definition of the term includes "among other things, traditional navigable waters, tributaries of traditional navigable waters, and wetlands that are adjacent to traditional navigable waters or their tributaries." Anyone not eligible for the general permit may apply for an individual permit from the state EPA.

The federal permits, issued under the National Pollutant Discharge Elimination System, also set discharge limits (1,500 gpd) and require inspection, reporting and effluent monitoring by a qualified person every six months and visual inspection by the property owner twice a year (including a log of inspection dates and findings). Connection to a sanitary sewer system is required if it is less than 300 feet away from the property.

It is the homeowner's responsibility to make the determination if the system requires a permit. Violations would be subject to enforcement action under the Clean Water Act. Guidance provided in an FAQ document posted by EPA Region 5 indicates that most newly installed systems, at least during exceptionally wet periods, would meet the requirements for a permit.

There are also requirements for notifying the EPA if the property changes hands so a permit can be issued to the new owner.

Alabama

Illegal septic systems and other problems are forcing about 80 families out of their mobile homes at Pleasure Point Park and Marina on Lake Martin in Dadeville. The property is owned by Alabama Power, which was cited last summer for 19 violations, including unpermitted and illegal septic systems and graywater discharges from the homes.

For almost 50 years, the company has been leasing 37 acres to Pleasure Point, which then subleases the lots to individual homeowners. Canceling the lease with Pleasure Point means all the homeowners must move their mobile homes by June 30. While most are vacation homes, some are permanent residences.

Alabama Power says it could cost up to $1 million to remove all the illegal systems and clean up the property. The tenants claim a community onsite system could be built for about $300,000, but the power company says a remedy could cost up to $2.5 million.

Kansas

The Kansas Department of Health and Environment has issued specifications county health jurisdictions can use if they want to allow graywater reuse in their communities. It is not a rule, and local officials are free to decide whether or not to allow graywater reuse, according to a February memo from the department.

"The local authorities responsible for enforcing County Sanitary Codes have always and still have the ability to adopt local graywater rules and regulations as part of their approved Sanitary Code, in order to allow or prohibit graywater use and reuse," the memo states. "Local authorities may also approve graywater systems as a variance to existing codes. We want to make it clear, it is not mandatory that local authorities allow graywater reuse. However, if a local authority wishes to pursue reuse, they may."

KDHE has also offered technical assistance to local officials should residents request permission to reuse graywater. The specifications apply only to single-family homes; graywater reuse from any other source is prohibited.

According to the department, interest in graywater reuse is on the rise due to drought conditions. A bill that would have required KDHE to develop rules and regulations died in committee in 2013, but the department was tasked with drafting specifications, "that would meet the needs of Kansas residential constituents, while protecting public health and the environment," according to the memo.

Maryland

Even proponents say there's not much chance of them passing, but two bills in Maryland would have the state reimburse people for lost property value due to the Sustainable Growth and Agricultural Preservation Act of 2012. The law restricts the use of septic systems in residential subdivisions across the state, among other things.

One proposal, House Bill 576, would require payments to landowners from the state for lost property values based on the average of three appraisals. Senate Bill 176 calls for income tax credits. The Republican bills have little chance of passing the Democrat-controlled legislature. A GOP bill to repeal the septic law last year died in committee.

Septic Tanks and Components

By Craig Mandli

Leaching chambers installed at beachfront snack bar

Problem: Sandy Beach at Lake Morris in Bantam, Conn., was undergoing a renovation, including the installation of a new snack bar with a grease trap, bathrooms and a bath station. Since the existing septic system from the 1950s was outdated, a new innovative system was needed to provide enough storage to accommodate the updates.

Solution: Contractors at Green Construction Management LLC consulted with **CULTEC Inc.** to design and install a Connecticut Department of Energy & Environmental Protection-approved subsurface septic system that would provide increased storage and dispersion of sewage effluent. The contractor installed a 2-inch pipe that pumps approximately 400 feet across the beachfront, where it meets a splitter valve system. The splitter valve separates into four distribution boxes, which then run on top of two 100-foot double rows of **CULTEC Contactor 100HD** plastic leaching chambers – 54 chambers total. The 2-inch line features 1/4-inch holes every 3 feet that drain into the chambers.

Result: This new system design provides efficient handling of the snack bar's increased sewage flow. The municipality reports no issues. **800/428-5832; www.cultec.com.**

Precast tank used for deeply buried septic system

Problem: The University of Wisconsin's Health East facility in Madison required that its septic tank sit 18 feet underground. Soil loads at that depth dictate a strong tank.

Solution: Having engineered tanks for similar site-specific challenges, which included soil loads of 2,220 pounds per square foot, **Crest Precast**, a member of the **National Precast Concrete Association**, took on the project. With the use of a consultant engineer, Crest designed a 5,000-gallon clamshell-style tank that exceeded specifications. Using rational design methods and known material properties as guidelines, they designed the tank with 6-inch walls, and a 7-inch top and base, providing a rigid structure that was easy to install and backfill. The 6,000 psi concrete included an admixture to further waterproof it. Crest also accommodated the client's special request for 36-inch-diameter risers.

Result: "We requested a precast concrete tank due to the deep bury condition to ensure a permanent structure for the life of the building," says Ron Babler of Hooper Corporation, the contractor for the job. The end product proved not only cost-effective but had the strength to meet the unique site demands. **800/366-7731; www.precast.org.**

Concrete tanks provide solution for rural apartment complex

Problem: Because it was located 9 miles north of Williston, N.D., the Missouri Ridge apartment complex needed its own sewage treatment system. The original specifications for the project called for fiberglass tanks, but due to the composition of the soil in the area, tank weight is an issue to prevent floating. In addition, the fiberglass tanks required a smooth aggregate to prevent piercing, which was not readily available in the area.

Solution: **Wieser Concrete Products** suggested using precast concrete tanks. Because of the weight of the tanks, ballast was not required. Additionally, existing soils could be used for backfilling. A total of 21 tanks were produced for this system. Tanks located within the complex include 12 12,000-gallon tanks, six 6,010-gallon tanks, a 3,000-gallon tank and a 1,000-gallon tank. The heart of the system, located about 1,500 feet from the center of the complex, is a 38,000-gallon dose tank. This tank contains 12 pumps, which are connected to 12 zones within a 6-acre drainfield.

Result: In this situation, the precast concrete tanks eliminated costly extras and the project realized significant savings. **800/325-8456; www.wieserconcrete.com.**

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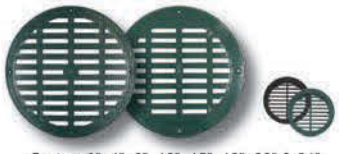

Grates: 3", 4", 6", 12", 15", 18", 20" & 24"

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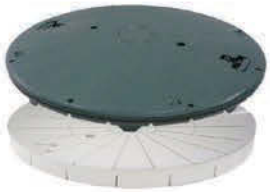

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