

May

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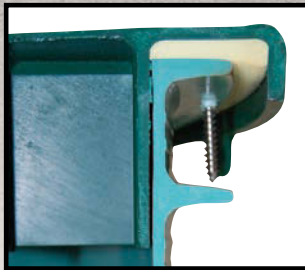
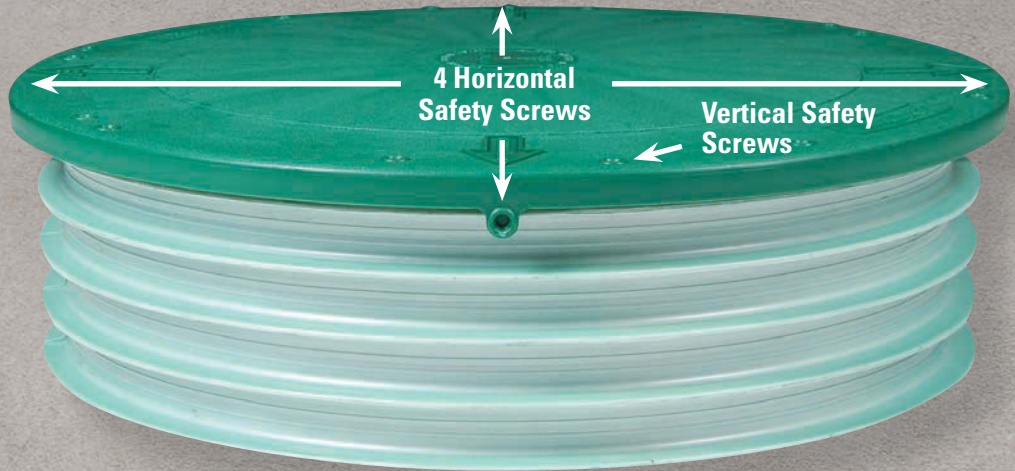
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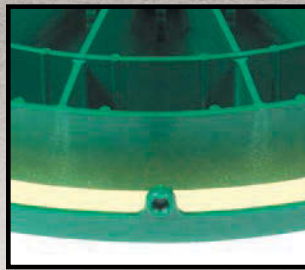
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ON THE COVER: When an economic downturn had a major impact on its hometown of Janesville, Wisconsin, three-generation family company Fanning Excavating tweaked the business plan and started providing service work, including septic pumping. Onsite installation remains the company's bedrock mission with cousins Roger (left) and Don Fanning (shown on a work site with a Case excavator) at the helm. (Photo by Anthony Wahl)

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- System Profile: A retooled ATU system solves issues for a rural church

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Real Estate Inspections, Fertigation and a Party For Dirt

What are several unrelated topics pulled from hundreds of emails that turn up in an editor's mailbox?

By Jim Kneiszel



It's time to reach down deep into the *Onsite Installer* mailbag and pull out some interesting notes and news items I've received in recent months. Here's a sampling of correspondence grabbed from hundreds of monthly emails, with a bit of commentary along the way:

Would you hire a Realtor who doesn't support point-of-sale inspections?

Late last year, the voters of York township, Maine, voted down a referendum that would have required point-of-sale onsite inspections for homes. It was the only referendum to fail out of three measures aimed at reducing water pollution. Two referendums targeting stormwater runoff issues passed overwhelmingly, by 5-1 margins. The onsite inspection question failed 3,683 to 3,052.

Why the vastly different outcomes when the referendums all targeted similar pollution concerns? I'm sure it had to do with an opposition campaign mounted by Realtors groups concerned about the impact of required inspections on lucrative property sales.

According to an article at www.seacoastonline.com, local real estate agents rallied opposition from state and national Realtors associations to fight the measure. They argued that requiring point-of-sale inspections would be a "great overreach of town government regulation" and it would be "costly to sellers and buyers."

In the comments section under the story, a poster asked whether readers would want to hire a Realtor who may be more concerned about sales commissions than in protecting the interests of their clients in a real estate transaction. Those comments have since been taken down from the website. The same commenter posted another response questioning why the criticisms were removed.

I think the poster raised a valid question. Wouldn't an onsite inspection report serve the interests of both the buyer and seller? Both parties in a transaction should want to know that the system is working properly, eliminating potential legal wrangling down the road. In the story, a proponent asked the question: "Why shouldn't you be responsible for your own septic system? If you're selling your house, you're responsible to make sure your roof is in good repair. Why not your septic system?"

I've said it before and I'll say it again. The onsite system is as critical as any component to the proper function of a home. Requiring an inspection at the time of sale is a reasonable regulation to protect buyers and sellers and the health and safety of the public.

Fertigation: The new Brangelina?

Forget hot celebrity couples; the wastewater world is coming up with its own trendy linguistic blend: fertigation. It's the release of fertilizers through irrigation, and onsite systems provide a great opportunity to promote the process, according to a paper written by turfgrass experts and published in the journal *Crop Science*.

Authors Bernd Leinauer and Elena Sevostianova reported that 40 percent of all golf courses in the U.S. Southwest use effluent from municipal treatment plants – containing fertilizing nitrate – to create lush fairways. They suggest that the use of partially treated effluent from onsite systems can be used to effectively fertilize landscaping across the country, not just in the desert Southwest.

"Soil – like air, water and sunlight – is one of the natural resources necessary for life. By telling the story of what soil does for us as humans, we hope to increase the respect humans give back to soil, to protect it for future generations."

David Lindbo

The authors promote the idea of delivering nitrate-laden effluent to plant roots underground rather than sprinkling plants from above. They say decentralized wastewater systems serving entire neighborhoods could "tailor" the effluent to contain 15 ppm of nitrate to replicate the nitrate-based fertilizers golf course operators and homeowners already work into the ground with potable water.

A turfgrass specialist at New Mexico State University, Leinauer is studying the viability of fertigation in his home state. He says the results have been positive, that drip-irrigated tailored water is producing grass that is as green and healthy as test plots receiving potable water and mineral fertilizers.

"We're doing our part in the Southwest, but our region is completely different from, let's say, New England or the Midwest. So these questions need to be investigated more thoroughly on a regional basis," he said in a release.



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Celebrating soils

Did you know it's the International Year of Soils? Well, it is, as declared by the Global Soil Partnership at the Food & Agriculture Organization of the United Nations. And the Soil Science Society of America (SSSA) has planned a variety of activities and is posting promotional videos to give props that soils so richly deserve. You can see the first of the IYS videos here: www.soils.org/iys/monthly-videos.

"Soil – like air, water and sunlight – is one of the natural resources necessary for life. By telling the story of what soil does for us as humans, we hope to increase the respect humans give back to soil, to protect it for future generations," said David Lindbo, past president of SSSA and a professor of soil science at North Carolina State University. The Madison, Wisconsin-based SSSA was founded in 1936 and has more than 6,000 members.

New videos are being posted throughout the year, but the first few present interesting scientific information in an easy-to-understand way. When your onsite customers wonder how their drainfields work, you can refer them to the series of videos for helpful background. The more the public knows about how soil works, the better they will understand why it's critical to take care of their onsite systems.

So have fun digging up the dirt on soils this year!

More resources to educate your onsite customers

Another source of news you can use comes from publications offered by the National Environmental Services Center (NESC), which occasionally sends updates my way. Here are a few new online products the NESC has added in recent months that may appeal to your crew or your customers. For more information, go here: <http://nesc.wvu.edu/products.cfm>.

"Buying or Selling a Home With an Onsite Septic System." This story from the *Pipelines* newsletter covers inspections, system types and questions a homebuyer or seller may consider.

"Minimizing Nitrogen Discharges From Onsite Wastewater Systems." This covers basic information about nitrogen, why reducing levels in effluent is important in some locales and explores how nitrogen-reduction systems work. □



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There are more than 200 known viruses and bacteria in wastewater that can make you sick. Not all workers in the industry are using proper personal protection equipment. Here's a look at what you should be doing to make sure you and your employees are safely outfitted. It may be time for an upgrade!

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Overheard Online

"You may not have any interest in developing a huge, multinational company, but all businesses need to evolve, expand and change."

- 7 Tips to Build and Grow a Small Business

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PUNCH THE CLOCK

Punctuality Problems?

Are some of your employees showing up late – or not at all? Timeliness is key to running an efficient and profitable company. Instead of passive-aggressively handing out watches, here are four suggestions to get your workers in the door on time.

