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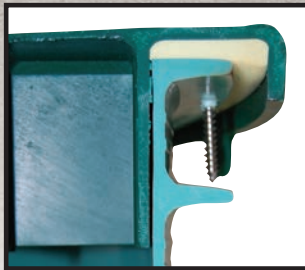
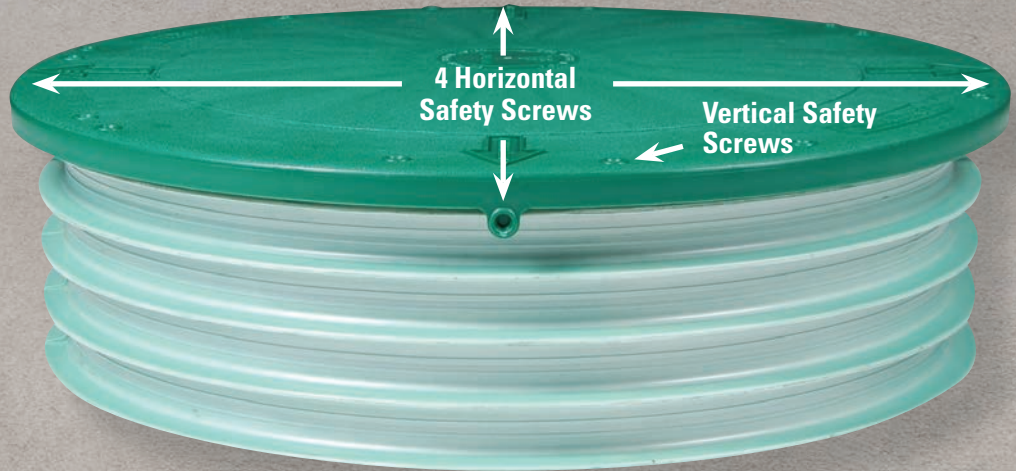
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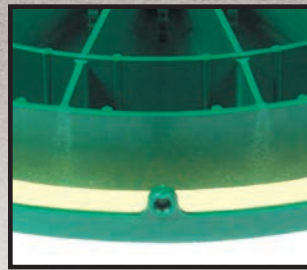
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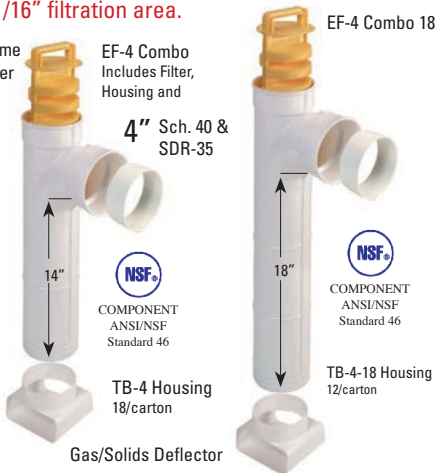


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INSTALLER PROFILE:

No Muss, No Fuss By David Steinkraus

ON THE COVER:

Ken-Way Excavating utilizes pipe bursting technology to replace failing pipe in onsite systems. Owners Charlie Fisher, Dan Zamastil and Pat Zamastil are shown on the job with the company's GapVax MC1510 Series Combination Jet/Vac Unit mounted on a Peterbilt truck. (Photo by Mark Hirsch)

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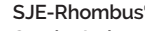
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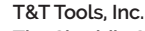
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Jim Kneisz



Meet One of the Gang

Our Snapshot feature will introduce you to new friends in the wastewater industry

I'm excited to announce the launch of a new feature in *Onsite Installer* this month. It's called States Snapshot, and each month it will allow a wastewater professional from a different region and representing a state or provincial trade association to share their story, in their own words. Turn inside and you'll meet Bernie Miller, a member of the Minnesota Onsite Wastewater Association and owner of Miller's Sewage Treatment Solutions in Kimball, a small town located northwest of the Twin Cities.

Miller graciously agreed to be our guinea pig for this new type of feature story, and we're indebted to him for the help. In editing the story, I learned a lot about this 23-year veteran of the industry, who is a systems designer, advanced system inspector, service provider and maintainer. I think you'll enjoy reading about Bernie too, and perhaps see some similarities between his business and yours.

The Snapshot is an outgrowth of our State of the States feature that started in 2013. At that time, we decided to dedicate a story each month to sharing the news from each of the wastewater trade associations in U.S. states and Canadian provinces. It took almost four years, but we finally got around to featuring all of the trade groups as were willing to be interviewed.

We want you to get to know another friend in the industry and learn about his or her team, **hobbies and what they find most important about their career in wastewater.**

A few of the groups from our Associations List, which runs every month, failed to respond when we called. If your group wasn't featured over the years, call your association leaders and contact me at editor@onsiteinstaller.com. We didn't mean to slight your group. We want to give every organization a chance to share information about the good things they're doing.

At any rate, when we got through the first round of State of the States features, we came up with the idea of profiling a member of each organization. But we're taking a fresh approach to this assignment. We know everybody in the industry is extremely busy these days, and it can be

easier to respond to our interview request if you know the questions ahead of time. And heck, we know some of you would like to sit down and write your answers to these questions at your own pace.

So we developed a list of questions and topics that we email to the featured contractors. They can either fill out the answers themselves, like Bernie Miller did, or they can think about how they would respond to the questions when a writer makes a follow-up call. We work on the provided information or conduct the interview, then create a package that includes the Q & A-style story and a photo of the wastewater professional and his crew.

We hope to accomplish a few main objectives with the States Snapshot. First, we want you to get to know another friend in the industry and learn about his or her team, hobbies and what they find most important about their career in wastewater. Also, we want to learn why they belong to a trade association and what they believe are the most important issues they would like to address through their membership. We want them to tell you about the most challenging job they've had, their favorite piece of equipment and to share a helpful nugget of small-business advice.

We will eventually get around to asking every wastewater trade association to provide a member who we can talk to for the Snapshot feature. If you read Bernie's story and think, "Hey, I'd like to take a crack at this," drop me a note and we can talk.

What's happening to the State of the State feature? We will continue to focus on important issues being addressed by our trade associations as they come up. So the space will be filled each month either with a Snapshot story or a States story. If your group is working on an important issue and you'd like to share information with the rest of the industry, just let me know and we'll get right on it.

I invite you to go and learn more about Bernie Miller. I'm sure you'll like him.

We Lost a Valuable Friend, Communicator

Over the years, many of you were called by our longtime Rules & Regs, Association News and State of the States writer Doug Day as he gathered news of the industry. We regret to announce that Doug passed away early this year, on Jan. 21, at age 60. A final Safety First story by Doug appears in this issue.

Doug did a great job keeping his finger on the pulse of the onsite industry through his monthly contributions. In addition to monitoring legislation about wastewater issues and interviewing trade association leaders throughout the U.S. and Canada, Doug also wrote occasional



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contractor profiles and worked on other features for the magazine. His varied communications background operating his own public relations agency and working as a veteran radio announcer made him a skilled reporter of our industry's happenings.

Doug's work went well beyond his writing for *Onsite Installer*, though. He was a local politician in his hometown of Two Rivers, Wisconsin, on the shore of Lake Michigan, serving as both an alderman and city council president. He was also a busy volunteer for local civic causes, and in his spare time worked many years as a high school athletics official. On Friday nights every fall, you'd find Doug on a football field refereeing a big game.

