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**SAFETY
FIRST**
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BIG BOY TOYS

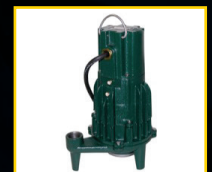
California 'septic surgeon' Nick Herrera loves his machines and puts them to good use tackling a broad spectrum of onsite challenges [p.12](#)



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INSTALLER PROFILE:

Big Boy Toys By David Steinkraus

ON THE COVER:

Nick Herrera has built a successful small-scale operation in Paradise, California, where he uses a well-maintained collection of equipment to complete custom work in a community dominated by onsite wastewater systems. Herrera is shown on the job with his Ferretec 760 backhoe. (Photo by Lezlie Sterling)

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It's Time to Get Serious About Safety

Installers need to bring a 'safety first' attitude to their crews and stress taking the time to get the job done right every day

Through its new safety-training program, the Washington On-Site Sewage Association has made an incalculable positive contribution to the industry and every technician who's worked in a trench or completed a tough confined-space job.

If you haven't already seen videos produced by WOSSA, you should take a look and then share them with your crews. The videos, and the collection of photos you'll see here and along with writer Doug Day's State of the States interview with WOSSA officials, confirm there's a lot of work to be done to build safety standards across the onsite industry.

As you will learn in Doug's story, WOSSA has developed a comprehensive safety-training program that includes the videos, a workbook and exercises aimed at educating on the Focus Four hazards identified by OSHA: falls, caught in or between, struck-by, and electrocution. The free training sessions have been offered by WOSSA in six states and the association wants to expand the reach further.

The facts presented are sobering. On average, 54 U.S. workers die every year in excavations and trenches. More than 90 confined-space entry deaths are reported annually. About 25 percent of the confined-space deaths happen during repair and maintenance, and cleaning and inspections operations.

Personal stories in the videos are riveting.



These workers are complying with hard hat and safety vest requirements, but are working with no shoring protection directly beneath a 50,000-pound excavator. (Photos courtesy of the Washington On-Site Sewage Association)

Went Ahead Anyway

In one video, onsite system specialist Justin Johnson described how he felt forced to enter a deep septic tank to repair cracks with liquid grout. As he roto-hammered holes in the compromised concrete, the tank wall gave way and he was injured before being pulled to the surface.

"My first thought when I was presented with this job; it was a residential tank that was way too deep for what it was designed," Johnson said. "We decided to go ahead with the repair ... when my first instinct was not to."

"I have been in other predicaments since then, and before I start any job, the first thing that goes through my mind is that I do have a family and my son is very important to me. ... Nobody is going to fill my shoes at home."

Deadlines, tight scheduling and impatient contractors can encourage installers to take chances and cut corners. Weather conditions can also play a role in these tragedies, as customers don't want a soaking rain to slow their project, even if delaying the work is the right thing to do.

continued >>

<< The driver of this dump truck delivering fill to an onsite system installation didn't properly account for slope of the land when raising the box.



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Today's Answer for the Protection of Tomorrow's Environment

Keith Pelzel, owner of Westside Septic Design, explained in a video how he bowed to pressure and started working in the rain at an excavation with unstable fill soils. It was a mistake he almost paid for with his life.

I felt pressured

“I tried, on three different occasions, talking to the contractor trying to postpone doing the job that day,” Pelzel said. “Through a series of events and bad decisions, and things unknown to me, in 15 seconds I am completely passed out, no air. That’s it.”

Pelzel was buried in a collapsed trench, pulled out and revived, but he suffered multiple serious and painful internal injuries. He learned a lesson.

“I did this from pressure from the contractor. It absolutely made a huge difference on how I looked at jobs,” he said. “I don’t let people push me anymore. I know what my limits are and I go to my limits. I don’t go any further.”

Do these stories sound familiar? Every onsite technician has felt similar pressures to get the job done now. Homeowners and building contractors want to stay on schedule, so installers may go against their better judgment and get to work. Look at the photos that accompany this column and our State of the States feature to see trenches that should be shored, trucks and excavators pictured in the wrong place at the wrong time, and technicians failing to don personal protection equipment, or PPE.

There are a few important takeaways from the training videos.

Safety training is not a sometime thing.

What do you call a quarterly safety session with your crew? A good start. But it’s not enough. It’s important to review safety challenges your people are going to face every month, every week and every day. Make these meetings mandatory for all workers, even the office staff, so they understand all the work being done in the field and the procedures everyone should follow. Start the morning looking at where each crew is going for the day and what sort of safety equipment they should take along to the job site.

Sessions need to be compelling and informative.

Look for good sources of job site safety information, starting with the WOSSA program and the OSHA website, www.osha.gov. Check with your state’s onsite trade association for access to training materials or to set up association-sponsored training sessions. If you aren’t a member of your state association, check out the list of regional onsite associations with contact information in every issue of *Onsite Installer*. The Water & Wastewater Equipment, Treatment & Transport Show, this month in Indianapolis, is also a good place to attend training sessions that often touch on working safely. (See more on that at the end of this column.)

Make sure they’re paying attention.

Work hard to keep technicians interested in learning and reviewing safety procedures. It doesn’t help to call a safety meeting if no one is paying attention. Turn off the cellphones and demand everyone’s undivided attention. Ask questions, make eye contact and seek immediate feedback to make sure

“I don’t let people push me anymore. I know what my limits are and I go to my limits. I don’t go any further.”

Keith Pelzel



A worker exposed to pathogens because of a ruptured hose.

workers are hearing and understanding your message. Reinforce that safety is serious business and you expect full compliance.

Just say no to dangerous situations.

Refuse to bow to pressure to proceed with a job if you have any safety concerns. Tell your customers you’re going to require all necessary equipment to shore trenches, operate equipment safely and secure work sites. Encourage your crew to ask questions if they see something that isn’t right. Empower them to stop a job to rectify a safety concern. Preach that it’s more important to keep the crew safe than meet unrealistic deadlines. A “safety first” attitude will gain the respect of your workers and help ensure they won’t take chances because they perceive pressure to get the job done no matter the risks.

Lesson Learned

William Gonzales, owner of Grizzly Septic Services and a victim of a serious industrial accident, puts it all into perspective in one video.

“With regards to safety, money shouldn’t be a consideration, because what you save by your safety meetings saves money in the long run, both in employee safety and employee health,” he said. “A person doesn’t realize how quickly they can become injured and how a trivial little item can cause serious damage. So we must be aware on our job all the time with regards to safety.”

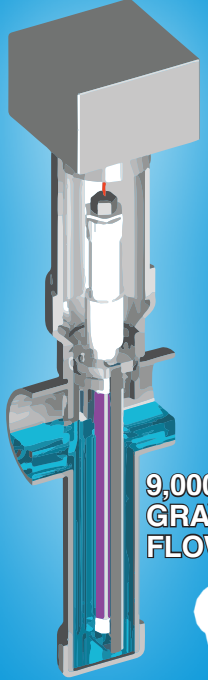
See You at the WWETT Show

Welcome to the WWETT Show! You may be reading this issue of *Onsite Installer* at the Indiana Convention Center during the 2017 WWETT Show, Feb. 22-25 in Indianapolis. This is the biggest trade show for the industries working in decentralized wastewater, including the installer community. When you’re here, you’ll see a wide range of onsite components and equipment used by installers, and have the opportunity to network with the best and the brightest contractors from across North America.