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DESIGN INSPIRATION

Absorption Width Tutorial

Struggling with mound system design? No worries. From loading rates to berms, our expert makes it easy to understand. Here we outline how to determine absorption width when designing a mound system. Check out the whole online series. onsiteinstaller.com/featured

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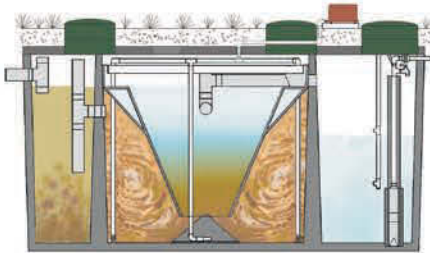
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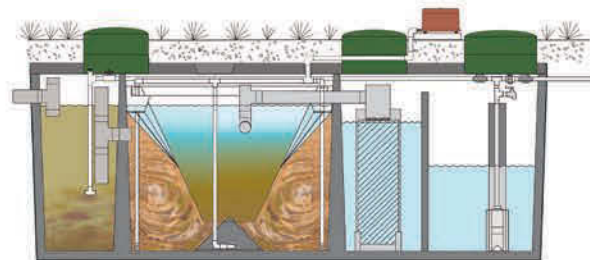
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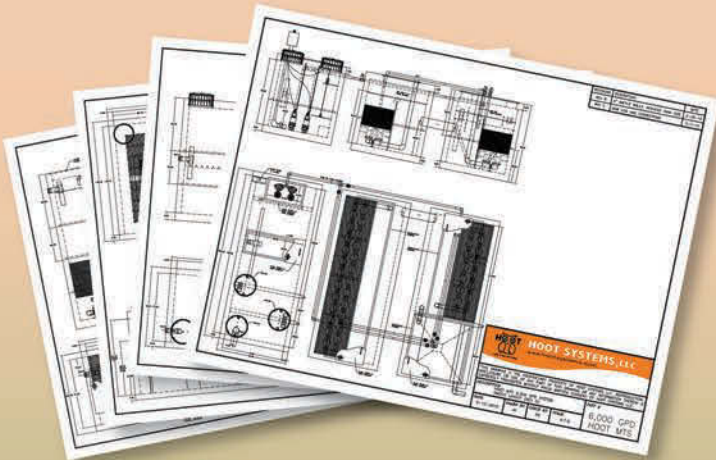
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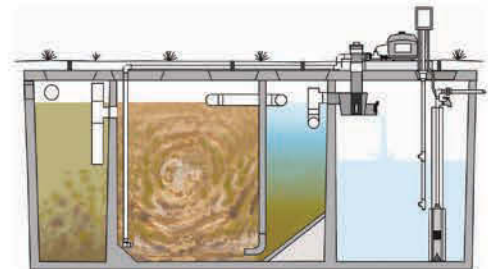


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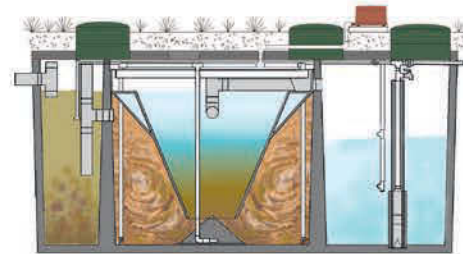


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BOUNCING BACK BIG

Fanning Excavating fights through the closing of a major local employer and a deep housing recession and emerges as a strong, more diversified business with a bright future

By Ted J. Rulseh

Even a historic recession and the closing of a huge automotive plant in the heart of its trade area couldn't stop Fanning Excavating.

The third-generation company in Janesville, Wisconsin, now 69 years old, slowed down for a while but switched gears, augmenting its onsite installation business with more septic system pumping and service work. The business recovered as the general economy improved and as new and growing business slowly restored local jobs.

Roger Fanning Jr., who owns the company with cousin Don Fanning, admits it may be a long time before the return of prosperous times to rival the 1990s, when crews installed as many as 150 systems in a year. Still, through it all, Fanning Excavating held on to its longtime team members, diversified its offerings, deepened its roots in the community with charitable activities, remained profitable and positioned itself to grow.

Today the company installs about 30 onsite systems per year, mainly conventional systems and mounds, while pumping some 800 systems annually, performing system inspections for real estate sales and handling a

Fanning Excavating, Janesville, Wisconsin



FOUNDED:	1946
OWNER:	Roger Fanning Jr. and Don Fanning
EMPLOYEES:	10
SERVICE AREA:	30-mile radius
SPECIALTY:	Onsite installation and maintenance, commercial excavating
AFFILIATIONS:	National Onsite Wastewater Recycling Association, Wisconsin Liquid Waste Carriers Association
WEBSITE:	www.fanningexcavating-septic.com



ABOVE: Don Fanning operates a Case CX130 excavator during the installation of a series of tanks for a new septic system.

<<OPPOSITE PAGE: The crew at Fanning Excavating includes (back row, from left) Alex Zainer, Michael Halverson and Alex Poad; and (front row) Don Fanning, Richard Gregg and Roger Fanning. (Photos by Anthony Wahl)

variety of repairs. The continued success is a testament to the power of good customer relations, a hard-earned reputation for fair dealing and excellent work, and a positive attitude.

FARMING ROOTS

The Fannings' grandfather and grandmother started the company in 1946. "They were farmers and were having a hard time making a living," says Roger Fanning. "So my grandfather bought a backhoe and started fixing waterlines and doing other projects for farmers." His first big job was building roads around nearby Whitewater Lake.

He branched out into septic systems in the 1950s. In 1980, Roger (Duff) Fanning Sr. and his brother, William Fanning, bought the company. Don, William's son, served in the U.S. Air Force and, upon discharge, came back to the family business.

Roger Jr., meanwhile, tried college for a time, then for a few years poured septic tanks for local precaster Dalmaray Concrete Products. In 1990, he joined the family company. "I came in with nothing," he recalls. "I started with a shovel." He is now a certified soil tester and site evaluator and is state licensed as a privately owned wastewater treatment systems maintainer. He also holds a master plumber license (restricted).

As for Don, "When he came back he pretty much just jumped on the equipment. He runs all the machinery. He's more the dirt guy and I'm more the pipe guy." The two took over the business in 2012. Roger Sr. remains active in estimating projects, "and he still likes to climb into the excavators once in a while," says his son. William Fanning handles most of the company finances. Don's daughter, Elly, works part time supporting Melisa Lowell, office manager.

"I came in with nothing. I started with a shovel."

Roger Fanning Jr.

DEALING WITH ADVERSITY

Don and Roger Jr. bought the business during a challenging period. In the 1990s, the company's business was about 85 percent installation and the balance maintenance. Janesville was a growing area and home to a General Motors assembly plant that had produced more than 16 million vehicles starting in 1918.

In 2009 the plant closed, putting about 1,200 highly paid people out of work. This was at a time when the housing market was collapsing as the economy went into recession. "Once GM left, all the plant's suppliers left, too. A lot of good jobs were lost. The local economy took a big hit. It didn't kill us, but it sure put us down on the ground for a while. Over the last three years, you can see it getting better and better."

That's largely because Roger Jr. and Don and their team refused to let hard times defeat them. One longtime employee had recently retired,



The crew from Fanning Excavating guides the top section of a new Dalmaray Concrete Products 2,000-gallon septic tank into place at a home-building site near Janesville, Wisconsin.

Giving back

For the past several years, Roger Fanning Jr. and his company have been big contributors to causes in the Janesville area. In 2010, the company entered a team in the Bert Blain Memorial Heart Walk for the American Heart Association, in honor of the owners' grandfather and company founder John (Cud) Fanning, who died of a stroke. Involvement in that event escalated until, last year, the company sponsored a tent for sports teams and company mascots. The event's fundraising goal for 2014 was \$420,000.

For the past three years, the business has supported the Pound the Pavement 5K and 10K run for Habitat for Humanity in Rock and Jefferson counties. "We've raised around \$47,000 in that time," says Fanning. "I'm the logistics chair, which means I help set the race course, line up people for timing and help with setup and breakdown."

Last July, Fanning Excavating was an organizer of the Wisconsin Onsite Wastewater Recycling Association's Rejuvenate a Family Day charity project, an annual event in which members and vendors donate labor and materials to install a new septic system for a family in need.

lightening the payroll. To make up for the loss of installations, the company boosted its septic tank pumping side.