Thank you for a job well done, Doug. You will be missed. □

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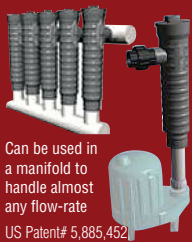
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The 4" filter in a 4" Tee.

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- Improving Employee Morale Doesn't Have to Mean a Pay Raise

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TROUBLESHOOTING TIPS

Combating Clogged Screens

Cleaning effluent screens is part of regular upkeep, but if you're finding yourself increasing the frequency of maintenance to an excessive degree, you need to do some investigating and have a talk with the homeowner. Here are 11 guidelines to share with your customers if this is happening to you. onsiteinstaller.com/featured



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Sand is specified as treatment media in many soil treatment areas, such as mounds and media filters, but it must be clean in order to prevent system failure. The granular media also must be coarse enough to permit a sufficient flow rate, yet fine enough to provide adequate treatment. This online article explains how to analyze treatment sand to achieve the best media performance and system longevity. onsiteinstaller.com/featured

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NO MUSS, NO FUSS

Ken-Way Excavating finds many benefits to utilizing pipe bursting technology for Iowa onsite system repairs

By David Steinkraus | Photos by Mark Hirsch

The three partners who bought Ken-Way Excavating were looking for a niche in the onsite installing market. They found their specialty in pipe bursting to replace existing septic service lines.

Getting the job done underground saves on fuel consumption over using traditional excavation, extending the work season in their frosty territory around Cedar Rapids, Iowa, and making customers happy by limiting the mess left behind by trench work.

Charlie Fisher, who owns Ken-Way with brothers Dan and Pat Zamastil, saw the technology as popular in other parts of the country and wanted to bring its advantages to Iowa.

◀ Tucker Schroeder, Zach Covington, Derek Vesely and Mitch Fountain use a GapVax MC1510 Series Combination Jet/Vac Unit in a residential pipe bursting job.

▶ Mitch Fountain uses a Connectra Fusion Technologies system to join HDPE SDR-17 pipe.



join HDPE SDR-17 replacement pipes using a system from Connectra Fusion Technologies.

“We can burst plastic, cast iron, ductile iron and transite pipe,” Fisher says.

Not every job is perfect for bursting. Replacing pipe of one diameter with new pipe of the same diameter — in other words 4-inch with 4-inch — is typically less challenging. When the replacement is a larger diameter, the volume of soil displaced may become an issue, Fisher says.

“In denser soils there may be a problem bursting a 6-inch clay main to upsize it to a 10-inch,” Fisher says.

Sandy material is easier to displace than glacial tills, but hard-packed sand could also pose a challenge. Problems come from the usual arrangement on job sites where other utilities are often located near wastewater pipes. It’s those other pipes that may be affected by displaced soil. It doesn’t always happen, but it is a situation you have to think of and be prepared for, Fisher says.

Ken-Way Excavating

Location: Cedar Rapids, Iowa

Owners: Charlie Fisher, Pat and Dan Zamastil

Founded: 1966

Employees: 16

Service area: Eastern Iowa

Services: Site analysis, percolation testing, excavating, septic replacements, new septic installations, septic repairs, hydroexcavation, commercial development underground utilities, utility installations in industrial plants

Associations: Iowa Onsite Waste Water Association, Land Improvement Contractors Association, National Association of Sewer Service Companies, International Pipe Bursting Association

“I came home to Iowa from Denver and there were sewer companies doing it there on a daily basis,” he says. Although he had not seen the technique used for onsite installations, he realized that the pipe between a home and a tank was no different than the lateral from a home to a sewer collection main. And the idea can be extended to include pipes that carry water or natural gas.

Two months into the partners’ ownership of Ken-Way in March 2010 they purchased pipe bursting equipment, and it is often employed in the up to 30 onsite systems they install annually. The work ranges from simple gravity systems, perhaps with a sand filter, to those utilizing Ecoflo Biofilters (Premier Tech Aqua) for more limiting sites.

Bursting Out

Currently Ken-Way uses pipe bursting equipment from HammerHead Trenchless Equipment. For replacing 4-inch pipe they have a PB30. It’s a small machine suited for tight spaces. Machines of other sizes handle larger sewer main work. And although typical demonstrations or online videos show equipment bursting clay pipe, it can do more. Technicians



▲ Kyle Jacobson, Derek Vesely, Mitch Fountain and Zak Frame work at a home in Cedar Rapids, Iowa.

▼ Kyle Jacobson carries a 4-inch HammerHead Quick Grip Burst Head attached to SDR-17 pipe in preparation for drawing it through a damaged pipe.



Other preparation is required for bursting. Every line is televised before and after the job. A pipe with an offset joint or a pipe that is collapsed can be replaced. A pipe with a long sag or belly is not a candidate for replacement because the lack of proper bedding will create a belly in the new pipe just as it did in the old one. After the work is done, Ken-Way televises the line again to ensure the job has been done properly.

Many Advantages

Where it can be used, bursting is much better than digging a trench, Fisher says.

“Why would you have an open trench 60 feet long when you can have two pits? You can prep two pits safely, and you’re not dragging a trench box along. For a pipe replacement, bursting takes about the same amount of time but it is much less dangerous for the men. Buying bursting equipment increases your costs, but that is offset by the reduced risk and by fuel cost because you don’t burn as much as you do when digging,” he says.

Customers are happier, too, because their property damage is less. In one situation, there was a run of several hundred feet from a house to its septic tank. The yard contained several trees, and the owners didn’t want the roots damaged by digging. Pipe bursting did the job and left only a couple of pits for restoration instead of a long trench.

Pipe bursting is also good in tight situations where an excavator arm cannot swing, even a mini-excavator. In one case a home had a large second-story deck. Instead of removing the deck, Ken-Way technicians set up the pipe bursting gear in the basement and replaced the pipe from there to the septic tank.

Using pipe bursting extends Ken-Way's working year as well because there is less frozen soil to dig. The company's hydroexcavator helps, too.

"We had a project on a cold December day last winter. The work site was too tight for an excavator. We brought in the hydroexcavator and hydraulic shoring. In four hours the crew cut a pit, and we were ready to set the pipe bursting equipment," Fisher says.

"Even without the hydroexcavator we work through the winter every year. If it's 10 degrees and rising, we're going to go out and work. On days when the high is in the single digits, we cannot justify sending the guys out. In that kind of weather machines break and nothing goes right. Still, during the coldest January or February we typically take only a few days off," he says.

"We have expanded quite a bit, but we don't depend only on growth. Our goal is growth and strength — being stronger within the niches we have developed so far."

Charlie Fisher

We're Cat Lovers

Except for a Yanmar excavator, all the equipment that Ken-Way operates is from Caterpillar. Their largest excavator is a 330F, and the smallest is a 303.5. In addition, the company has six Mack dump trucks (most carrying Henderson Products dump bodies) and a hydroexcavator from GapVax on a Peterbilt chassis.

Choosing Cat was easy, and part of the decision depended on the local dealer, Fisher says.

"When we bought the company, we created relationships with our equipment suppliers. In the last six years we made a lot of changes, and our Cat dealer took care of us. Whenever there's a problem we can't solve, all we have to do is pick up the phone, and it gets handled," he says.

Plus, the resale market for Cat equipment is always strong, he says.

Ken-Way rotates equipment based on its records. Everything about each machine is tracked, whether it's routine maintenance or a major repair. Each machine carries a number, and the partners can call up the record of a specific machine and see how much money has been spent on it over time.