I’m here, too. I will be roaming the exhibit hall looking at the latest onsite technologies, and meeting manufacturers and contractors alike. I’d enjoy meeting you and learning more about your business. Please swing by the COLE Publishing booth at the WWETT Show and introduce yourself. We’re always on the lookout for interesting onsite companies to feature, and challenging subjects for our monthly System Profile entry. Tell me about your most recent big challenge and maybe we’ll feature you in an upcoming issue. ▣

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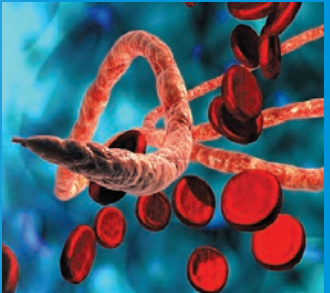
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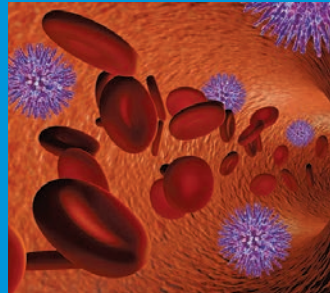
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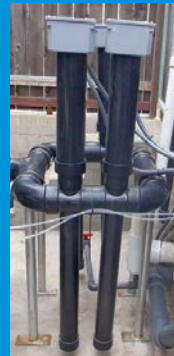


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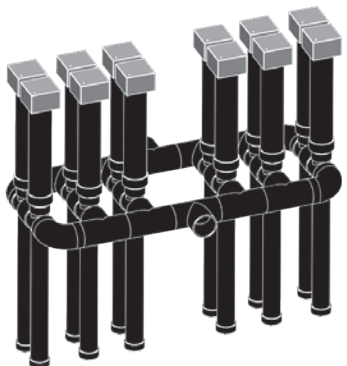
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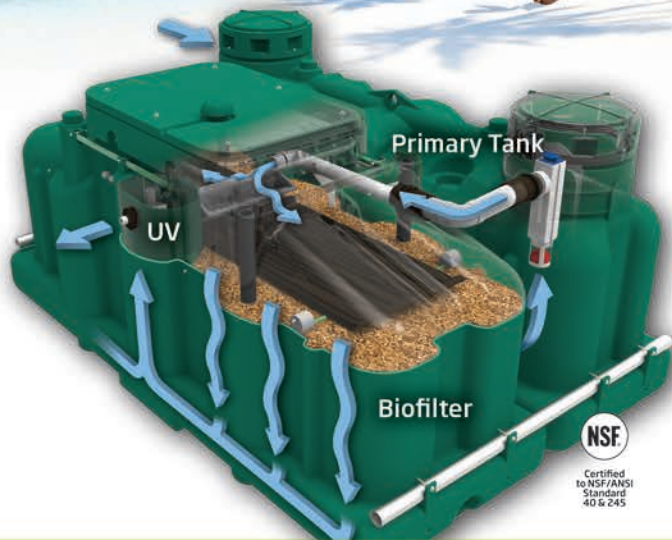
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ROUTINE EVALUATION

Tips for Drip System O&M

Drip distribution systems have been around for over two decades, so chances are if you're a service provider you will encounter these systems, if you have not already. In this exclusive online story, our resident expert Jim Anderson outlines the items and conditions that should be evaluated and how to determine a course of action for drip system maintenance. onsiteinstaller.com/featured



Overheard Online

"Research indicates that more than 75 percent of employees say a benefits package is important in their decision to accept or decline a job offer."

- *Can Your Onsite Septic Business Afford Employee Benefits?*

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WORKING IN TIGHT SPACES

Room to Maneuver

Directional drilling equipment is something that most installers are more likely to hire than purchase. But for cover star Nick Herrera, renting that equipment wasn't a good solution for the small footprint he faces on most jobs near his home base of Paradise, California. Read more about how Herrera utilizes his favorite tool: his directional drilling machine. onsiteinstaller.com/featured



MAINTAINING PRESSURE DISTRIBUTION

System Cleaning Guide

Changes in orifice sizing mean cleaning the pressure manifolds or laterals is a good practice when maintaining pressure distribution systems. Now, when pressure distribution systems are installed for mounds, at-grades or pressurized shallow trenches, they are installed (or should be installed) with accessible clean-outs to facilitate regular maintenance and to check pressure in the laterals. Here we share a guideline for inspecting and cleaning manifolds and laterals. onsiteinstaller.com/featured

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INSTALLER PROFILE



Herrera operates a Ditch Witch JT922 directional drilling machine, which frequently comes in handy on onsite projects.

BIG BOY TOYS

California 'septic surgeon' Nick Herrera loves his machines and puts them to good use tackling a broad spectrum of onsite challenges | By David Steinkraus | Photos by Lezlie Sterling

After years in the wastewater business, Nick Herrera didn't go big. He went the other way, and in the process found that having a smaller company is a better way to serve his customers. "When I had crews before, I'd spend most of my time going from crew to crew. And now I can be a lot more controlled and everything gets done right the first time," he says.

Getting it done right the first time is the way Herrera looks at business. Look at the company's website, and you see this: "Our philosophy is simple: Do the very best job that is humanly possible, period."

Herrera went into the installing business as soon as he graduated from Paradise High School in 1978. That installer was his father-in-law, and

Herrera stayed there until 1986, when he started NH Construction. His license is for general building and engineering contracting, and while he built a couple of houses on spec, he likes wastewater work better. He says he prefers moving from job to job instead of chasing the many small pieces that must be brought together for a house.

Big idea for onsite

Herrera's service area is Paradise, California, and the nearby city of Chico, both about 90 miles north of the state capital of Sacramento. Paradise is a city of about 26,000 people in the mountains of northern California, north of Sacramento, northwest of Lake Tahoe. Chico is downslope, a city

of about 90,000 and one of the many communities in California's agriculture-heavy Central Valley.

Paradise is also the largest community in the U.S. Herrera knows of that has no municipal wastewater system. Every home and every business has its own onsite treatment system. That strategy is left over from the 1980s and '90s when city leaders didn't want their community to grow too fast.

Those were the older leaders. Younger people in charge now are thinking differently about the city, Herrera says. There is talk of collecting wastewater and sending it downhill to Chico, which has some excess capacity at its treatment plant.

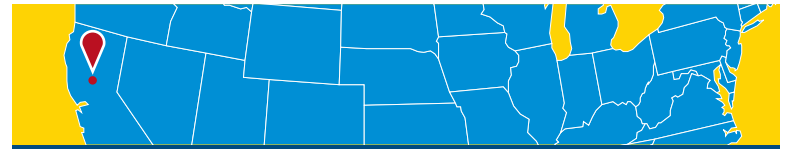
Either way, Herrera has business because he handles both types of wastewater service. His business is about half onsite and half sewer work. Onsite is done in Paradise and in the nearby rural areas. Sewer work happens in Chico. And he lives in the lower part of Paradise, closer to the valley floor, where the distance between the communities is about equal.

NH Construction used to employ eight people. About three years ago Herrera reduced that to one person besides himself, Nick Graham. It was all about quality.

Doing it right the first time has multiple payoffs. The customer is happy because there are no lingering troubles and repeat calls for service.

Another payoff is cost.

"Going back to a job again and again to fix problems costs you the money you would make on a new job, and it costs you the time that would be spent on that other job. Going back is also not pleasant, and adds risk. When you put a system in the first time it's all new pipe and new fittings. When you go back to work on it, it's no longer new. It's soiled," he says.