"You've got to put food on your table," says Roger Jr. "We had always pumped septic tanks, but we had never really pursued it hard. We pretty much took care of our own customers and used the vacuum truck when we had to deal with a failing system."

That changed quickly. The company began aggressively promoting its pumping service, deploying its 1990 Mack tri-axle vacuum truck with a Jurop/Chandler pump and 4,500-gallon aluminum tank fabricated by Longhorn Tank & Trailer of Gravette, Arkansas.

ADDING EVALUATIONS

"When the county went to a three-year maintenance requirement on septic tanks under state law, we went to the health department and looked up people who were due for pumping," Roger Jr. says. "We did that for several months. The business also grew by word-of-mouth. People would see the kind job we did."

"We cost a little more than most competitors, but we don't charge for add-ons, like if we have to drag out an extra hose, or clean the filter, or pump the pump chamber. We have a flat fee for up to 2,000 gallons, and we do everything that needs to be done while we're there. People



Roger Fanning and Alex Zainer (in the background) apply a butyl rubber seal to the top edge of the lower half of a new septic tank during installation. The next part of the operation is placing the top carefully over the sealer.

also notice the truck on the roads with its nice, shiny tank and say, ‘We’ve got to call them.’”

The company also moved into system evaluations for home sales, using a protocol created by the Wisconsin Onsite Wastewater Recycling Association (WOWRA). “They’ve created a uniform evaluation course so that no matter what part of the state you’re in, you have the same evaluation done,” he says. “It’s very detailed. It’s not a pass-fail thing as in the past. It’s a thorough evaluation of what the owner has on the property.”

He met with real estate agents and showed them the program. “Some of them bit into it. It’s going pretty well,” Roger Jr. says. Don notes that system evaluations have led to new sources of business: “We get whole different groups of people calling. We get contacts from real estate agents and from people who want to sell or buy a home. It really has opened a new chapter.”

INSTALLS ON THE RISE

Meanwhile, installations are growing, though at a slower pace. Most new systems are replacements on alternate sites now required by code.

Fanning Excavating starts with thorough site and soil evaluation, usually performed by team member William Steinke. Soils vary from challenging clay to system-friendly sand and gravel.

In difficult soils, the company installs mounds and, occasionally, such as on space-constrained riverfront sites, FAST systems (Bio-Microbics). The field crew includes heavy equipment operators Richard Gregg, Michael Halverson and Alex Poad, and laborer Alex Zainer.

The equipment inventory includes four Mack dump trucks and earth-moving machines that include a 1996 Case 621 wheel loader, 1996 Case 580SK backhoe, 1997 Bomag 172D-2 roller, 1999 Kobelco SK-200IV excavator, 2000 Case 1845C Uniload, 2002 Kobelco SK035 SR excavator, 2004 Case CX130 excavator, 2006 Case 850K dozer and a 2013 Case SR200 skid loader.

Fanning Excavating prefers EZflow drainfield media (Infiltrator Systems) for ease of handling and durability and uses mostly precast concrete tanks (Dalmaray). While not eager to share company secrets, Roger Jr. notes several characteristics of the company’s systems: “I can come back in 20

years and look at a system and tell you if we put it in.”

High on the agenda is ease of maintenance – installing pumps with ample service access and installing filters so that they’re easy to pull out and clean. “Some competitors put a distribution box deep in the ground and bury it,” says Roger Jr. “Why put in a box if you’re going to bury it? Our boxes are up at ground level as much as possible because you want to be able to access them.”

ATTENTION TO DETAIL

“Suppose you put in a system with three trenches and you have tank effluent going out to three different lines. If you can’t turn one of those lines off because it’s saturated, what good is the box? That’s the beauty of a box – if one line out of three gets saturated, you can just plug it for a while and let the trench dry out,” says Roger Jr.

There’s also the matter of leaving a clean site behind after a job. “We like to leave the site the way we found it. You have to, or you won’t be around very long. People drive by in the country and see you working, and they’re going to look at the property when you’re done.”

Good work often leads to more customers. “A lot of our business over the years has been word-of-mouth,” Don observes. “We don’t do a lot of advertising. Farmers speak to each other, residential property owners speak to each other. A lot of times someone will call and say, ‘You did a job for so-and-so, and he recommended you.’ We do hear that quite often.”

“We like to leave the site the way we found it. You have to, or you won’t be around very long. People drive by in the country and see you working, and they’re going to look at the property when you’re done.”

Roger Fanning Jr.

A SOLID TEAM

While treating customers right, Fanning also takes special care of its team. Says Roger Jr., “I learned from my dad, uncle and grandfather that if you treat people fairly, they will treat you fairly. They also taught us the importance of showing people what you want and then stepping back and letting them figure things out on their own. They never micromanaged us, and we don’t micromanage our people today.”

The company offers competitive wages and a benefit package that includes health insurance, a retirement plan and paid vacations. Uniforms are provided.

Good treatment likely accounts for the team’s longevity. Soil tester Steinke has been with the company for 33 years; equipment operator Gregg



Don Fanning places a riser over a Dalmaray Concrete Products tank during a system install.

for almost 40. “Richie is the best dozer operator you’ll ever see,” says Roger Jr. “Halvy [Halverson] has been with us for 16 years and loves driving truck.”

Don notes that satisfied employees pay dividends for the business: “They don’t complain. If we have to work late, which we do often, or if we need them to come in on Saturday for any reason on short notice, it’s not very often they tell us no.”

A smooth-functioning team allows Roger Jr. to dedicate time to WOWRA, where he serves on the board of directors, as his uncle William did in the 1980s. “I started going to the conventions and was impressed by the wisdom of some of the older members,” he says. “As a young guy in my 20s, I listened to people like Claire McQuestion, Jim Tesmer, Wayne Pett and Rick Apfel talk about how they installed systems and the little tricks they used.”

The knowledge he gained now helps him win over prospective customers. “If they spend 15 minutes on a site with me, they’ll realize that I know what I’m talking about. We’ve also been around long enough so that people know who we are – they know what they’re getting,” says Roger Jr. “We’re here because we do a good job, and I’m proud of that.” □

MORE INFO:

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www.biomicrobics.com
(See ad page 19)

Dalmaray Concrete Products Inc.
608/752-6507
www.dalmaray.com
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800/221-4436
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The Linear Loading Rate

Understand how water infiltration impacts treatment so you can install the optimal onsite system for every site

By Jim Anderson and David Gustafson

As we have written in the past, the design loading rate in terms of gallons per day per square foot (gpd/sq.ft.) is determined by the soil property's texture, structure and consistence. This combined with an estimate of daily water use determines the area in square feet needed for the soil treatment area.

Loading rates at the infiltrative surface take into account development of the biomat. The term adopted for this loading rate is the Long Term Acceptance Rate (LTAR). Other factors, though, determine how water moves out of and away from the soil treatment area. As systems become larger in size, these factors become more important from both a design and installation perspective. They also have a large impact on the amount of treatment that will occur.

A designer and installer need to know the conditions below the excavated surface. If landscape factors and loading rates are not accounted for, there can be problems with treatment and having the water stay below the surface.

SEPARATION DISTANCE

One factor is simply the separation distance from the infiltrative surface (bottom of the soil treatment trench) to some type of limiting layer. This layer can be bedrock, seasonally saturated soil, dense soil conditions or a significant change in soil texture.

Required separation distance is specified in state and local codes, depending on the level of safety selected to provide for treatment of pathogens. In Minnesota, our separation number is 3 feet, which was based on early research showing pathogen removal within 2 feet of soil if flow was unsaturated and did not exceed a loading rate of about 1.2 gpd/sq.ft.

Soil considered non-limiting between the bottom of the trench and a limiting layer should also be evaluated in terms of estimated LTAR. If there is a layer or horizon below the infiltrative surface of the trench with a slower estimated LTAR, an evaluation should be made as to whether water that leaves the trench will infiltrate into and through this layer without

mounding water underneath the trench, thus creating a saturated condition that would interfere with treatment or impact an adjacent trench.

A simple example to consider is a series of trenches on a level site. The soil at an infiltrative surface has an LTAR of 0.6 gal/sq.ft./d and there is a soil layer below that has an LTAR of 0.4 gal/sq.ft./d. For 1 lineal foot (lf) of a 3-foot-wide trench, the total load is 1.8 gal/lf of trench. This means the slower soil will take 1.5 times more area to infiltrate the effluent, so instead of infiltrating 1.8 gallons in 3 feet it will take 4.5 feet.