Given experience with machines and their needs, this has led to a practice of trading some machines in every few years and others hardly ever.

For example, bulldozers are built tough, Fisher says. Maintenance costs are minimal, and they're expensive to buy, so Ken-Way holds on to its dozers as long as possible. Skid-loaders are a different story. They're traded out at 2,500 to 3,000 hours because the company's records show maintenance costs increase dramatically after that point.

Taking Care of Business

Dan Zamastil oversees the shop and the company's equipment. If something breaks, the company's workers know they need to call Dan. Much of the maintenance is done in-house, even a job like rebuilding a bulldozer. If a transmission goes out in one of the trucks, Dan makes the call to have an outside shop fix it. His brother Pat runs operations and scheduling. Fisher handles the administrative work, estimating and looking at contracts.

continued >>

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Pat Zamastil, Adam Reed and Mitch Fountain couple HDPE SDR-17 pipe to excavate material for a residential pipe bursting operation.

DIY TECHNOLOGY FOCUSES ON THE NECESSITIES

“What this does is take a load off everyone’s shoulders,” Fisher says. “You don’t have one person trying to make decisions on everything. We can assign a job to the right person, and we trust one another. We look on one another as brothers rather than partners.”

Building a good company also means building up a good workforce. Ken-Way doesn’t necessarily look for people with long experience in the industry. They seek a person who will mesh with the team and is willing to learn, because the right person can be taught the skills he needs to do a job.

“When we bought the company and began expanding it, we had to replace much of the staff and add to it,” Fisher says. “We now have a great group of guys. Many of them have been with us for a long time, and we have every intention of keeping them for a long time.”

Obviously competitive pay is a factor in employee retention, he says. On top of that the company offers a health insurance program, a retirement program with company matching, and the potential for annual bonuses. Every year the company conducts performance reviews with each employee. Workers are complimented on their improvements, and they have a chance to look at where they stand in the company and where they want to go.

Going places can also bring company assistance. If a technician wants to become a licensed plumber, Ken-Way will pick up the tuition cost for local classes. “We’re only as good as our team is, so paying tuition is an investment to us,” Fisher says.

Ken-Way is already a recognized brand with a good reputation, Fisher says. The company’s best marketing is its equipment, which is kept clean. Another factor is the company’s relationships with local plumbers. They refer business, as do Ken-Way’s previous customers.

Education is something Ken-Way also offers. Large real estate companies in eastern Iowa have invited Ken-Way to give 15-minute presentations for

Charlie Fisher and his partners at Ken-Way Excavating like to keep everything in-house for more control and efficiency. The same idea is in play when it comes to the company’s use of technology. There is QuickBooks for general accounting and tracking costs, but beyond that, Fisher likes to create his own custom templates.

“We use a lot of Excel spreadsheets, from estimating to a lot of our different forms that we’ve created in-house,” Fisher says. “When I’m creating a daily job sheet for our guys, I know what I want it to accomplish. They can easily take it and use it, and I get exactly the information I need.”

The same goes for bid proposals. He can open his spreadsheet template and modify it as needed, perhaps with a different layout or with items specific to that job.

Technicians use paper copies of spreadsheets and fill in information by hand, whether it’s a count of loads hauled or the amount of material used. Each sheet is coded by job.

“All the job sheets are customized. We have some only for guys driving dump trucks. Others are for guys doing hydroexcavating, jetting and cleaning. And there’s another set for the technicians installing onsite systems,” Fisher says.

At any time, he or his partners can bring up any job on his computer and see all the various costs for it. There are also separate codes for each type of service, such as commercial work or hydroexcavation.

“At any time I can pull a cost report and see how much we’re making or losing on septic work specifically. If I want to go further, I can break it down by job.”

continued >>

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▲ The Ken-Way crew includes, from left, Derek Vesely, Kyle Jacobson, Mitch Fountain and Tucker Schroeder. In the background is a Cat mini-excavator.

“For a pipe replacement, bursting takes about the same amount of time but it is much less dangerous for the men. Buying bursting equipment increases your costs, but that is offset by the reduced risk and by fuel cost.”

Charlie Fisher

employees. For example, a presentation may cover how septic tanks work or what real estate brokers should look for in an existing system — age, type of system, pipe materials and so on — that may positively or negatively affect a buyer or seller.

In 2015, Ken-Way booked a venue and invited representatives of area engineering firms and municipalities to learn the basics of pipe bursting. Aside from their own people, Ken-Way brought in a representative from HammerHead and from a pipe manufacturer. One of the engineering firms in attendance subsequently hired Ken-Way for a large sewer replacement job, but the knowledge passed on at the workshop benefitted more than just Ken-Way.

Business Transition

The three partners grew up on the same street in the same town.

“We’ve been around the industry since we were kids, through family members, through high school, college, and after college,” Fisher says.

The previous owner of Ken-Way was a family friend, and when he was ready to leave the business, he approached Fisher and the Zamastils about buying it. They looked at the numbers, put together a plan, and settled the deal with a few phone calls. It was a good company in a niche market, and they decided they could build on that.

“It was a family septic, sewer and water business. We’ve just taken it to a much larger scale,” Fisher says.

They also brought many functions in-house. Rather than hiring trucks when needed, they bought the equipment so their schedules were not dependent on a subcontractor.

“We have expanded quite a bit, but we don’t depend only on growth. Our goal is growth and strength — being stronger within the niches we have developed so far,” Fisher says. That means emphasizing services such as hydroexcavation or pipe bursting that most excavation companies don’t perform for themselves.

“We don’t desire to get more dozers and excavators. Right now, if we get a call of a main pipe break, we can handle the job with our existing excavators and camera truck. If we identified a need for three more hydroexcavators in our area, that’s where we would rather grow,” Fisher says.

That does not mean that’s where they will grow. Every year is different, and next year the partners may take Ken-Way in another direction.

“What it comes down to,” Fisher says, “is you have to be ready to evolve with the opportunities that come before you.” □

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OSHA Rule Requires Crane Operator Certification for Concrete Tank Delivery

By David Steinkraus

Beginning Nov. 17, anyone operating a crane delivering concrete septic tanks to a job site must be certified to do so under a coming rule from the U.S. Occupational Safety and Health Administration. In 2014, OSHA extended the deadline for certification to this year. The rule was originally published in 2010, and the agency estimated then that crane operations result in 89 fatalities annually in construction work.

As the rule was being formed by OSHA, the National Precast Concrete Association said their members' work consists of delivering materials and suggested truck operators need not go through certification. The rule said any crane hoisting and placing items, as opposed to lifting materials and placing them on the ground, was engaged in construction and should have a certified operator.

When it became clear that the certification requirement would remain, NPCA worked to develop a certification program specific for the precast industry. This certification is for boom trucks of less than 21 tons, which is a large fraction of the cranes in use. Certification requires the completion of three exams. Two are written exams, one on general knowledge and the other specific to the precast industry. There is also a practical exam that must be taken on a boom truck less than 21 tons and with a boom of between 31 and 41 feet in length.

Florida

A bill introduced by Rep. Randy Fine, (R-Palm Bay) in the Florida House of Representatives (HB 285), would require the inspection of septic tanks as part of real estate sales. Fine's focus is the Indian River Lagoon, which last year was shown to be polluted by waste leaking from septic tanks. The number of tanks in the area is unknown, but is estimated in the hundreds of thousands because five counties surround the water body.