NH Construction

Location: Paradise, California

Owner: Nick Herrera

Founded: 1986

Employees: 2

Service area: Paradise and Chico and surrounding area

Services: Onsite systems, septic tank abandonment, installation of new sewer lines, city sewer tie-in, landscape restoration, community treatment systems

Website: www.chicosewerconnection.com

Technician Nick Graham checks the installation of an Orenco AdvanTex AX-Max community treatment system for a subdivision in Chico, California.





“Whenever I see a kid watching me dig and they get intrigued, I say be careful because you could wind up like me.”
Nick Herrera

▲ Herrera uses a Bobcat 418 mini-excavator to dig a trench for an onsite project in Paradise, California. The community is the largest in the U.S. with no centralized sewer, Herrera says.

▼ Nick Herrera, left, and Nick Graham check the control panel for the Orenco AdvanTex AX-Max community treatment system installed by NH Construction.



Loves his machines

You can see most of Herrera’s equipment on his website. He likes earth-moving equipment, which started when he was a boy fascinated by Tonka trucks, then continued with the real thing.

“Whenever I see a kid watching me dig and they get intrigued, I say be careful because you could wind up like me,” he says with a laugh.

He favors Bobcat equipment, as is clear from the list of his gear:

- Bobcat 418 mini-excavator
- Bobcat 430 zero-swing compact excavator
- Bobcat 331 tracked compact excavator
- Bobcat T180 tracked skid-steers
- Bobcat 763 skid-steer
- Bobcat 442 tracked excavator
- Caterpillar 303.5 tracked excavator
- Caterpillar 228 skid-steer
- Fermecc four-wheel-drive 760 backhoe
- Terex four-wheel-drive 760 backhoe
- Ditch Witch JT922 directional drilling machine

His website also shows a dump truck, but he doesn’t have it anymore because it became more economical to do without it in the

NO ADVERTISING NEEDED

With nearly 40 years of experience in the onsite industry, Nick Herrera, owner of NH Construction, requires few marketing strategies to keep the workload coming in. His website lists other companies as references, people who do a good job and who are good to be associated with. His only ad, he says, is the company name on the doors of his trucks.

"A lot of times when I am hired to do projects it's because of a recommendation from an engineer or someone I did work for," he says. "I've been here for almost 30 years doing this, and pretty much everybody knows me."

Herrera does not look at other installers in his area as competition. He designs systems for some of them, and his specialty of doing difficult projects makes him distinct. Other installers are his colleagues.

"You know what, I don't call other installers competitors," he says. "I don't feel I have to be super competitive because I have plenty of work and don't have to beat the next guy out of a job."

face of regulations from the California Air Resources Board. As part of its effort to reduce pollution, CARB wanted to decommission older trucks, and when he looked at the cost of newer equipment plus the necessary licenses and insurance, it was cheaper to contract his heavy hauling, Herrera says.

His trucking needs are now met with a pair of 1-ton pickups, a Chevy 3500 and a GMC 3500. He uses dump trailers for moving equipment and light hauling. One in particular he had custom built with sides about 3 feet off the ground to make it easier to load with small equipment or debris.

At the end of the season all the equipment is washed. He usually does maintenance himself during winter, but sometimes takes machines to a dealer if a repair requires specialized knowledge.

A detour into dining

For a while Herrera was in the restaurant business by accident, but it led him to a productive relationship that he maintains today.

In the early 1990s he was called in about a challenged system at the restaurant. The owner didn't want to fix the system. He was ready to shut the business down. Herrera worked out a deal. He took over the restaurant, installed a new wastewater system, and ran the business.

"It was like an upscale Denny's, but family owned. The restaurant business is a really hard business — which I learned. You have to keep everyone happy all the time, and that's hard when you're serving 200 to 500 people a day and must depend on the people you hired. One of the big downsides was keeping the business fully staffed, and it was a big restaurant. There could be an event in town, and suddenly 200 people would walk through the door on a day when you expected to have only half the restaurant open," he says.

On top of all that, minding the restaurant took time away from his main business. Herrera sold the restaurant to a man who had eight others, and focused on wastewater systems.

But from that restaurant detour came his relationship with NorthStar, an engineering and design firm. Its staff designed the system for the

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“Going back to a job again and again to fix problems costs you the money you would make on a new job, and it costs you the time that would be spent on that other job. **Going back is also not pleasant, and adds risk.**”

Nick Herrera



▲ Herrera and Graham use a Ferretec 760 backhoe during a septic system installation.

◀ Herrera, who loves his compact equipment for getting into tight backyard spaces, works a Bobcat 418 mini-excavator on a residential project.

and Herrera had to install tanks and piping for the system as deep as 13 feet. Because the shallow groundwater left too little unsaturated soil for final treatment, the system used a pair of shallow ponds to evaporate treated wastewater. Water was pumped into one pond until it was full, then pumping switched to the second while water in the first evaporated. He dealt with the groundwater by drilling wells around the perimeter of the site and setting pumps before installing the wastewater system.

“At one point we were pumping over 2,000 gallons a minute just to keep the groundwater at a decent level,” he says.

Successful operation

Providing quality service from the first bucket of excavated soil to restoring a home’s landscaping is a key to keeping customers happy. On his website Herrera dubs his company “the septic surgeon.”

“I picked that because we try to be surgically precise and not tear everything up. When you’re done with a job, the only thing the customer sees is the top of the ground. If you defaced their land while working, they’re not happy about it,” he says.

From a project like the one in Robbins to the smallest residential project, that emphasis on getting it right has ensured success for NH Construction and kept Herrera at the controls of the equipment he loves to operate. □



watch them in action

To learn more about NH Construction, check out a video profile at www.onsiteinstaller.com.

restaurant, and almost all of the engineered systems he installs are done by NorthStar. The two companies have a good working relationship and a good process.

Look first, draw later

“Before we do anything, before we put anything on paper, we’ll go out to the site, look at it, and toss ideas around. When the plan comes out of engineering, we know it will work because we’ve worked out the issues beforehand. Compare that to some engineers who draw plans first, and then it is on people in the field to find out where the problems are,” he says.

Herrera does some septic design himself. The city of Paradise allows an installer to design a simple pressure-dose system. Anything more complicated requires an engineer. The county requires designers to be certified if they do anything more complicated than a gravity-fed system. He does some design work for other installers, but it’s not steady, and it’s not a lot because Herrera is busy with his own projects.

Advanced treatment installations make up about 40 percent of his business with the remaining 60 percent being conventional systems. He favors Orenco Systems products.

His largest system is a complete collection and treatment system for the town of Robbins, California. The groundwater was about 2 feet below grade,

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When Existing Systems Require a Compliance Inspection

The level of complexity grows when you move up from a more basic operation inspection to a compliance inspection. Follow these steps to ensure you cover all the bases.

By Jim Anderson and David Gustafson

There are several reasons an existing onsite system would require a compliance inspection. A number of states — Minnesota included — require the local permitting authority to establish an inspection program to bring failing or non-code systems up to compliance over time. Also, homebuyers often request compliance inspections before purchasing the home to be assured the septic system meets the current standards and requirements.

Compliance inspections of existing systems are a level beyond the operation inspection, where the system is checked to determine if all the components are there and operational, which is the level of inspection most often seen in terms of real estate transfers. From a service provider standpoint, the compliance inspection is more comprehensive, so it will require more time and effort and therefore command a higher fee.