Water will infiltrate from the trench and be moved down by gravity until it encounters the slower soil, where it will spread out laterally 4.5 feet before it all moves into the layer below. On a level site, water would move out both directions away from the trench because the primary downward force would be gravity.

CONSIDER LANDSCAPE LOCATION

Since most trenches are installed 7 feet on center, there should be enough area under and around the trench to have the water move into the slower layer without impacting the next trench. Now consider a layer that has an LTAR of 0.2 gal/sq.ft./d. In order for the 1.8 gallons to infiltrate, it will take three times the distance; so instead of 4.5 feet it will take 9 feet. Now the trenches are located too close together and the spacing should be changed to 10 feet on center at a minimum to make sure the trenches do not interfere.

When a series of trenches is placed on a slope, landscape location must be considered. This is where the contour loading rate is something that may need to be evaluated. Let's think about two 3-foot-wide trenches placed 7 feet on center on a slope. Water will move out of the trenches downward due to gravity, but also laterally down the slope. In the area of the trenches with the same 0.6 LTAR soil, the loading rate along the contour is 3.6 gallons per lineal foot. There is now the danger of "stacking" water up along this contour over the limiting layer. For the layer with a 0.2 LTAR, there has to be 18 feet under and downslope from the trenches to infiltrate the water.

If the surface of the slower layer runs parallel to the land surface, this is probably not a problem. But think of the areas you have seen: bedrock layers where it intersects (outcrops) downslope or seasonally perched water that intersects with the toe of the slope. Now it is more critical that the water either infiltrate before it reaches these points in the landscape or has passed through enough unsaturated soil before it exits to ensure treatment.

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

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For these reasons, we always suggest that the soil treatment part of the system be designed and installed as long as possible along the contour. Long and narrow is better than short and wide. For example, let's look at a narrow bed that is 10 feet wide in the same materials. Now the loading per lineal foot along the contour is 6 gallons. Now we need 30 feet under and downslope from the bed to get the water to move away.

WORK TOGETHER FOR SUCCESS

The bottom line: A designer and installer need to know the conditions below the excavated surface. If landscape factors and loading rates are not accounted for, there can be problems with treatment and having the water stay below the surface. □



Environmental Impact

A pretreatment system including UV disinfection placed on a tiny brookside lot helps protect the clean-water supply at New York's Lake George

By **Scottie Dayton**

Algae blooms at the mouth of Smith Brook, a Lake George tributary, concerned residents in the Village of Lake George, New York. Nicknamed the Queen of American Lakes, the oligotrophic (low biological activity) lake is a source of drinking water and one of the state's top vacation destinations.

Soil surveys conducted along the road paralleling the brook revealed a cesspool on each tiny residential lot. Fast-perking soils and seasonal homes never allowed biomats to develop and systems to backup.

Kathy Bozony, head of the Septic Initiative Program run by the Lake George Consolidated Board of Health, contacted Eric Murdock, P.E., proprietor of Onsite Engineering in Syracuse. "The owner of a three-bedroom home wanted to sell and realized the cesspool was an impediment," says Murdock. "The town offered to assist in paying the engineering costs of a replacement system if I found a solution."

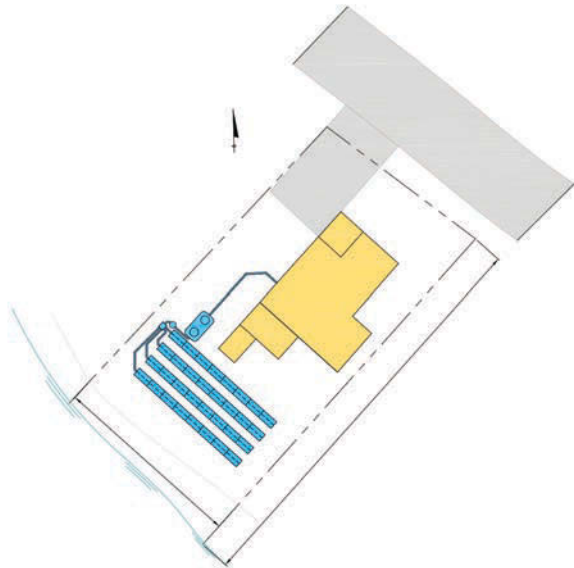
The 44- by 81-foot-long lot was the greatest challenge, necessitating an all-in-one treatment unit to fit the footprint. Because the drainfield would be less than 50 feet from surface water, code mandated an NSF Standard 40 Class 1 treatment system with disinfection. "I also wanted nutrient removal, shock load capabilities and ease of operation with no mechanical components," says Murdock.

SYSTEM PROFILE

Location:	Lake George, New York
Facility served:	3-bedroom home
Designer:	Eric Murdock, Onsite Engineering, Syracuse
Installer:	Dean Burdick, Stone Installations, Saratoga Springs
Site conditions:	Sand and gravel; percolation rate 6 to 8 minutes per inch
Type of system:	Fusion ZF-450 purification unit, Clarus Environmental, a Division of Zoeller
Hydraulic capacity:	330 gpd

<< OPPOSITE PAGE: Larry Blanchard of Stone Installations checks the lifting straps on the Fusion purification unit while Dean Burdick, vice president of operations, observes. Foreman Brian Ramos operates the excavator. (Photos courtesy of Stone Installations/graphics courtesy of Onsite Engineering)

BELOW: A tiny 44- by 81-foot waterfront lot in Lake George, New York, necessitated an onsite system with a compact footprint. The layout shows the footprint of the three-bedroom house and the Fusion treatment unit with effluent flowing into a chamber drainfield.



The drop-in Fusion ZF-450 purification unit (Clarus Environmental Products) with gravity flow design met all the requirements. As the first installation of its kind in the area, the system treats effluent to less than 9 mg/L BOD and TSS (as low as instruments register), and less than 1 cfu/100 mL total coliform.

SITE CONDITIONS

Soils are sand and gravel with a percolation rate of 6 to 8 minutes per inch. Smith Brook, 30 feet from the system, defines the south boundary of the 0.09-acre lot.

SYSTEM COMPONENTS

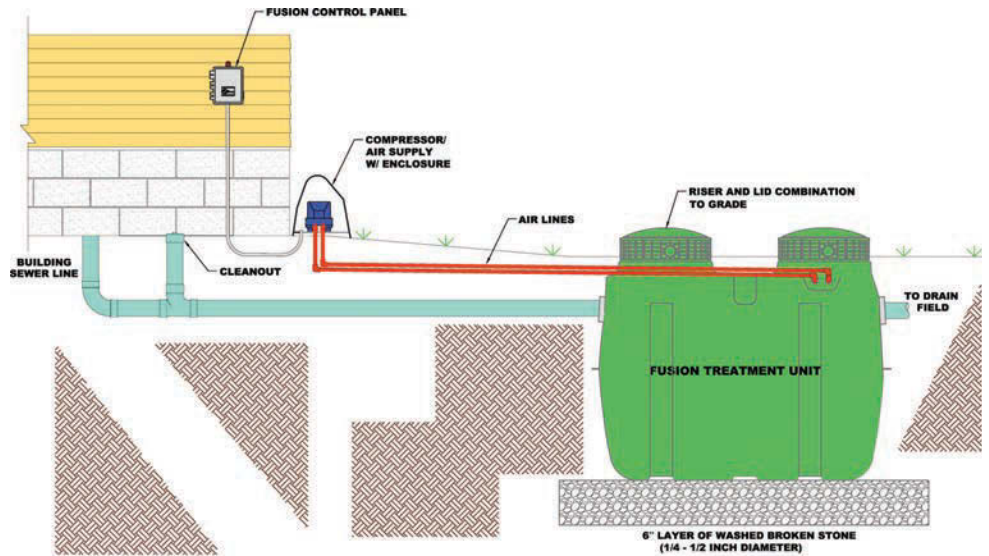
Murdock designed the system to handle 330 gpd. Onsite Sales and Service (also owned by Murdock) provided the major components. They include:

- Fusion ZF-450 purification unit from Clarus Environmental, a Division of Zoeller
- 3G ultraviolet disinfection chamber from Salcor Inc.
- Arc 24 chambers from Infiltrator Systems
- Fusion control panel

SYSTEM OPERATION

Wastewater flows by gravity through a 4-inch PVC pipe to the 85- by 44- by 62-inch-high purification unit with four chambers. The sedimentation compartment acts like a septic tank. In the anaerobic chamber, microorganisms on fixed 4-inch spherical-skeleton type media digest nutrients at the same time suspended solids are captured. The media provides a stable environment that leaves bacterial colonies unaffected by high-flow events.