Under the proposal, taxpayers will not be required to contribute to this cost, nor does this require property owners to pay for inspections if they have no plans to sell their homes. Inspections will help to inform buyers about the properties they are looking at, he said.

North Dakota

A bill in the North Dakota Legislature would shift responsibility for onsite wastewater system inspections from local health departments to the state Plumbing Board. The bill authorizes hiring additional inspectors and authorizes fees necessary to recover the cost of inspections.

The change would provide uniform enforcement across the state, but the state plumbing inspectors are not comfortable with the change. The

chief inspector for the board said onsite systems are properly a public health issue and are outside the expertise of the board's inspectors.

Representatives from environmental health divisions across the state have been working on a uniform code to make regulations consistent, and the Plumbing Board's chief inspector said his organization would support that. It is also possible that the board could set standards and then contract with local health inspectors to perform fieldwork.

Washington state

County commissioners in Thurston County, Washington, are rethinking a septic inspection fee scheduled to take effect Jan. 1, 2018. The county touches the southern end of Puget Sound and includes the state capital of Olympia.

The fee would apply to all properties using onsite systems, including those within cities such as Olympia. The only exception is land in a special district to protect shellfish that live in the waters of Puget Sound. Each single-family home would pay \$10 while multi-family buildings would pay \$10 per housing unit. The money would be used to pay for staff, monitoring and outreach.

An election put the fee in doubt. Two recently elected county commissioners campaigned on the promise of repealing the fee. Their predecessors advocated the fee as a way to protect drinking water quality. Commissioners said they want more information about onsite system failures and how other counties are updating their onsite management plans. Then they will decide whether to make any changes to the septic fee. They asked the county public health staff to assemble that information.

Maryland

As Maryland legislators gathered to outline their priorities, environmentalists also gathered to ask for the return of a rule governing onsite technology. Their desire is a bill that would require the best available technology to reduce water pollution.

In 2016, Republican Gov. Larry Hogan announced a rule change that allowed counties to decide whether to require onsite systems with the best available technology on lands outside environmentally critical areas. Critical areas include land with 1,000 feet of tidal waters or wetlands along Chesapeake Bay and the Atlantic Ocean.

The old rule governed newly installed onsite systems and required technology that cut nitrogen emissions in half. Opponents of that rule said it is unclear how much nitrogen moves from onsite systems into waterways outside those environmentally critical areas. The state construction industry

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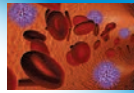


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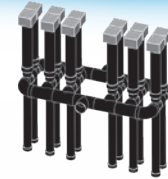
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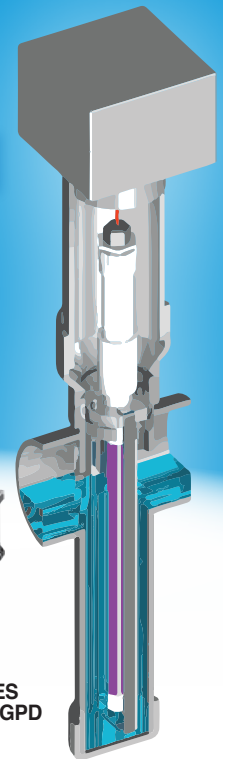
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also objected. A spokeswoman said property owners outside critical areas faced a significant cost without clear evidence of a benefit.

New York

A supervisor in the town of East Hampton, New York, is proposing a law to require upgraded onsite systems and to offer rebates for people to make the technology switch. The town is on the shore of the Atlantic Ocean and near the tip of Long Island, and homes there are known for having cesspools and older onsite technology in an area with sandy soils and high water tables.

The bill would require all new commercial and residential construction, and buildings undergoing major renovation, to install onsite systems discharging nitrogen at less than 19 mg/L.

In the most environmentally sensitive areas, those with high groundwater or proximity to tidal water bodies, qualifying property owners would be reimbursed for the full cost of replacing a system up to a maximum of \$15,000. Other homeowners replacing systems would receive \$5,000 to \$15,000 depending on what system they have now and household income.

Money for the work would come from the town's Community Preservation Fund. It is funded by a 2 percent tax on real estate transactions, and up to 20 percent of it can be used annually for water quality improvement projects. Based on 2016 revenues, the town will have about \$6 million for water quality projects in 2017.

Wisconsin

The U.S. Environmental Protection Agency has approved a request from the state of Wisconsin to provide less-costly options for meeting the state's limits on phosphorus pollution. The state will now have the option of phasing in rules that govern point source discharges such as factories and wastewater treatment plants, the EPA said.

The EPA variance will last for 10 years with an option for another 10-year extension.

To apply for a variance from the rules, an entity must face a major facility upgrade to comply with the limit. Even under a variance, phosphorus discharges must decrease for each five-year term of the entity's NPDES permit, and the entity must implement a watershed improvement project or pay an amount per pound of phosphorus discharged in excess of the permit limit.

When it approved tougher phosphorus regulations in 2010, Wisconsin was among the first states to adopt specific standards for the substance. Businesses objected to the projected cost. An analysis by two state departments estimated that cost at more than \$7 billion over the next 20 years.





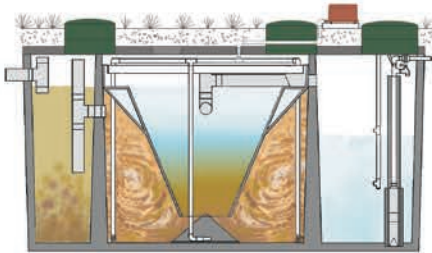
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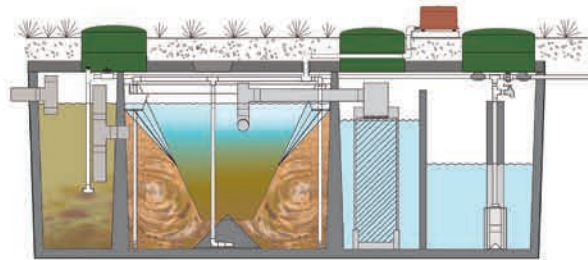
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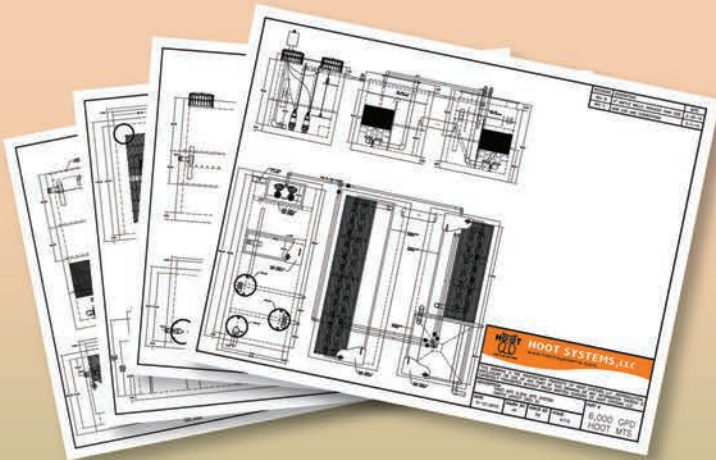
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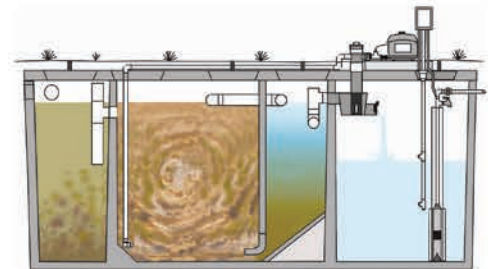


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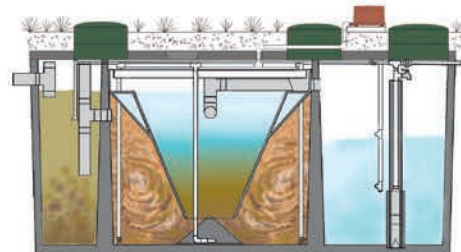


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Steep Slope Solution Saves the Sale

A Type IV advanced treatment design with pressurized at-grade distribution is the answer after a real estate inspection fail in Minnesota

By **Scottie Dayton**

Finding a dry well ended Daren Hofschulte's point-of-sale inspection of a two-bedroom single-family home in Pine Island, Minnesota. According to state code, dry wells are noncompliant.