Look at Tank Contents

The sequence for inspecting system components and the items evaluated will look similar to the operation inspection, but will go a step or two further in the assessment. All sewage tanks are going to be inspected to determine whether they are watertight and structurally sound. This means evaluating the walls, the bottom of the tank and all penetrations, including the inlet and outlets as well as the tank lid, manhole risers and inspection ports. In our opinion, this means the tank will

From a service provider standpoint, the compliance inspection is more comprehensive, so it will require more time and effort and therefore command a higher fee.

be pumped to provide access for the evaluation. Before pumping, the contents should be evaluated for conditions that may indicate other problems, such as evidence of previous backups or lack of three distinct layers.

The inspection ports and manhole should be evaluated in terms of their location as well as any cover or access restriction requirements to keep unauthorized persons from entering the tank. Baffles within the tank should be checked for their presence and condition as well as whether they

have the proper space between the pipe and the baffle wall and proper depth within the tank. Presence of an effluent screen should be determined.

If there is a pump tank it should be evaluated for structural soundness and the pump and controls evaluated to verify the pump has adequate capacity to deliver effluent to the next system component. Controls and electrical connections should be checked to determine if they meet electrical code requirements. Connections should be in a box or control panel outside of the tank.

These are the same items checked during a new system inspection. In an operation-level inspection the inspector checks to see everything is there and the pump turns on and off, and connections are proper, but does not go so far as determining pump doses and capacity.

Down and Dirty

The area of greatest difference in level of inspections comes in evaluation of the soil treatment area. During an operation inspection, the drainfield is evaluated for surface evidence of hydraulic failure and that effluent does not back up into the tank. Compliance means the soil treatment area is the right size based on soil, texture, structure and estimated daily sewage flow. In addition, the area needs to comply with the required horizontal separation distances and vertical separation distances required for treatment.

The soil texture and structure in the area of the system needs to be determined to supply the long-term acceptance rate for the soil, which can be used with estimated daily sewage flow to determine the necessary system size. If records of the site evaluation and system design are available, information gathered in the field can be compared to those numbers to see if they match. If there are no records, this inspection provides the baseline information for future comparison.

Similarly, vertical separation, to a limiting condition such as bedrock or high water table must be determined. In the case of water table or seasonally saturated soil conditions, this requires the evaluation of soil color to determine if there are redoximorphic features. These features indicate — even during dry periods — the presence of saturated soil conditions. The separation distance is determined by measuring from the highest point in the profile where redoximorphic features are indicated to the elevation of the bottom of the drainfield or bed in an elevated system.

A note here; in Minnesota for a compliance inspection of an existing system, the state code stipulates that two independent entities need to make



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the determination of soil condition. One of these can be the initial site evaluator's information; but if there are not records, there would need to be an independent verification. As example, a compliance inspection is conducted by a county or municipal licensed inspector and a determination made to update county records. Presumably this would need to be confirmed through an independent evaluation by another licensed inspector.

Difference of Opinion

This can lead to some disagreements, so there is also a requirement that the county or permitting authority establish a way to resolve any disagreements in the evaluation. This is an important provision since there is often some level of disagreement among professionals about soil interpretations. As we see it, though, recognize that once you move on from an operating level inspection there is a significant jump in time effort and resources to determine if the system is in compliance with all code requirements.

As we travel around the country we see many areas where inspection requirements have not been fully addressed. Usually these are the places that just now or recently (the past decade or so) have moved to requiring inspections and records at the time of new installation, but lack records for all the existing systems previous to current rule updates and requirements. This is why it is important to understand the differing levels of inspection and what each requires. □



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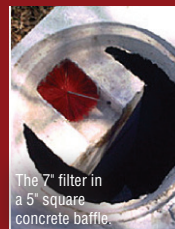


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Caution! Watch out for These Safety Violations.

Sending your crews home unharmed at the end of the day requires special training — and you can get it for free courtesy of the Washington On-Site Sewage Association

By Doug Day

In 15 seconds, I am completely passed out, no more air. And that's it." Keith Pelzel, owner of Westside Septic Design in Puyallup, Washington, was revived after a near-fatal trench collapse, and tells his story in a free safety-training program available through the Washington On-Site Sewage Association. "I had never, ever experienced anything as painful as that," he adds in one of the video vignettes used in the training.

"In a conversation recently with an employee of a service provider, I wasn't surprised to hear that people consider safety rules to be nothing more than a burden, written by government employees sitting in an office

somewhere with no real life experience," says WOSSA Executive Director John Thomas. "Regulations are based on actual accident investigations in the construction industry and trades going back to 1972. They are not there to burden the owner, they exist to protect workers from getting killed or injured."

WOSSA has developed a comprehensive safety-training program specifically for the onsite wastewater industry using an Occupational Safety and Health Administration (OSHA) Susan Harwood training grant of \$139,000. Thomas and Administrative Director Chuck Ahrens have presented the free training over the last year in a half-dozen states. With a 2016 grant



extension of \$125,000, Thomas hopes to hit more states this year. He says he can also provide the training for large companies or WOSSA can provide the materials and do train-the-trainer sessions for organizations or companies that want to conduct their own sessions.

The hands-on training includes videos featuring accident victims, a workbook, exercises in root cause analysis and other material designed to raise awareness of risks workers face every day.

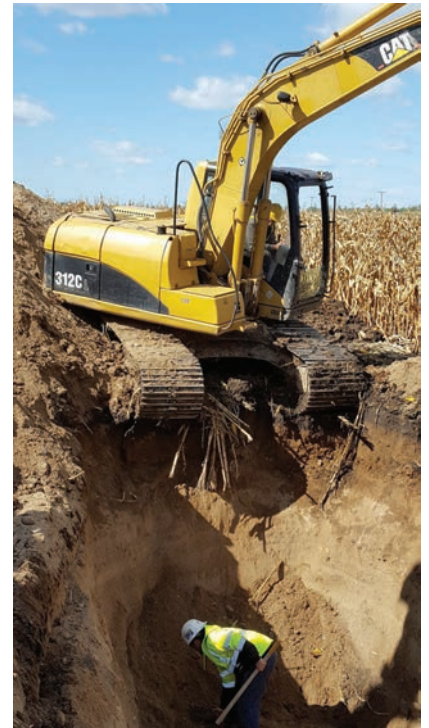
It covers the Focus Four hazards identified by OSHA for the construction industry; falls, caught in or between, struck-by, and electrocution. The training can be done in sessions of four or eight hours and is designed for groups of up to 25 people. All costs are covered by the OSHA grant.

Why is this training needed?

Thomas: Most folks recognize unsafe conditions, but don't recognize what pushes them into making bad decisions or they have the wrong skills or experience when faced with a new situation. This training raises awareness of the employer's responsibility and workers' rights under OSHA or state-approved plans in context with the work we do every day in the onsite industry. It's an interactive class and we have participants work in small groups throughout the day in each of the Focus Four areas to develop skills to better understand risk and conduct job safety analysis.

What did you learn as you developed this training?

Thomas: When we did our initial field interviews of companies that work in our industry, we generally characterized them into one of three categories: companies that knew about the OSHA or state rules and had programs in place and resources committed to keep it running; companies that knew about the rules and at least some effort had gone into safe work practices in the field, but they didn't have a program robust enough to ensure that field staff were actually working safely; and lastly, we came across a few owners that either incorrectly thought the rules didn't apply to them, or just choose to ignore them. We



▲ These workers are complying with hard hat and safety vest requirements but are working with no shoring protection directly beneath a 50,000-pound excavator. (Photos courtesy of the Washington On-Site Sewage Association)



◀◀ This worker fails to protect against pathogen exposure while cleaning up after off-loading septage.