The aeration chamber, with an upper aeration section and a lower filter media section, is filled with 3/4-inch-long hollow cylinders. Incoming air from a compressor keeps them agitated.



ABOVE: This graphic shows the installation of the Fusion treatment unit.

BELOW: Lack of space forces operator Brian Ramos from Stone Installations to dig and backfill trenches with the excavator straddled over them. The trenches hold Arc 24 chambers from Infiltrator Systems.



Microorganisms growing in a thin biofilm on the cylinders remove impurities. Residual suspended solids are captured by the stationary filter media in the chamber's lower portion.

Because sludge develops rapidly in the third chamber, the filter is backwashed twice daily in 10-minute cycles.

Air vigorously stirs the media to break up accumulated materials. An airlift pump transfers waste back to the first chamber for further digestion and to aid in denitrification. The anaerobic and aeration chambers have risers.

The fourth chamber temporarily stores effluent before it flows by gravity through the disinfection chamber to the distribution box feeding four 33.5-foot-long trenches. Each has six 67- by 22.5- by 12-inch-high chambers on 48-inch centers.

"The Fusion's operation with recirculation is very dynamic to watch, yet the design is uncomplicated."

Eric Murdock

INSTALLATION

In August 2014, Murdock gave a Powerpoint presentation about the Fusion system to the town board. He planned a hands-on installation training session for contractors until the preconstruction meeting with Dean Burdick, vice president of operations for Stone Installations, Saratoga Springs.

"Walking the site helped us realize that it was too small to accommodate such an event," says Murdock. "Furthermore, the property lines as defined

by the homeowner were wrong." Wary of installing components on someone else's lot, Murdock insisted on a property survey, which took a month to complete.

"I wasn't the most popular guy on the project because everyone wanted the job done ASAP," he says. "As the engineer, I won't show a property line unless it's on a survey." The survey revealed the lot was even narrower than originally thought.

Burdick and foreman, Brian Ramos, used a 3-ton Caterpillar tracked excavator to dig the tank hole, then bedded it with 6 inches of washed stone.

"The Fusion installs just like a septic tank," says Murdock. "After leveling it, we connect the four pipes, then fill the tank to the mid-seam with water to equalize the pressure from the backfill."

Murdock's original design had five 33.5-foot-long drainfield laterals paralleling the brook, but that didn't leave enough maneuverability beside the riverbank. Board of health members on site during installation agreed to reduce the footprint by one lateral based on the pretreatment and disinfection of effluent.

"The trick was to set the Bosch laser level and not move it while installing the drainfield," says Murdock. Working from the brook toward the house, the men installed one 24-inch-wide trench at a time, tracking in and out following the same path. Once a trench was backfilled, they added 12 inches of cover, then straddled the excavator over that trench while digging the next one about 30 inches deep. The entire installation took two days.

Early this March, Murdock invited design engineers, regulators and contractors to another training event. The morning classroom sessions covered the system's design aspects. In the afternoon, they visited the property. "The Fusion's operation with recirculation is very dynamic to watch, yet the design is uncomplicated," says Murdock.

MAINTENANCE

Onsite Sales and Service holds the service contract. From each compartment, technicians pull samples to record transparency, pH, alkalinity and nitrate, and they measure the thickness of floatables and depth of sludge.

The data develops a baseline to help identify a disturbance in the tank's biological activity. "I've never seen [a disturbance], even when owners are undergoing cancer treatments," says Murdock.



Air lines and recirculation valves are shown in the Fusion's aeration chamber.

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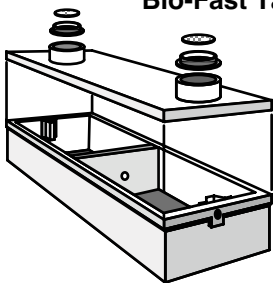
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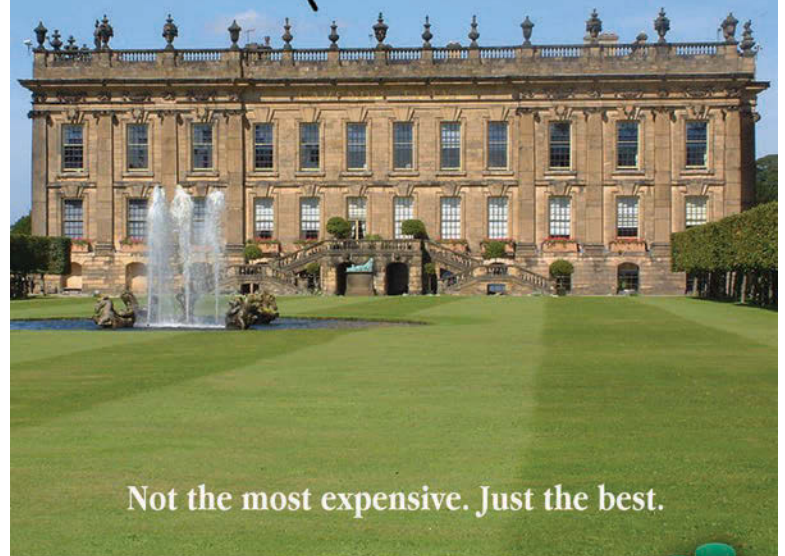


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E Z Onsite markets a self-cleaning pump vault at the WWETT Show

By Craig Mandli

A septic tank effluent pump (STEP) system allows neighborhoods to treat wastewater independently and avoid connection to a municipal sewer. However, these large decentralized systems typically require more intensive maintenance than an ordinary septic system, as filters between the pump vault and treatment plant can clog with solids. E Z Onsite addresses that problem with its STEP system with a self-cleaning pump vault, which was displayed at the 2015 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show.

“This is a single-tank application that precedes the treatment plant,” says Micah Frazier, manager and officer with E Z Onsite. “Instead of collecting the solids, this system returns them back to the tank treatment zone. They settle to the bottom of the vault and are forced through a 2-inch opening for easy disposal.”

Fewer solids reach the filter, allowing for longer maintenance intervals and reduced system alarms due to clogging.

Since launching its STEP system featuring the self-cleaning pump vault in spring of 2010, E Z Onsite has installed 10 units in the southeastern U.S. They come with float collars that connect to 1-inch Schedule 40 PVC pipe, floats with a wide or narrow angle, discharge assemblies available in 1/2-inch quick connect PEX or Flex 1-, 1 1/4- and 2-inch pipe, and control panels manufactured in a 508 UL-listed control panel shop, with simplex and duplex options and visible and audible alarms. Smart panels with telemetry are also available.

“We’ve received outstanding feedback from the units in the field,” says Frazier. “We have one utility south of Nashville, Tennessee, in particular



Micah Frazier, right, manager and officer with E Z Onsite, explains the self-cleaning pump vault technology behind his company’s STEP system to an attendee at the 2015 WWETT Show. (Photo by Craig Mandli)

that was getting alarms on their STEP system pretty regularly. Since they replaced the unit with our self-cleaning pump vault, they haven’t had an alarm in three years.”

Frazier says the system has proven itself in the southeast U.S., and now the company is ramping up marketing in the rest of the country. He says contacts he made at the WWETT Show are promising.

“I talked with several installers and municipalities from the Midwest that are interested in taking a look at how our unit would work in different climates,” he says. “That’s exciting!” 615/427-1824. □



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Wisconsin Supreme Court finds septage is a pollutant in well-contamination case

By Doug Day

Septic service professionals in Wisconsin may be facing a bit of a quandary concerning their liability insurance. In two December decisions, the Wisconsin Supreme Court ruled that septage and manure may be considered pollutants. When wastes are identified as pollutants, the court determined, they are subject to the pollutant exclusion clause of a liability insurance policy – even if that policy was purchased to cover a company in the business of handling septage or manure.

One case involved a septic service business that had a permit to apply septage as a fertilizer on their neighbor's farmland. The neighbor's well became contaminated by runoff, killing some cattle, and they sued the septic business' insurers. The Supreme Court agreed with lower courts that the septage qualified as a pollutant, so the pollution exclusion applied and the insurance company did not have to cover the damage.