Hofschulte, owner of Hofschulte Backhoe and Septic in Elgin, Minnesota, frequently designs mound systems with leaching chambers for such properties, but not this time. The house, set into a hill, was 20 feet from the street. A shared potable well eliminated using the area west of the house, and the hill rose behind it in a 10 percent slope.

"That left pretreatment, and only licensed engineers may design Type IV advanced treatment systems," says Hofschulte. For assistance, he turned to Chris Priebe, advanced designer at G-Cubed Engineering in Chatfield, Minnesota.

"Pretreatment reduces the vertical separation to the seasonal high water table from 36 inches to 18 inches, but we found bedrock at 12 inches," says Priebe. "However, adding UV disinfection enabled us to reduce the separation to 12 inches, and design a pressurized at-grade system."

System Profile

- Location:** Pine Island, Minnesota
- Facility served:** Single-family residence
- Designer:** Chris Priebe, G-Cubed Engineering, Chatfield, Minnesota
- Installer:** Daren Hofschulte, Hofschulte Backhoe and Septic, Elgin, Minnesota
- Site conditions:** Silt loam over bedrock; loading rate of 0.78 gpd per square foot
- Type of system:** Pretreatment with pressurized at-grade drainfield
- Hydraulic capacity:** 300 gpd



◀ Technician Britt Coulson from Hofschulte Backhoe and Septic rolls geotextile fabric over 36 EZflow by Infiltrator geosynthetic aggregate modules. (Photos courtesy of Infiltrator Water Technologies)

▼ The Wieser Precast Steps tank holds an H-600A 600-gpd aerobic treatment package from Hoot Aerobic Systems.



Site conditions

Soils are 12 to 18 inches of silt loam over limestone bedrock with a loading rate of 0.78 gpd per square foot. The lot is 0.8 acres.

System components

Priebe designed the system to handle 300 gpd. Major components are:

- A four-chamber 2,080-gallon tank from Wieser Precast Steps housing a Hoot Systems H-600A 600-gpd aeration unit and clarifier
- 4/10 hp effluent pump, A.Y. McDonald Mfg. Co.
- 3G ultraviolet disinfection unit, SALCOR Inc.
- SJE-Rhombus control panel
- 36 EZflow by Infiltrator Water Technologies geosynthetic aggregate module

System operation

Wastewater flows 20 feet through a 4-inch PVC lateral to the 400-gallon pretreatment compartment, then to the 715-gallon aeration chamber. Aeration stones on the bottom of the chamber releases finely diffused bubbles to keep the bacteria alive and solids in motion. Liquid then rises up through the 205-gallon clarifier, where solids settle out before flowing

to the 760-gallon pump chamber.

The pump cycles six times per day for 7.4 minutes. Each 50-gallon dose passes through the UV tube, then gains 18 feet in elevation as it travels 95 feet through a 2-inch force main to the drainfield. An additional 66 gallons is drainback. Only the 4-inch distribution pipe in the middle horizontal triple module configuration receives effluent. Water from the distribution pipe then flows by gravity through the remaining four rows of bundles in the 32- by 12-foot drainfield.

Installation

Hofschulte's crew installed the tank and drainfield simultaneously. After the original septic tank was pumped, son Corey Hofschulte and laborer Jeff Rahman crushed and abandoned it with a John Deere 75D tracked excavator.

The 14- by 7- by 5-foot ATU tank fit between the property line setbacks east of the house and parallel to the road. As Hofschulte and Rahman dug through sand, sandstone and bedrock, the walls caved in. Soon the excavator arm's 21-foot reach wasn't enough to clean out the sand. Daren Hofschulte called for reinforcements — his John Deere 160 LC track excavator with 29-foot reach. By the time Rahman cleaned the corners of the hole, it measured 25 by 18 by 11 feet.

» Steep slope is evident in the backyard behind a patio and retaining wall.

» Only the 4-inch distribution pipe in the middle horizontal triple module configuration receives effluent. Water from the distribution pipe then flows by gravity through the remaining four rows of EZflow by Infiltrator bundles in the 32- by 12-foot drainfield.



“We hauled away the rocky material and kept the sandy soil for backfill,” says Daren Hofschulte. “Spoil was piled behind us, on both sides of the road, and on the road, but we left enough room for traffic to drive around it.”

Meanwhile, operator Britt Coulson used the 75D to slope into the hill for the drainfield, grade the area to drain runoff, and scarify the soil. “The west side of the house had ample space to maneuver our equipment around the retaining walls and up the hill,” says Hofschulte.

The preassembled bundles — three side-by-side 10-foot by 12-inch-diameter modules — snap together to form the required absorption area. “I would use them every day if they magically appeared on the job when we arrived,” says Hofschulte. “They work great on steep slopes, but transporting them was the most difficult part of this install.”

Hofschulte strapped the bundles on a utility trailer, then stopped several times to retie them as wind loosened the load. “You can’t strap them down as if they were plastic pipe, because that would compress the Styrofoam peanuts,” he says. “Break a bundle and millions of little peanuts fly all over. In hindsight, we should have used a dump truck with a rolling tarp.”

To achieve a 32-foot-long absorption area, Rahman and Corey Hofschulte snapped three bundles together to equal 30 feet, then added a 5-foot-long bundle on either end to make up differences in distances and extend the drainfield’s capacity slightly. They installed five rows, then covered them with geotextile fabric. Coulson used a John Deere 333 skid-loader to backfill with sandy loam and 6 inches of topsoil.

“We install an onsite system every day, and often on steep slopes. This was an ordinary installation for us.”

Daren Hofschulte

Digging the 3-foot-deep trench and laying the force main was straightforward. “We install an onsite system every day, and often on steep slopes,” says Hofschulte. “This was an ordinary installation for us.”