⚡ Smoke rises from a tank after a short in an electrical component, demonstrating the importance of lock out/tag out protocols.



had some say things like “it is an acceptable business risk” as a justification for knowingly minimizing or not adhering to a rule or practice. They do this at their own peril.

What barriers do onsite companies face when it comes to having solid safety programs?

Thomas: The first is just a lack of resources to focus on safety, and I don't mean the money side of it. The majority of the companies in our industry are small businesses with two to 10 employees. Owners are working just as hard as their staff, and managing safety and working safely are really two different things. Owners finding the time to actually read and understand the requirements under OSHA or their state-approved plan is pretty tough. Then you have to actually write a company policy and administer your safety management plan.

The other is getting the employees to think about safety as they go through their workday. It's one thing to remember to put on safety glasses, it's completely another to jump into a six- or eight-foot trench or tank excavation to rake out the gravel. But they do it every day. Changing behaviors is a challenge for employers who may want their guys to work safely but may not understand what they need to do it.

Lastly, I would say that it can be overwhelming for small-business owners as they read the rules to try and comply with everything. So, many focus on doing their best to work safely but fall pretty short when it comes to meeting the administrative requirements.

Where does someone begin?

Thomas: Just start. Start with looking at the most severe exposures in the work that you do. It's pretty easy to figure out the big stuff and what will kill somebody ... so start there. The four focus areas are a good place to begin because 79 percent of fatalities nationally and almost 90 percent of all penalties and noncompliance fines are associated with one or more of these areas.

What are some common examples?

Thomas: This is based on the feedback from the hundreds of people who have been in our courses:

Falls — from ladders, off of equipment, and in and around excavations.

Struck-by — equipment, tools, binders on trailers, rocks and debris, eyes and face such as splash-back or baptism by sewage when a hose breaks, and in one case, injection into the chest when struck by a jetter hose. Those are the obvious ones, but OSHA also looks at excessive noise as a “struck-by” category.

Caught in or between — equipment and vehicles, connecting trailers, equipment moving while not chocked or a brake not set, working on or adjacent to moving machinery, and maintenance work. But the big one for us is engulfment in an excavation or trench. We have heard a ton of stories from guys who have been in a trench with no protection and a wall comes in.

Electrocution — we have a lot of work being done in the field by people who may or may not really understand what they are doing. In some states, electrical work is done by licensed electricians, other states don't have any licensing requirements for electricians, and of course you may have your homeowner messing about in the line as well.

In Missouri for example, outside of some major cities, there is no trade licensing requirements by the state for electrical work. It naturally increases the electrocution hazard involving pumps and controls from years of unskilled workers doing the work. In some states, where trade licensing requirements are clear, unlicensed work continues. Worse, we have seen places where local county regulations that call out specific tasks allowed by O & M contractors are in direct conflict with state law.

In our training sessions, I ask, “Who has ever gotten a jolt while working on a system?” Almost all hands go up every time. The saying in the safety world is “It's not the voltage, but the amps that will kill you.” Virtually everything we work on has enough amperage to kill you if it hits you right.



▲ This 21-foot-deep excavation collapsed before shoring could be installed.

Are there some common areas that are misunderstood?

Thomas: Here are two good examples, lock out/tag out and confined space.

Most people think that LO/TO (lock out/tag out) is associated with electricity. The rule for LO/TO is broader and includes the need to define procedures to work on anything with “stored energy.” Think of steam lines, rigging under tension, or any other lines or vessels with pressure. Anytime we talked about how this procedure is managed, owners had a lot right, but were missing a few things because of how they think the rule applies. We have examples in the workplace that LO/TO procedures would prevent some pretty serious “struck-by” types of accidents, not just those relating to electrical hazards.

We found companies that had confined-space entry (CSE) procedures in place, but they were lacking correct protocol in keeping workers safe because most people think of CSE being limited to controlling the atmosphere. But it is much more when you think about things like going into a septic tank to do a crack repair. The rule says you have to have a rescue plan. Virtually everybody we ask in the classes says their rescue plan is 911. Unless they’ve actually talked to the local fire department, that’s inadequate under the rule. If your local responders are volunteers with no specific training, it will turn into a body recovery, not a rescue.

It’s a concrete structure that, because it is cracked, has been compromised from an engineering standpoint. Add the element of depth and water tables and now you’re going to go down and use a roto-hammer on a wall with a 5-foot crack in it. Most people would look at that and say “you can’t pay me enough to go in there.” If all your pre-entry evaluation considers is atmospheric testing, then sooner or later you’re likely to get into a mess.

What do you want to accomplish in this training?

Thomas: The point of the exercises in the training is to get people to change how they think about work processes, exposures, risk management and mitigation either as an employer before things happen or as an employee out in the field wearing a safety hat and safety vest standing in a trench under a 50,000 pound excavator. □

To host a WOSSA training session, call 253/770-6594 or email administrator@wossa.org. There is no charge for the training; all costs are covered by an OSHA Susan Harwood training grant.

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SYSTEM PROFILE



Onsite Choices for Legal Marijuana Growing Facilities

Zeiter Septics Unlimited is called on late in the development of two Illinois indoor growing operations and installs membrane bioreactors to handle wastewater

By David Steinkraus

◀ The layout of the MBR system at the marijuana processing plant near Hillcrest, Illinois, was much more straightforward than the Dwight operation. In the foreground, the Arc chambers of the drainfield are just visible. The combination settling tank and MBR tank, and 1,000-gallon pump tank, are covered by Infiltrator Water Technologies risers and lids. (Photos courtesy Dave Zeiter)

▼ Technician Jim Koltunchik applies ConSeal butyl sealant on the Wieser tank for the MBR at the Dwight, Illinois, marijuana processing operation.



The growing number of states allowing marijuana for recreational or medicinal use opens another business area for wastewater professionals, as Zeiter's Septics Unlimited learned recently. Zeiter, based in Morris, Illinois, was hired to complete the wastewater systems at two new marijuana growing and processing operations, each about 80 miles from Chicago.

One facility is located near Dwight, Illinois, southwest of Chicago, the other near Hillcrest, Illinois, due west of the city. Both facilities were well along when Zeiter was brought in to replace a different contractor. It became his job to salvage the project, which had somehow been started without the proper permits and posed other obstacles.

"The soil was terrible. It was clay, and it was very tight, wet clay," Zeiter says. In addition, the site had been under heavy vehicle traffic that compacted the soil, and aggregate and spoils had been stockpiled on the proposed drainfield site of 30 by 30 feet. This didn't help the infiltration tests.

During his initial evaluation, Zeiter went in with a Caterpillar bulldozer, ripped up the existing clay soil on the drainfield site, raised a section 6 inches, mixed it with the best topsoil he could find on the land, and tested the infiltration. Even with this help, the per-square-foot loading rate was 0.27 gpd, which implied an absorption field with more than 500 linear feet of laterals. Given all those constraints and the owners' desire for an advanced, environmentally friendly wastewater solution, membrane bioreactors were the logical choice.