Chief Justice Shirley Abrahamson was the only dissenter, questioning why such a company would purchase insurance in the first case. "I conclude that a reasonable person ... in the business of hauling, storing and disposing of septage, would not consider septage a pollutant under ... general liability policies they purchased to cover liability for damage caused by their septic business operations."

In the manure case, the Supreme Court overturned a lower court and ruled that the manure became a pollutant when it entered wells on property adjacent to a farm field where it was spread as a fertilizer. Abrahamson also dissented in that case for similar reasons.

Michigan

An exception to Michigan's septage waste law will remain in effect now that a sunset provision of the regulation has been removed. Most septage haulers are required to dispose of their waste at a receiving facility in their area. That provision does not apply to those who own a septage storage facility of at least 50,000 gallons if it existed prior to a septage disposal

facility in their area. Those haulers can continue land application, an exemption that was scheduled to end in 2025. The Legislature's action removes that sunset provision and makes the exemption permanent.

The bill also limits the ability of local governments to impose stricter septage requirements than those in state law. Under Michigan law, septage receiving facilities must have a designated service territory, and some communities have made it mandatory that septage pumped in that area be taken to their receiving facility. Such mandates are now allowed only for existing receiving stations and only until their construction debt is paid off.

Maryland

The owner of a rental home who bypassed a failed septic system has been fined, and a contractor who did the work is being charged. The Laurel, Delaware, woman was contacted by tenants who rented the Wicomico County home due to strong odors and sewage backing up into the home. The woman hired a contractor to install a pipe that discharged wastewater from the septic system into a creek in a wooded area of the backyard.

The homeowner pleaded guilty to misdemeanors of water pollution and improper alteration of a sewage system and was placed on probation for three years, fined \$12,000 to be paid to the Maryland Clean Water Fund and ordered to perform 75 hours of community service. An additional \$23,000 fine was suspended by the judge. The contractor has been charged with two counts of water pollution and 11 counts of installing or altering a sewage system without a permit. □



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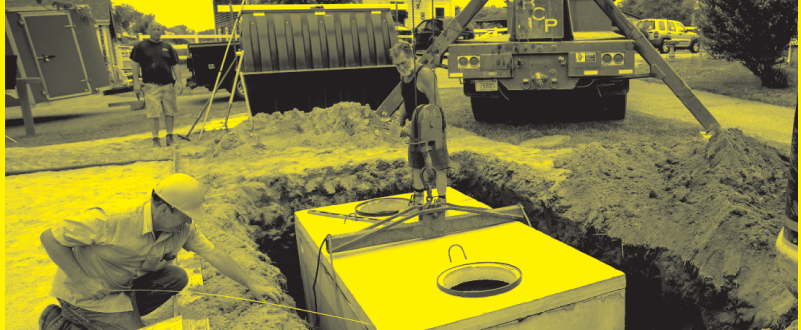
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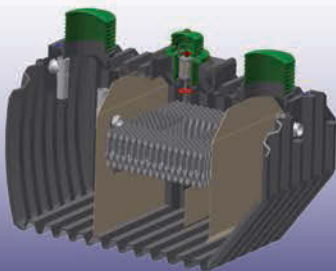
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Is Ethanol a 4-Letter Word?

Ethanol-blended fuels get a bad rap for creating wear and tear on small engines used every day by installer businesses. But is the criticism warranted?

By Ed Wodalski

Would you? Could you? Should you use ethanol-blended, oxygenated fuel in your small engine?

The short answer is yes, but ...

Today's spark-ignited, carbureted engines used in pumps, generators, weed whackers, lawn mowers, chain saws, Crust Busters, snow throwers, power washers, concrete saws and similar equipment are designed to run on E0 (100 percent gasoline) to E10 (10 percent ethanol, 90 percent gasoline) fuels.

The devil, as they say, is in the details. Even ethanol-free fuels can be harmful to your small engine if not stored properly.

DON'T BLAME THE FUEL

"A lot of things get blamed on ethanol, but it's not really ethanol's fault," says Mike Rickey, senior manager, Honda engines.

Fuel naturally degrades and becomes stale over time. Running an engine on stale fuel is the leading cause of carburetor failure. Stale fuel also leaves gum and varnish on piston rings that can cause engine failure. Stale fuel, however, has been a problem long before blended gasoline.

"Fuel can get stale in 30 to 60 days," Rickey says. "We recommend people only buy enough gasoline to last one to two months and add a fuel stabilizer to the storage container, even if you're going to use it fairly quickly."

A word of warning: While stabilizer extends the shelf life of gasoline, it doesn't "refresh" or reconstitute stale fuel.

Two natural enemies of blended fuels are air and water, which quickly break down improperly stored gasoline.

WHAT ABOUT MY TRUCK?

So why are cars and trucks more tolerant of blended fuels than small engines? Two reasons: Cars and trucks are used more frequently, leaving less time for gasoline to break down. Secondly, unlike carbureted small engines, today's cars and trucks are fuel injected. In such systems, fuel from the tank forward is contained in a sealed vessel, preventing air and water from entering. Fuel injected engines also have numerous sensors that ensure the engine receives the proper air/fuel mixture. These "smart" engines have the ability to make adjustments for variations in fuel that carburetors cannot.



ABOVE LEFT: To help ensure you choose the correct fuel for your small engine, the Outdoor Power Equipment Institute launched a "Look Before You Pump" campaign, placing red warning labels on pumps and equipment.

ABOVE RIGHT: Gasoline should be stored in an approved, sealed plastic container in a cool location away from direct sunlight. It's also a good practice to keep the container full to prevent the gasoline from absorbing air and water, add a fuel stabilizer and shake the container for at least 30 seconds to ensure a proper mixture before filling your engine.

Honda recommends storing gasoline in an approved clean, plastic, sealed container. Make sure the vent, if equipped, is closed to prevent air and moisture from entering, and keep stored fuel in a cool location away from direct sunlight.

"Ethanol, as it hydrates, gets more aggressive toward metal components," says Martin Radue, senior staff production engineer for Kohler engines. "That's going to drive more corrosion in the fuel system."

SHAKE BEFORE FILLING

Given the opportunity, each gallon of ethanol-blended fuel absorbs about 3/4 of an ounce of water. Upon reaching a saturation point, it begins to separate. Since ethanol and water are heavier than gasoline, the mixture drops to the bottom of the storage container.

To ensure your fuel is properly mixed, it's a good idea to shake the container for 30 seconds before refilling your engine, says outdoor power equipment maker ECHO.

NOTHING ABOVE E10

Never run E15 or higher blends of fuel in your small engine. In addition to being prohibited by federal law, the carburetor in your small engine isn't tuned to run on fuel containing more than 10 percent ethanol.

"Carburetors, as a general rule, have a 10 percent window for tuning, based on emission standards," Rickey says. "When you tune a carburetor for using certain kinds of fuels, from E0 to E10 is 10 percent and E5 to E15 is another 10 percent."

Could engines be made to run on E15 or E20 fuel? Certainly, he says.

"An engine can be designed to run on pretty much anything. If we wanted engines to run on E85, that absolutely could be designed. But the applicability of engines today is E10 or less."

Rickey says as long as consumers follow good maintenance and storage practices, blended fuels shouldn't be a problem, even for equipment built 10 years ago.



BELOW: Stabilizer products can extend the shelf life of stored fuel but they don't refresh stale gasoline.

RIGHT: While designed to run on E10 fuel, Crust Busters/Schmitz Brothers recommends using E0 gasoline in its equipment.



LOOK BEFORE YOU PUMP

That said, as more fuels are introduced to the market, service stations have begun installing pumps capable of dispensing E10, as well as E15, E30 and E85 gasoline. To help ensure you select the correct fuel for your small engine, the Outdoor Power Equipment Institute launched a "Look Before You Pump" campaign, placing red warning labels on pumps and equipment.

"We sell a lot of carburetors and carburetor kits because ethanol gas will literally eat the carburetor, the gas lines and the gaskets. It's raising havoc with small engines, and it really doesn't matter what name brand it is."