Maintenance

Another company maintains the manufacturer’s required service contract. Biannually, the technician observes the mechanical and electrical components, collects an effluent sample for fecal coliform bacteria before cleaning the UV bulb, and replaces it every two years. □

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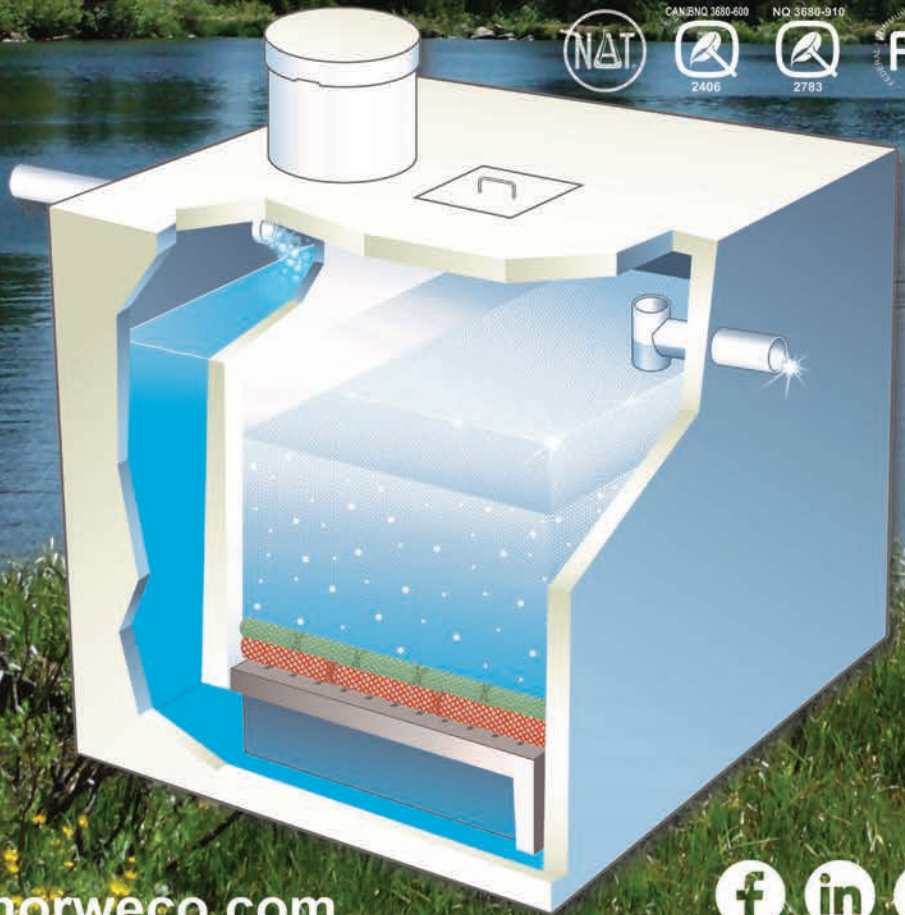
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Canada
514-457-2914 • Fax: 514-457-3589
info@bionetix.ca
www.bionetix-international.com

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888-606-1998 • 320-677-2838 • Fax: 320-677-3001
brenlin@frontiernet.net
www.seal-r.com
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www.camspray.com
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www.clarusenvironmental.com

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info@crestprecastconcrete.com
www.crestprecastconcrete.com
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Delta Environmental
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800-219-9183 • 225-665-6162 • Fax: 225-665-1422
brenda.martinez@pentair.com
www.deltaenvironmental.com
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Den Hartog Industries, Inc.
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800-342-3408 • 712-752-8432
sales@denhartogindustries.com
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888-406-2289 • 406-581-1613
info@eliminite.com
www.eliminite.com

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jim@ferguspowerpump.com
www.ferguspowerpump.com

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questions@hootsystems.com
www.hootsystems.com

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pete@hydro-action.com
www.hydro-action.com

I

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4 Business Park Rd.
Old Saybrook, CT 06475
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877-221-4426 • 860-482-1645
tanxrus@gmail.com
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866-943-7256 • 315-475-0100 • Fax: 315-475-0200
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sales@mightyprobe.com
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800-382-7009 • 847-550-1011 • Fax: 847-550-8004
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www.tuf-tite.com

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513-530-0888 • Fax: 513-530-0893
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Water Cannon, Inc. - MWBE

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sales@watercannon.com
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Wieser Concrete

W3716 US Hwy. 10
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www.biomicrobics.com
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SALCOR UV DISINFECTION

SALCOR, Inc.

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Arcan Enterprises

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Clarus Environmental

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Fergus Power Pump, Inc.

Fergus Falls, MN
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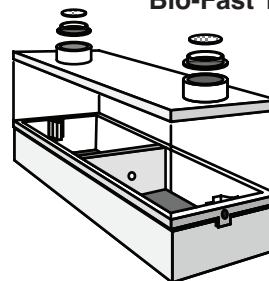
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Jim Anderson, Ph.D., and David Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. David is extension onsite sewage treatment educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor. Readers are welcome to submit questions or article suggestions to Jim and David. Write to andero45@umn.edu.

Whew! This Pit Toilet Stinks.

As a service provider, you can play a key role in reducing odors for your campgrounds or fishing resort customers who maintain outdoor toilets

By Jim Anderson and David Gustafson

This may seem like an odd topic, but I think all of us have been at a campground or picnic area where outdoor toilets are in use. Sometimes these facilities are relatively clean and odor-free, while at others — not so much. This topic arose from someone who also had questions about venting septic odors inside and outside the house.

Both of us have frequent experiences on fishing trips with outdoor toilets that are of the second type mentioned above. So, what goes into keeping an outdoor toilet odor-free? Since some service providers are called upon to regularly clean pit toilets, it may be helpful for you to offer some tips to those that are building and managing these facilities.

Several methods can be used to minimize odors from the pit: Chemical additives can be added, the pit and the upper structure need to be properly vented, seat covers should be airtight, and polyurethane paint should be used inside the structure to minimize penetration of odors into the wood.

Numerous products on the market claim to minimize odors. The owner or manager should try them to determine the most effective solution. Some only mask the odor, while others encourage bacterial activity to break down the solids. A generic product that has been proven effective is hydrated lime.

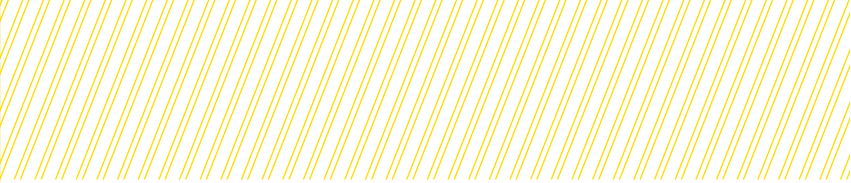
One cup of hydrated lime sprinkled periodically over the pit contents will minimize odors and aid in decomposition. A couple of cautions are in order. First, the compound is caustic so when using the product, proper clothing, gloves and mask should be used to prevent the compound from contacting skin and out of eyes or mouth. Second, if it is used too often it inhibits bacterial action and slows decomposition. It controls the odor but the waste breaks down, meaning the pit will need to be cleaned more often.

Ventilation Tips

Just as in a septic system, ventilation is the key to prevent odors in an outdoor toilet. It is easy to determine if ventilation guidelines have been followed; your nose will tell you right away. To minimize odors, insect-proof openings should be placed in the walls below the seat. A vent should extend from the underside of the seat board through the roof or up to a horizontal vent open to the sides of the toilet. Make sure the vent is flush with the bottom of the seat board and does not extend down into the pit. The gasses that cause odors are lighter than air and they will collect under the seat



These are examples of basic outhouse pit toilets located at a remote fishing spot. (Photo by Jim Anderson)



board if the vent extends into the tank, releasing into the structure when the cover is lifted.

The opening in the seat board must have a tight-fitting cover. The type of seat and cover used with a flush toilet is not satisfactory unless weather stripping or other sealing material is added to make the cover and seat airtight. The cover should be kept closed when not in use to prevent odors from rising into the structure. This is why most campground privies have a spring-loaded hinge that automatically closes the cover.