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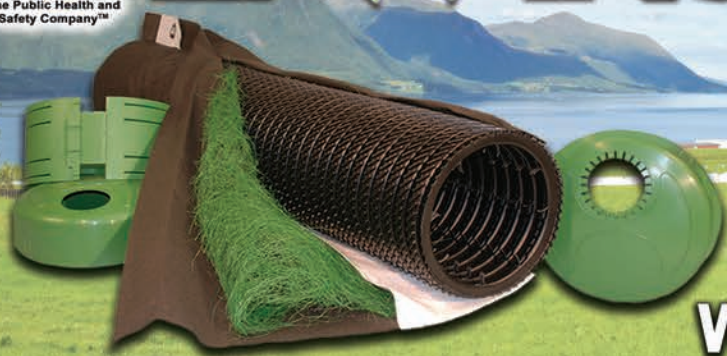
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Both processing facilities use BioBarrier MBRs from Bio-Microbics.

In Dwight, effluent from the processing building runs by gravity about 45 feet through 6-inch SDR 26 pipe to a 771-gallon tank from Grove Concrete. Another 4-inch schedule 40 pipe for the floor drains brings in more wastewater from the grow building that is also about 45 feet away.

The 771-gallon tank functions as a lift station because the wastewater pipes had been buried by the previous contractor at a depth of about 6 feet. Inside the tank, two 2 hp Liberty Omnivore grinder pumps push waste through a pair of 2-inch schedule 40 discharge lines that run to a 2,500-gallon tank from Grove. Of the total volume, 1,000 gallons are used as a trash and settling tank with a pair of 4-inch SaniTEE filters (also Bio-Microbics). The other 1,500-gallon section houses the two 0.5 MBRs. A 2-inch pipe takes treated water by gravity into a 12-inch-diameter stormwater tile that surrounds the property and flows into a detention pond about 1,000 feet from the tanks. An NPDES permit was required because the storm tile eventually discharges into a detention pond.

At the Hillcrest plant, wastewater flows about 43 feet from the processing building into a 2,500-gallon tank from Wieser Concrete. A trash and settling tank takes up 1,000 gallons of that volume, and the other 1,500-gallon space houses the MBR. A pair of 4-inch SaniTEE filters separates the two sections.

From the MBR, water flows to another Wieser tank. This one is 1,000 gallons and holds a pair of Sta-Rite 1/2 hp turbine pumps (Pentair). They dose

“In my years of (onsite work), these owners were among the best in their concern for the system. We told them, **This is a water recycling system; it’s not a sewer; it’s not a typical onsite wastewater treatment plant.**”

Dave Zeiter

the drainfield through about 30 feet of 2-inch schedule 40 pipe. The field is comprised of two 80-foot sections of ADS Arc 24 chambers on top of the soil.

At both Dwight and Hillcrest, the systems are controlled by panels from Ohio Electric that accommodate the Cell682 Sensaphone remote dialers to alert technicians if there is a problem. Dosing is on demand with about 100 gallons per dose.

Designed for tomorrow

The system in Dwight is sized and designed for the possible addition of a kitchen and bakery that would produce products containing the marijuana oil produced by the operation. “We don’t know what waste products the kitchen will bring into play in the system,” Zeiter says.

That was far from the only worry about the small indoor agricultural operation. “We were also very concerned about the chemicals in irrigation water coming off the plants,” Zeiter says. “But in my years of (onsite work),



▲ At the Hillcrest site, effluent from the Bio-Microbics MBR flows into two 80-foot sections of ADS Arc 24 chambers.

▼ Cory Wilson performs a double ring infiltrometer test after installation at the Hillcrest site.



System Profile

Location:	Dwight and Hillcrest, Illinois
Facility served:	PharmaCannis
Designer:	Zeiter's Septics Unlimited
Installer:	Zeiter's Septics Unlimited
Type of system:	BioBarrier MBR
Site conditions:	Clay soil, dense and wet
Hydraulic capacity:	450 gpd

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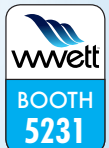
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▲ Jim Koltunchik, left, Mike Gifford, right rear, and Matt Moser install a Tuf-Tite riser above the duplex grinder station that discharges to the MBR at the Dwight site.

these owners were among the best in their concern for the system. We told them, 'This is a water recycling system; it's not a sewer; it's not a typical onsite wastewater treatment plant.' They asked us lots of questions and wanted to know what other people are using in their BioBarrier systems to prevent problems." That included a discussion of cleaning products that would not harm the biomass inside the MBR. Wastewater from the plant-growing operation does not enter the MBR treatment chain. It is treated as agricultural runoff and is directed elsewhere.



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Call the expert first

By the time Zeiter was brought in to replace the first contractor, both processing plants were close to 80 percent complete, and the client was committed to beginning production by a certain date. As the design progressed, Zeiter discussed the option for reusing treated water for irrigating the plants. The local health departments were open to the idea, and approval looked likely, but the owner's plumbing plans had not originally called for a full water reuse system at the Dwight complex. This would have required the use of marked piping to separate non-potable and potable water. In the end the production deadline left no time to change the building's plumbing.

Wastewater pipes coming out of buildings at Dwight were buried deeply because the previous contractor was accustomed to municipal sewer systems. And the project was complicated by the presence of other supply lines crossing in the same space that wastewater pipes used.

"You're talking a 2-inch gas main, an 8-inch water main reduced to 4 inches, and power was running through there," Zeiter says. There was also a pipe taking water from a well to four 25,000-gallon tanks supplying the fire-suppression system and buried under the parking lot. "And everything was running on angles. We had a lot of hand digging."

Zeiter ordered the grinder pump tank with a thick, rebar-reinforced lid to support more than 5 feet of earth. The depth of the wastewater lines dictated part of that; the presence of a nearby service road also played a part in his decision.

Look to the future

The Hillcrest installation was straightforward. "At Hillcrest they probably could have done a raised filter bed instead of the MBR, but we felt this would be a better long-term fit." Although a raised sand filter bed was possible, the MBR will allow the company to capture water for reuse if the owners ever wish to do so, Zeiter says. Also, at least on paper, the absorption field will never need service because water from the MBR is so clean.

The Dwight processing plant is only about 2 miles from town, so municipal sewer there could be a possibility in the future. In either case the only real maintenance is changing the membrane filters at eight or 10 years. And should the owner ever want to complete the water reuse cycle, the BioBarriers will allow that.

Even though deadlines were tight, Zeiter's Septics came to the rescue and helped a fledgling business meet its deadlines and prepare for a future of growth. □

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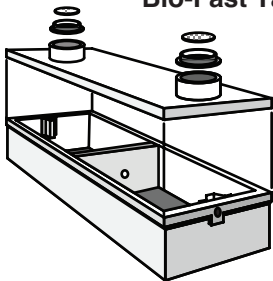
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The Polylok PL-250 Effluent Filter is Designed for Large Flows

By Craig Mandli

Many home construction projects are being supersized, but septic system components aren't necessarily designed to handle the increased wastewater flow typical in houses with four or more bedrooms. Seeing that gap in the industry, Polylok focused on the company's heavy-duty PL-250 effluent filter at the 2016 Water & Wastewater Equipment, Treatment & Transport Show.



Betsy Chaffet, right, a sales associate with Polylok, points out features of the PL-250 effluent filter to a 2016 WWETT Show attendee. The unit is designed to handle up to 3,000 gpd of flow with 250 linear feet of filtration. (Photos by Craig Mandli)

The PL-250 is designed to handle up to 3,000 gpd of flow with 250 linear feet of filtration. According to Charlie Brix, the company's vice president of development, the filter meets a growing need in the industry.

"It's a filter that's going to handle your larger residential flows without any problem," he said. "It's 250 feet of filtration media filters from the outside through, allowing it to keep a lot of solids out of the system."