Pete Schmitz

But even that might not be enough. Pumps dispensing multiple blends from the same system can cause contamination. The problem increases when filling small containers. For example, according to a 2010 technical statement issued by the Engine Manufacturers Association, pumps retain 0.2 gallons of residual fuel. If the previous customer selected E85, the fuel in your 1-gallon container might actually contain a 25 percent ethanol blend (E25) instead of the desired E10.

"What we recommend to people with the Crust Busters is they try to find non-oxygenated gas," says Pete Schmitz, a partner for the septic tank agitation manufacturer. "We sell a lot of carburetors and carburetor kits because ethanol gas will literally eat the carburetor, the gas lines and the gaskets. It's raising havoc with small engines, and it really doesn't matter what name brand it is."

Website locates ethanol-free fuel

If you want to avoid using ethanol in your trucks or small engines, this handy site tracks filling stations that sell ethanol-free fuels throughout the U.S. and Canada: <http://pure-gas.org>.

DRAIN IT DRY

Crust Busters uses two-cycle Emak engines, which are designed to run on E10 gasoline with an octane rating of 89 or higher. Emak cautions against buying more oxygenated gasoline than you will use in one or two months. Schmitz recommends disposing of oxygenated fuel that isn't used in two weeks and to run the engine dry if not used after that time.

Radue says if a small engine is more than 10 years old, it's probably a good idea to seek out an E0 fuel.

"Anything 5 years old or less would have been engineered to run on 10 percent blended fuels," he says. "You can run the 10 percent fuels in older products; you just run a higher risk."

As with any equipment, it's always a good practice to check the operator's manual for the manufacturer's recommendations. □

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Moving Beyond the Holding Tank

Manitoba wastewater association wants provincial environmental officials to consider new onsite treatment technologies in environmentally sensitive areas

By Doug Day

The people who install onsite wastewater systems in Manitoba have some thoughts about improving the industry in the Canadian province. Regulators have a few ideas of their own. Since the two organizations have developed a good relationship over the years, the chances of moving forward are pretty good.

“They rely on our association for real boots-on-the-ground support for what they’re trying to do,” says Hugh Bonner, continuing education chairman and longtime board member of the Onsite Wastewater Systems Installers of Manitoba (OWSIM).

Formed in 2006, OWSIM has just over 100 members. There are a few engineers and suppliers, but the vast majority are installers, representing roughly half of the active installers across the province. The industry is regulated by Manitoba Conservation and Water Stewardship (CWS).

“Why should our population be made to pay for a certain percentage [that] want to have cottages in these pristine areas? It’s our belief, especially in the case of a second home, that the homeowner should bear the entire cost, including taking care of the septage rather than having it hauled to lagoons that are paid for by all the residents of Manitoba.”

Hugh Bonner

“They come to us when they have questions about certain practices that installers have put in place and ask for our opinions that may be used in determining the actions they’ll take,” says Bonner.

That was the case in 2010 when the province began phasing out surface discharges from ejector systems. OWSIM contributed to the rule changes, which now requires that owners commit to replacing such systems upon the transfer or subdividing of property. While repairs to existing ejector systems are allowed, no new ejector systems will be permitted. There are several exemptions in response to concerns about its impact on rural homeowners.

They may now get exemptions if the property is not located in an environmentally sensitive area, is at least 10 acres, complies with other regulatory requirements and does not impact any other property owners.



Hugh Bonner

Marie Taplin

HOLDING TANK ISSUES

While there are no pumpers on its current membership roster, OWSIM is beginning to reach out to them because they are an important part of the industry. Manitoba is the only Canadian province that requires holding tanks – rather than distribution fields – for septic systems near many lakes, rivers and streams, and areas with poor soils. The tanks are required to be pumped periodically by a registered waste hauler. Many of the systems serve cottages and second homes in popular vacation areas.

“It is very unique,” says Bonner. “Our association believes it would be to the betterment of the whole industry if the holding tank law was possibly altered to allow a properly designed advanced onsite system.”

There is concern about holding tanks not being pumped properly and effluent making its way to a water body. There is also an issue with the sewage lagoons where septage pumped from holding tanks is taken. Along with the level of treatment for various nutrients that can harm water quality, the lagoons are subject to overflows.

“The lagoon structures have been lacking in some areas,” says Bonner. “In times of high water or a lot of rain, we have had a number of emergency discharges right into the receiving water.” He adds that 2014 was one of the worst years for high water levels. “We’ve seen water levels in our lakes and rivers that are probably 10 to 15 percent higher than we’ve ever seen.”

TEST SYSTEMS EXPLORED

While owners of holding tanks pay for pumping, there is not always a fee for disposing of the waste in the tax-supported lagoons. Bonner poses a question that is on the minds of many: “Why should our population be made to pay for a certain percentage [that] want to have cottages in these pristine areas?”

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C-Level™ sensor detects the liquid level in the tank and sends a signal to the IFS panel. Pump activation and alarm levels are adjusted on the panel touch pad, eliminating the need to go into the tank. One C-Level™ sensor simulates up to four (float) levels.



Tank Alert® EZ Alarm System

This new alarm is all about making installations easier! It features an innovative enclosure which integrates the red LED beacon, external mounting tabs for quick installation and a removable cover which allows greater access for easier field wiring.

Altering the rule may be difficult. Holding tanks are popular with cottage owners because they are inexpensive, comparatively speaking. A system with a 2,400-gallon holding tank costs about \$3,500, while a proper system with a distribution field would cost around \$20,000.

"It's our belief, especially in the case of a second home, that the homeowner should bear the entire cost, including taking care of the septage rather than having it hauled to lagoons that are paid for by all the residents of Manitoba," says Bonner.

CWS has shown flexibility on the holding tank issue. "They've actually considered allowing a few secondary treatment installations designed by our installers to test them out," he adds. "So they are open to it. As the recreational homes get bigger, so do the flows, and so do the problems that go along with it. We are making inroads."

TRAINING OPPORTUNITIES

Training and certification of installers is done by CWS as often as twice a year, depending on the number of registrants. The session, including a test, costs \$1,000 per person, which has increased from \$300. Certification attracts more than just onsite professionals.

"There are a lot of individuals who take it, homeowners and quasi-contractors that may do one or two systems, then fade away, but have certification that is good for five years," says Bonner. Because of that, he says it's difficult to keep track of the number of active installers.

There is no requirement for continuing education, but OWSIM offers it to increase professionalism of its members.

"Initially, we had very good response," says Bonner. "It has waned somewhat in the last few years, though we're always trying to develop new courses to gain their interest. Like all organizations, there is a higher rate of interest in the beginning."

OWSIM has offered training on such topics as pressure dosing and performing inspections for real estate transfers.

A soils assessment course will be the next training opportunity. "We have very different soils around Manitoba," says Bonner. "Around Winnipeg we have tight clay soil, out west is sandy soil and there is a lot of bedrock in the east." And there is the cold weather that impacts system design, especially in the tundra of the northern subarctic region.

IMPROVING PARTICIPATION

While training attendance could be better, membership meetings garner good participation with around 25 people at each. "They are held five or six times a year from November to May," says OWSIM Treasurer Marie Taplin, the longest-serving board member and one of the people on the original steering committee that incorporated the group in 2006. "We stopped trying to hold meetings during the construction season."

OWSIM Training Facilitator Rudy Hartfiel says the Member Services Committee has recently added a new twist to those gatherings that is proving popular. "We've had suppliers and industry representatives host luncheons. Along with networking, it gives our members a little bit more because they get to see what those businesses do and what they offer." □

FOR MORE INFORMATION -

About the Onsite Wastewater Systems Installers of Manitoba, call 204/771-0455 or go to www.owsim.com.

Drainfield Media and Design

By Craig Mandli

The design of a septic system drainfield can include leaching systems and media that help keep fields in proper operation. Additionally, decorative tank and vent covers on the surface provide pleasing aesthetics. Here are some of the latest offerings to help keep drainfields operating efficiently.

DRAINFIELD COMPONENTS

Clarus Environmental Spider Valve

The Spider Valve assembly from Clarus Environmental ensures appropriate filtered effluent distribution when regulations require pressurized splitting or when small lots require lateral lines of unequal length. Combined with a pump, customizable orifices within the manifold ensure that no lateral receives more than its share of total flow. A convenient sizing program is available to allow for customization for any project. It is available in models serving up to 10 laterals. Each assembly includes 5/32-inch predrilled washers and a union for each washer. Unions allow washers to be removed for cleaning and maintenance. It comes with 3 feet of 1/2-inch PVC flexible pipe on each discharge for easy assembly. It mounts in a 24-inch-diameter access riser. 800/928-7867; www.clarusenvironmental.com.