One cup of hydrated lime sprinkled periodically over the pit contents will minimize odors and aid in decomposition.

At the top of the structure there should be a screened opening on each side or preferably all the way around the top to allow air to pass through and carry away any odors that may be released inside. Any openings should be screened to prevent insect entry. Similarly, the door should be tight-fitting and have a self-closing feature to keep insects and other small animals out.

Using a polyurethane paint reduces the opportunity for odors to seep into pores in the wood. If odors have become trapped in the wood pores, a solution of disinfectant and trisodium phosphate, or TSP, can be used. The walls and ceiling should be scrubbed along with any other wood surfaces inside. After the wood has dried it can be painted with the polyurethane compound.

Extra Points

A couple of final points. If the pit has an earth bottom so the liquid part of the waste can seep directly into the soil, the bottom of the pit can be no closer to a limiting soil layer than the final soil dispersal area in a septic system. The separation distance must be maintained. If this distance cannot be achieved, the pit should be watertight just like any sewage tank and the waste removed periodically using a vacuum truck.

Most outdoor toilets we see these days have watertight pits. Even though decomposition occurs in the pit, over time the pit will fill up, requiring waste to be removed or the toilet moved to a new location.

Since the waste will be removed by a service provider, it is important the owner or manager is clear that the pit is not a receptacle for anything other than human waste and toilet paper. Every service provider who reads this can relate stories of unusual things they have sucked out of these pits. So just like a flush toilet, nothing goes in that hasn't been eaten first! Except toilet paper. □



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Wastewater professionals, lawmakers should steer policy toward stronger water recycling programs

Compiled by Sarah Umhoefer

In States Snapshot, we visit with a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we learn about a leader in the Minnesota Onsite Wastewater Association.

Bernie Miller

advanced inspector/designer,
service provider and maintainer

Business: Miller's Sewage Treatment Solutions,
Kimball, Minnesota

Age: 46

Years in the industry: 23

Association involvement:

I was nominated to run for a board position in 1996 and have served as many terms as possible with the limits set forth in our bylaws. I have been president and vice president at least a couple times and have chaired the membership and cluster task force committee multiple times. In my 20-plus years in the association, I have also served on the legislative and conference committee.

Benefits of belonging to the association:

I believe there are tangible and many less-tangible benefits to belonging to an association. This reminds me of a story I share with potential new members. It was the first conference I attended and hardly knew anyone there. I had just gone through the lunch line, found a table with an open spot and asked if I could join the group.

After introducing myself, I asked the two friendly brothers next to me what line of work they were in. They told me they were mostly excavators but did put in a few septic every year and enjoyed the conference, so they came every year for the fun. I then asked them where they mostly worked, and as it turns out it was in the area of a project I was working on. I explained that I was a project manager for an engineering firm and was working on a new church project in their area. I then asked if they might be interested in bidding

the job. As it turns out, they got the job and it was their primary job for the whole year. So needless to say, networking was a big benefit for them.

Being involved and keeping a pulse on the industry is critical for a business to stay on top of the industry. Benefits that come to mind are networking, education, resources and friendships.

Biggest issue facing our association right now:

Trying to identify what the association can do to better serve its members. The board members and people that are involved are always striving to be better and do more. As a board, we seem to have no shortage of ideas, but with a strong economy, no one on the board has the time to follow through with the ideas. It is apparent that we either need to be satisfied with what we are currently doing or hire additional staff to make these ideas a reality.

Our crew includes:

- Bernie Miller, designer, president/owner
- Barb Miller, office support, vice president/owner
- Jeremy George, site evaluator/inspector
- Chris Schiewe, service and maintenance
- Josh Miller, helper

Typical day on the job:

I spend most of my time in the office drafting, preparing design reports and talking with clients on the phone. Prior to having properly trained staff, I would spend my days in the fields and my evenings and/or nights making phone calls and completing septic designs. Having well-trained field staff has helped our business become more efficient and has allowed me to spend more time with family.

Helping hands – indispensable crew member:

Jeremy George has worked for us for nearly 15 years. His willingness to work long, hard hours in some extreme conditions makes him an indispensable crew member. Chris Schiewe is following right in Jeremy's footsteps with his willingness to work hard and dive into situations where most seasoned septic professionals would be hesitant.

The job I'll never forget:

Upon doing a real estate septic tank inspection, we found the tank was

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➤ The Miller's Sewage Treatment Solutions team includes, from left, Jeremy George, Chris Schiewe, Josh Miller and Bernie Miller. (Photo courtesy of Miller Sewage Treatment Solutions)



full of syringes. As it turns out, the septic tank had not been pumped since the system was installed about 20 years ago, and the single woman who lived there was diabetic. The pumper we had lined up refused to pump the tank unless we came up with a way keep the syringes out of his pump truck. We ended up making a 15-inch-diameter screen with 1/4-inch holes. The screen did work, however it took lots of water and pressure to separate the sludge, hair and grease from the syringes. We bought a couple different pool nets to get the syringes out of the tank.

After discussing disposal options for the syringes with the county, it was concluded that we were to place them in plastic tubs, tape them shut and take them to the landfill. As it turns out, we did get out of there without getting poked; however, the pumper has mentioned that he occasionally sees a syringe in the field where the septage was land-applied.

My favorite piece of equipment:

Our surveying total station, a Pentax PCS-315. The combination of the total station, data collector and our survey AutoCAD program helps us more accurately and efficiently gather site data used for design purposes.

Most challenging site I've worked on:

The most challenging and unique site is a church camp located on two mostly rock islands a stone's throw from Minnesota's Boundary Water Canoe Area Wilderness. The camp had been using pit toilets with the exception of one 100-foot-long by 30-foot-wide mound system located in the center of the main island that served the main lodge/dining hall. The terrain was such that it would be impossible to haul material over land, assuming you could even get the material across the lake.

I asked the camp director how they got the material across to build the mound, and he said, "with backpacks and buckets." On multiple occasions, while trying to locate additional mound sites, we encountered a cow moose with her calves feeding on the birch tree saplings. The following winter an ice road was created across the lake and the materials were transported with a wheel loader and placed in the areas of the proposed mounds. The system we designed for the main lodge included modifying the existing mound system by adding peat modules on top of the existing rock bed and incorporating aerobic treatment.

The craziest question I've been asked by a customer:

Prior to inspecting a holding tank, the customer asked me why I would not go back to school to get a better education so I would not have to look at other people's poop. I did not answer at that time and went on with my inspection. After completing the inspection in 15 minutes, she continued to question why I would not go back to school. After I presented her with a bill for \$300, she stopped asking.

If I could change one industry regulation, it would be:

Allow and provide incentives for wastewater recycling and reuse.

Best piece of small-business advice I've heard:

Shortly after starting my own business, I was talking with an older, very wise engineer about marketing and growth. He said it's like a dog chasing a car; you better have a plan if you catch it. I took that to heart and have been careful not to oversell our services until we have the staff and resources to handle the work.

If I wasn't working in the wastewater industry, I would:

It had taken me 20 years to realize I enjoy and get the most satisfaction in life from helping people by solving their problems. I suppose I would gravitate to another career or industry where I could get the same satisfaction.