The filter was introduced to the market in spring 2015. During a 1 1/2-year research and development period, the company tried several different configurations before finding the design that performed the best. According to Brix, the feedback the company has received from installers already using the filter in the field has been overwhelmingly positive.

"Installers are telling us that the filter is handling large flows in homes and even some light commercial applications without any problem," he said. "I'd say it was a very good first year for the PL-250."


Brix said that operation of the filter is very similar to the company's long-popular PL-68 effluent filter. The biggest difference is in capacity, as the PL-68 is designed to handle flows up to 800 gpd.

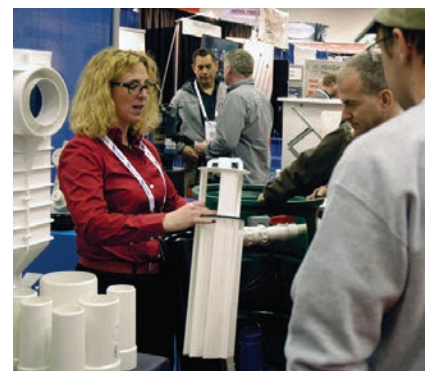
"The PL-250 is basically the PL-68 on steroids," Brix explained. "It is something we recommend for any larger home or home that sends a high waste flow into the septic system. You can never be too careful."

Like the company's other filters, installation is easy, according to Brix. The filter is removed with a quick twist. Because it locks in place, it will stay in place with no danger of floating, keeping the system protected, he explained. The housing is constructed of polyethylene and all filters are designed with functionality and longevity in mind.

"This product allows for the biggest waste flow of anything in our product line," Brix said. "It is very durable, and intended to last a long time."

Polylok is a longtime exhibitor at the WWETT Show, and Brix said it's always his company's biggest show of the year. The company is already hard at work coming up with innovations to present at the 2017 show, he said.

"We'll be back with a few brand new bells and whistles for sure next year," he said. "You have to grow to compete in this industry, and we're all about that." 877/765-9565; www.polylok.com. 



Chaffet, left, shows the filter media inside the PL-250 effluent filter.

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Take Care of Survey Tools and You'll Save Money

Total stations and GPS receivers require regular care and maintenance for trouble-free service for years to come

By Kyle Rogers

When prepping for work on a job site, your measurements must be precise. That means it's important to take care of the surveying equipment charged with acquiring those accurate measurements.

"The reason you want to care for this technology is so you don't make a mistake in positioning when you're out on site," says Scott Crozier, business area manager for site positioning solutions at Trimble. "You think you've positioned something correctly that you haven't — that's when it will cost you money."

Caring for surveying equipment begins with proper storage and transport. While the equipment is designed for durability with the knowledge that it's going to be put to work in construction environments, that's not an excuse to treat it carelessly, Crozier says.

"I think people sometimes don't treat the instruments with as much care as they should and typically it's because they're accustomed to using less precise, less expensive technology. So they treat these instruments just the same."

Watch calibration

Total stations in particular are high-precision devices that can be easily knocked out of calibration if not handled carefully. When being stored or transported, Crozier says the instruments should always be in their carrying cases.

"They should be treated as precision devices," he says. "Any time you knock them around or drop them, they have a chance of getting knocked out of calibration. GPS receivers, on the other hand, are more robust and

continued >>



Technicians make adjustments to a Trimble SPS720 Total Station at a work site. The units should be calibrated at least every two weeks to ensure positioning accuracy. (Photos courtesy of Trimble)

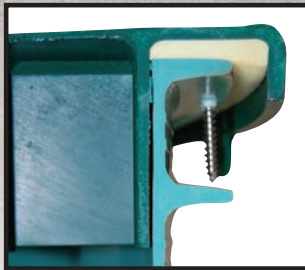
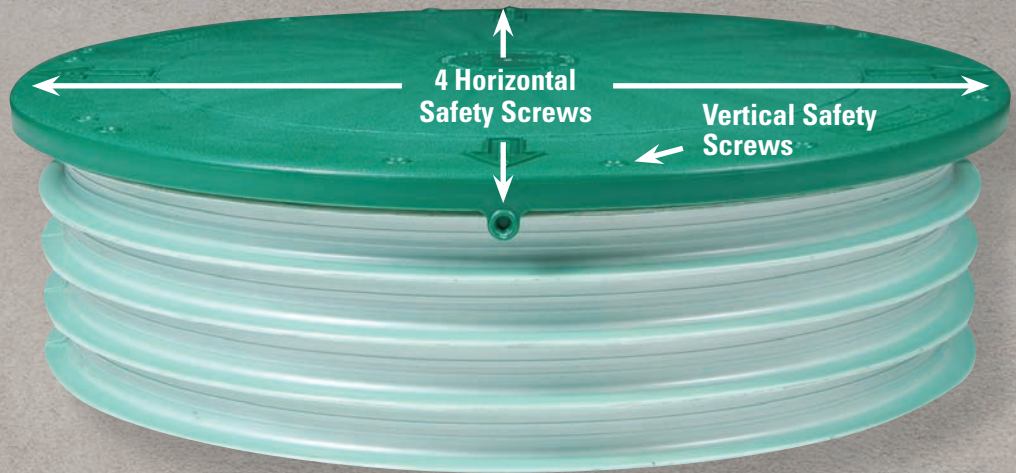
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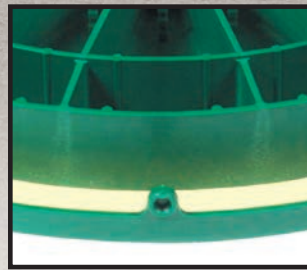
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Proper care and maintenance of precise measurement tools should be performed regularly to ensure they work properly in the field. Most maintenance work should be left up to the professionals.



don't have the same kind of mechanical precision to them, so they don't need quite the same level of care."

However, the rod on a GPS receiver is something to keep an eye on.

"There's a little bubble on the rod that tells you when the rod is level or vertical. If that gets knocked around some, it may not give you a level rod anymore, which would give you inaccurate positioning," Crozier says.

When transporting the equipment, using the carrying case is important, as is the location where you keep the case. Crozier recommends keeping it inside the cab of a service vehicle instead of a trailer or truck bed, where the case is more likely to get jostled around.

"If you do keep it back there, make sure that carrying case is very well strapped in," he says.

Not only can the equipment get knocked out of calibration, components could become loose and lead to future problems. "If things are loose, over time that causes wear and they could potentially bust," Crozier says.

Stowing and going

He also recommends not storing the equipment in a humid environment and avoiding significant temperature swings.

"You want to keep the equipment at an average storage temperature within the specifications," Crozier says. "Not too hot and not too cold. You don't want it in an environment where it can rust or corrode due to thermal cycling. At Trimble we try to make it more resistant to corrosion, but you still have to protect these devices as much as possible."

"Whether it's a GPS receiver or a total station, you should check it on a known control point to make sure that everything is measuring within specs.

That should be done on every setup."

Scott Crozier

Another tip for preventing moisture from harming the equipment is to always make sure it is dry when returning it to the carrying case. Crozier says surveying equipment typically fits snugly in the case with little room to spare, so putting it away wet is not a good idea.

"If it's not dry, leave the lid open. Let the moisture out first," he says.

In terms of regular servicing, Crozier recommends it be done annually, particularly for total stations since they are high-precision optical instruments that can be affected more by job site conditions. Even if there aren't any clear issues with a total station's site positioning capabilities, Crozier says regular service can prevent problems from developing.