Crystal ball time – this is my outlook for the wastewater industry:

I am mostly concerned about the drinking water supply of the world and think it is taken for granted in most places around the U.S. Forty-seven years ago we landed on the moon, but still have not developed processes and regulations to widely and efficiently treat and recycle wastewater on a smaller scale. After 23 years in the industry, I realize how hard it is to treat wastewater to drinking water standard and have always been perplexed that drinking water is used to flush toilets. My hopes are that the industry takes a leading role in developing ways to more effectively treat and dispose wastewater and that lawmakers down to the regulators allow or accept change before it is too late. □

The customer asked me why I would not go back to school to get a better education so I would not have to look at other people's poop. ...
After I presented her with a bill for \$300, she stopped asking.

Bernie Miller

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Trenching Deaths Double in 2016

Federal officials warn incidents show 'an alarming and unacceptable trend that must be halted'

By Doug Day

"Never again" he wrote on his Facebook page after a trench in which he was working collapsed in May. A month later, he was dead — killed in another trench cave-in.

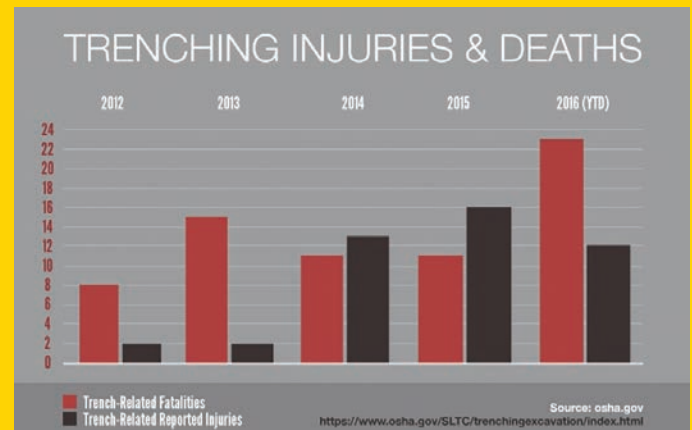
He was one of at least 23 workers who died in U.S. trenching mishaps in 2016, compared to just 11 in each of 2014 and 2015. The Occupational Safety and Health Administration released the troubling statistic last November with six weeks left in the calendar year. "There is no excuse," says Dr. David Michaels, OSHA's assistant secretary of labor. "These fatalities are completely preventable by complying with OSHA standards that every construction contractor should know."

According to local media reports, the 33-year-old victim in Ohio posted "Never again ain't worth it" on his Facebook page after the first incident May 10, 2016. On June 15, he was killed when a sewer line trench that collapsed earlier the same day gave way again. Despite the history of instability, no cave-in protection was provided. OSHA issued the company two willful and two serious safety violations with a proposed penalty of \$274,359.

The citations state that the 60-foot-long by 12-foot-deep trench had no protection against cave-in, the walls were not properly sloped, shored, benched or protected against collapse, and spoils had been placed within 2 feet of the trench. After the trench had collapsed earlier, workers were sent back in to dig out the caved-in soil from the trench. It later collapsed again, trapping the victim under 8 feet of dirt. His body was not recovered until several hours later.

Michaels calls the number of deaths "an alarming and unacceptable trend that must be halted." The dramatic increase in deaths comes as OSHA has a national emphasis program directed at trenching and excavation, which it lists as one of the most hazardous operations in the construction industry.

"It is truly sad that so many trench collapse fatalities are still occurring despite availability of a wide variety of shoring systems and trench boxes," says Tony Simunac, sales manager for Pronal-USA, which manufactures and sells the SmartShore inflatable trench shoring system. "The easier the system is to use, the more likely the crews will use it." □



Rules are clear

OSHA's Trenching and Excavation Safety fact sheet summarizes the requirements for trenching operations:

Protect yourself

Do not enter an unprotected trench! Trenches 5 feet deep or greater require a protective system unless the excavation is made entirely in stable rock. Trenches 20 feet deep or greater require that the protective system be designed by a registered professional engineer or be based on tabulated data prepared and/or approved by a registered professional engineer.

Protective systems

There are different types of protective systems. Sloping involves cutting back the trench wall at an angle inclined away from the excavation. Shoring requires installing aluminum hydraulic or other types of supports to prevent soil movement and cave-ins. Shielding protects workers by using trench boxes or other types of supports to prevent soil cave-ins. Designing a protective system can be complex because you must consider many factors: soil classification, depth of cut, water content of soil, changes due to weather or climate, surcharge loads (spoil, other materials to be used in the trench) and other operations in the vicinity.

Competent person

OSHA standards require that trenches be inspected daily and as conditions change by a competent person prior to worker entry to ensure elimination of excavation hazards. A competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary or dangerous to employees, and who is authorized to take prompt corrective measures to eliminate or control these hazards and conditions.

Access and egress

OSHA requires safe access and egress to all excavations, including ladders, steps, ramps or other safe means of exit for employees working in trench excavations 4 feet or deeper. These devices must be located within 25 feet of all workers.

General trenching and excavation rules

- Keep heavy equipment away from trench edges
- Keep surcharge loads at least 2 feet from trench edges
- Know where underground utilities are located
- Test for low oxygen, hazardous fumes and toxic gases
- Inspect trenches at the start of each shift
- Inspect trenches following a rainstorm
- Do not work under raised loads

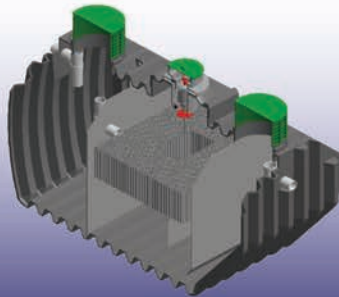


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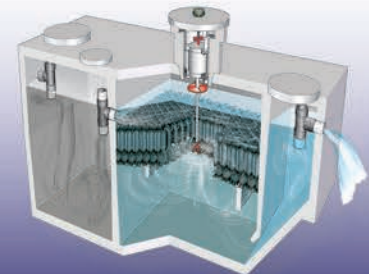
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Felling Trailers I Series

The I Series from Felling Trailers incorporates additional standard features, structural strength and ease of operator use. The design of the hitch plate area has been simplified to reduce the number of welds needed in production, adding strength in final construction. The tailboard incorporates a four-tailight LED system and a new design that offers a level transition onto rear deck boards when loading, extending deck life. An additional 2 inches added to the ramp width provides an 18-inch center gap between ramps. 800/245-2809; www.felling.com. □

INDUSTRY NEWS

Pettibone names Raffaelli VP and GM

Scott Raffaelli has been named vice president and general manager of Pettibone/Traverse Lift. Raffaelli will oversee all company activities, including engineering, operations, sales and aftermarket.



Rod Schrader

Komatsu CEO Rod Schrader named to AEM board of directors

Komatsu America announced that CEO Rod Schrader has been elected to the board of directors of the Association of Equipment Manufacturers, the North American-based international trade group for the off-road equipment manufacturing industry.

John Deere employees increase volunteer hours

In 2016, Deere & Co. employees increased by more than 50 percent the number of volunteer hours in service to community organizations worldwide, totaling nearly 158,000 hours in the year. Deere launched its Serving Our Communities initiative, where employees organized volunteer projects.

Infiltrator Water Technologies celebrates 30th anniversary

Infiltrator Water Technologies celebrates 30 years in the onsite wastewater industry this year. A septic system failure in the 1980s at the home of Jim Nichols, the company's founder, sparked the invention of the gravelless plastic leaching chamber. □

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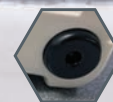
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