"At a service center, they'll go through and tune up anything that is 'drifting off' from the specifications and get it back to performing optimally," he says. "If you don't do that and it starts drifting, the wear and tear on the instrument increases over time. It's better to bring it back so it's in its optimal state. It's like changing the oil in a car. You wonder if you really need to get the oil changed, but if you don't, you run the risk of something failing that may not have failed if you were keeping up on regular oil service."

Keeping units clean

Outside of annual service, upkeep in the field for a total station should consist of a calibration at least every two weeks, as well as ensuring positioning accuracy by checking the instrument on a known point.

"All of our software that works with these total stations has the ability to do a basic calibration on site," Crozier says. "And whether it's a GPS receiver or a total station, you should check it on a known control point to make sure that everything is measuring within specs. That should be done on every setup."

For cleaning surveying tools, all you need is some soap and water. Crozier says all of Trimble's devices are rated at IP67 so they can handle some moisture. Alcohol wipes also work well, he says. However, on total stations, contractors must be leery of what they use to clean the optic lenses.

"The lens cap should be used when the equipment is being transported and not in use," Crozier says. "If you need to wipe the lens, you should use a specific lens-cleaning cloth. You don't want to use anything that can scratch the lens."

Crozier warns against attempting to make significant repairs to surveying equipment in the field. He recommends contractors call the manufacturer or reseller of the product first.

"That would be the starting point," he says. "I wouldn't assume anything could be fixed in the field unless I've been told by them. If a screw comes loose, you can tighten a screw. But typically these instruments are not designed to be repaired at the customer level. They're precision instruments." □



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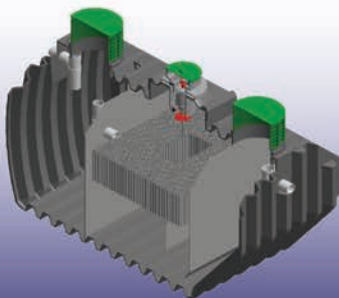


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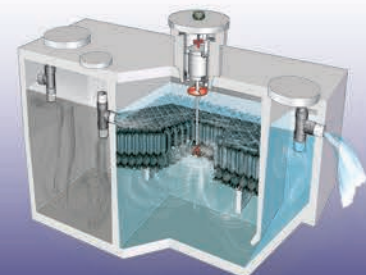


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Long Island Groups Urge Homeowners to Maintain Onsite Systems

By Doug Day

More than 30 communities and organizations on Long Island are launching a public campaign to encourage homeowners to properly maintain and have their septic tanks and cesspools pumped on a regular basis. They are all partners in the CESSPOOL Project (Coordinated Environmental Solutions for Septic Problems Occurring On Long Island). The Long Island Liquid Waste Association (LILWA) is one of the groups conducting the campaign supported by grant money from the Long Island Sound Futures Fund of the U.S. Fish and Wildlife Foundation, and the Local Waterfront Revitalization Program through the New York Department of State. The multimedia campaign includes a brochure, fact sheets, a file for homeowner recordkeeping, and a website www.getpumpedli.org. Coupons offering a \$50 savings are being accepted by 10 companies.

Alaska

Septic waste was the topic when the Alaska Supreme Court held one of its LIVE outreach programs at Colony High School in Palmer. The court's five justices heard oral arguments in the school's gymnasium in front of a crowd of students. The case involved a farmer who uses septage as fertilizer on some of his acreage and a developer who is building a subdivision nearby. Alaska's Superior Court had found in favor of the homebuilder, ordering the farmer to stop or minimize odor coming from the site and pay the homebuilder \$90,000 in damages. The farmer appealed based on the state's Right To Farm Act. After oral arguments, 300 students were allowed to ask questions of the justices and attorneys involved in the case.

Iowa

After years of discussion, the city of Rodman has entered into a consent agreement with the Iowa Department of Natural Resources to develop a plan to reduce unlawful sewage discharges from septic systems in the community. The city has agreed to submit a report to the DNR by July 2017 and a final plan by January 2020. The issue dates back to 1980 when the Department of Environmental Quality first sent a letter to the city. A 2008 complaint led to a notice of violation in 2010 and the city began studying alternatives, only to find it could not afford to do further studies. The city was designated as a Disadvantaged Unsewered Community in 2015. As such, and since it has been cooperating with the DNR, the city will not face daily civil penalties of up to \$5,000 for violations.

Close to 40 homes near Chatfield Lake in Lee County, Iowa, were notified in October that they had 30 days to install approved onsite sewage treatment systems. This came after county government decided against installing a community sewer system for the unincorporated area of Moor and Powdertown following four years of study. A sewer system would cost the county about \$1.2 million and monthly bills for users would be about \$75. Local officials say low-income residents could not afford the bills, which could leave the county responsible for costs under the regional sewer agreement.

Minnesota

After five years, an Amish family has been told to stop work on a home under construction and has been banned from living in the structure. Fillmore County adopted its septic regulations in 2013, allowing graywater systems that fit within Amish beliefs. A District Court judge in early October ruled against the family that cited religious reasons for not installing a septic system or getting a building permit. The house does not have to be torn down, but nobody can live there and no further construction work can be done until a permit is received. It could be converted to a barn or other use, but all drains would have to be sealed and the building inspected. Meanwhile, the family is living in a smaller home nearby without a permitted graywater system, but uses a straight pipe running directly into the ground. That may be the next issue pursued by the county. □



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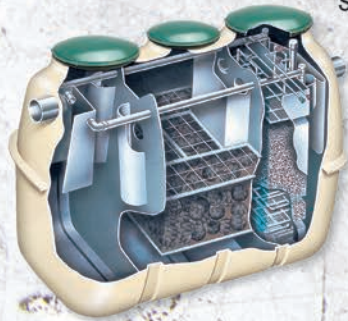
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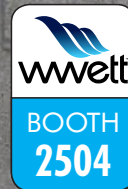
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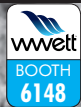
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The NightEye wireless app and cloud-based system from Liberty Pumps allows internet connection to a pump via a home's router and provides alarm and performance information to a mobile device. The system can send data via text, email and push notifications to up to four addresses/phone numbers. NightEye-connected products include the ALM-EYE Series indoor pump alarm, 442 battery backup pump systems and the SumpJet water-powered backup pump. 800/543-2550; www.libertypumps.com. □



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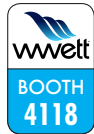
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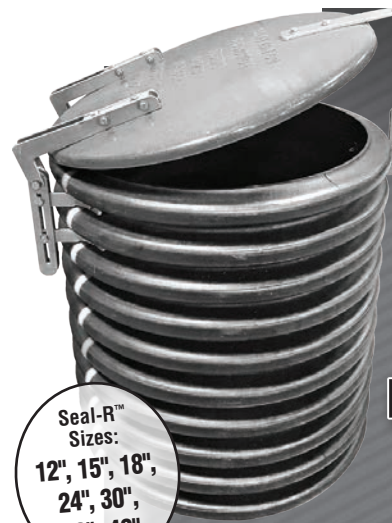
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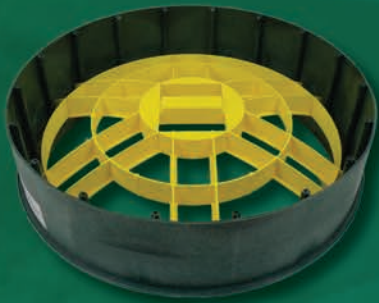


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