Geoflow Wasteflow

The Wasteflow dripline irrigation system from Geoflow is placed directly into the soil at the plant's root zone, where effluent is released slowly and uniformly to be digested and absorbed safely. It can be used on difficult sites, including shallow soil profiles, steep slopes, limited setbacks or in areas with poor soils. Molded Rootguard in each emitter protects against root intrusion, while the Geoshield component protects against biological buildup. 800/828-3388; www.geoflow.com.



Geomatrix Systems GST

The GST Leaching System from Geomatrix Systems uses a removable form to accurately shape and construct leaching fingers along the sides of a central distribution channel. It is constructed with 3/4-inch washed stone and is surrounded with ASTM C-33 sand. The narrow profile of the leaching fingers and central distribution channel, combined with the uniform profile of the sand treatment media, enhances oxygen transfer efficiency. This results in thorough treatment of wastewater pollutants and a long-lasting leachfield, according to the maker. It can be configured with standard gravity, pressure and/or time-dosed distribution. 888/764-5247; www.geomatrixsystems.com.



Plastic Tubing Industries Rockless MPS

The Multi-Pipe (MPS) Rockless drainfield system from Plastic Tubing Industries uses corrugated pipes to replace voided areas within a gravel system. It provides a reduced footprint, lower profile and increased transpiration and evapotranspiration area. All configurations are constructed with recycled materials. 407/298-5121; www.pti-pipe.com.



Polylok distribution box

Distribution boxes from Polylok allow installers to choose the height of inlets and outlets. They come with a seal that accepts 2-, 3-, 4-inch and corrugated pipe (the 20-inch unit accepts 6-inch pipe). The 12-inch unit comes with stabilizing feet to anchor the box. 877/765-9565; www.polylok.com.



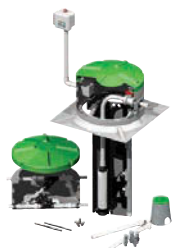
Presby Environmental Advanced Enviro-Septic

The Advanced Enviro-Septic (AES) drainfield dispersal system from Presby Environmental has been successfully tested and certified to NSF 40, Class I (a certification typically given to mechanical aeration devices), BNQ of Quebec, Class I, II, III and Cebedeau, Belgium, standards. It is composed of corrugated, perforated plastic pipe, Bio-Accelerator fabric along its bottom, which is surrounded by a layer of randomized plastic fibers, and a sewn geotextile fabric. It creates an ecosystem designed to simultaneously purify and disperse effluent after primary treatment by a septic tank. Bio-Accelerator screens additional solids from effluent, ensures even distribution and provides additional surface area. Each foot of pipe provides more than 40 square feet of total surface area for bacterial activity. 800/473-5298; www.presbyenvironmental.com.



Quanics drip system

Drip systems from Quanics include tubing, fittings, automatic and manual management systems, drip control panels and complete pumping systems for dosing the fields. Each package contains all required components for a complete system installation. 877/782-6427; www.quanics.net.



Septic Services Retro-Air

The Retro-Air Rejuvenator System from Septic Services helps return a failed existing septic system back to optimal flow and performance. It can be used in new or existing septic systems and can be installed in single- or multiple-compartment septic tanks. It is designed to eliminate clogged drainfield biomat, and the maker recommends it for aeration systems that are prone to backup. The system uses the aerobic process to restore failed anaerobic installations or to prevent failures in newly constructed septic systems by delivering a constant flow of air to the diffuser. It is easy to install, requires minimal maintenance and is available in several models. 800/536-5564; www.retro-air.com.



Sim/Tech Filter orifice shields

Orifice shields from Sim/Tech Filter are designed to prevent drain media, such as drain stone, from blocking discharge holes so pressurized systems distribute effluent evenly. The shields have a sturdy design that keeps them firmly in place after snapping them on the laterals. The large amount of open area between the pipe and the shield allows for easy placement over the holes and reduces media clogging by debris. Two styles are available – one for top discharge distribution holes and one for bottom discharge holes. Shields are available to fit 3/4-, 1-, 1 1/4-, 1 1/2-, 2- or 3-inch pipe. 888/999-3290; www.simtechfilter.com.



SludgeHammer Group Limited S-600

The S-600 aerobic bacterial generator from SludgeHammer Group Limited is certified to NSF/ANSI Standard 40 as an advanced treatment system for residential wastewater. It is engineered for subsurface drip disposal. Other models are listed with IAPMO to restore failed absorption beds. The unit allows introduced microbes to process waste in the septic tank; then the organisms migrate to and remediate clogged leachfields. Complete digestion reduces pumping and creates a healthy, porous biomat. It is designed as an alternative to repairing or replacing failed absorption beds. 800/426-3349; www.sludgehammer.net.



Tuf-Tite distribution box

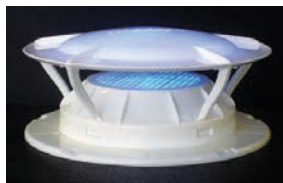
Permanent, noncorrosive distribution boxes from Tuf-Tite come with a speed leveler in each outlet. They are available in four-, six-, seven- and nine-hole sizes. Risers are available on the four- and seven-hole options. Boxes come with a one-piece watertight seal that accepts 1.5-, 2-, 3- and 4-inch SDR35 or Schedule 40 pipe – including corrugated – for ease of installation. 800/382-7009; www.tuf-tite.com.



VENT PIPE FILTERS

360 Products Siphon

The 360 Siphon from 360 Products can be used when a one-way airflow updraft is needed to eliminate high-pressure conditions in enclosed spaces, primarily waste-holding tanks. It channels wind movement to provide an oxygen-rich environment that promotes aerobic waste breakdown and exhausts odors and gases into



the open air. It has no moving parts to wear out, requires no maintenance and is designed to operate effectively at any angle. It can be used as a holding tank odor-control vent in residential and commercial applications, and is available in open stack mount or flanged models. 503/559-8094; www.360productsinc.com.

Pagoda Vent

Pagoda Vent onsite septic system vents are designed to provide optimum ventilation to septic microbes. The units are meant to be aesthetically pleasing and have a durable lightweight exterior that will not fade or rust. They are easy to install, while encouraging a healthy subsurface environment and mitigating harmful gases. They help preserve concrete component integrity by diminishing microbial-induced corrosion. Optional odor filter cartridges can be concealed in the unit. 888/864-1468; www.pagodavent.com.



Simple Solutions Distributing Super Wolverine

The solar-powered Super Wolverine vent filter from Simple Solutions Distributing is designed to eliminate odorous airflows up to 10 cfm, and the solar fan vents the tank, reducing accumulation of sewer gas. It holds between 8 and 10 pounds of activated carbon and is available with inlet sizes between 3 and 6 inches. It can be used for larger aerobic systems found at restaurants or on small commercial buildings. It has an optional saturation indicator for monitoring the life of the carbon bed and uses a 2-inch drain plug for media replacement. 866/667-8465; www.industrialodorcontrol.com.



The Dirty Bird septic pipe cover

The Dirty Bird septic pipe cover uses a charcoal filter to fight odors. It is available in three colors and fits into the landscape as a common yard ornament – a pedestal/birdbath. It can be used to conceal pipes from residential AIRVAC 4-inch vents. The three-step installation requires cutting a 4-inch vent at 22 inches above the ground and placing the unit over the vent pipe. A stainless steel screen is installed to accommodate the flow requirements of the AIRVAC system. 866/968-9668; www.thedirtybird.com. □



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Drainfield Media and Design

By Craig Mandli

Aerated filter system rejuvenates drainfield

Problem: Every home in Glenwood, a 300-home subdivision built in the 1970s in Nebraska, used an individual septic system. At the time, there were no local regulations, and 1,000-gallon concrete tanks were installed and outfitted with 50- to 100-foot drainfields on an old blue clay riverbed with a soil percolation range of 50 to 60 minutes per inch. Throughout the 40 years, many of these systems failed. A large-scale treatment solution was sought.

Solution: Nathan Cramer of All American Sewer & Drain found the S.O.S.-Save Our Septic Program through Bio-Microbics. On one of the problem sites that he was pumping every few weeks, he installed a RetroFAST system in the tank under this program. After he had the septic tank pumped, cleaned and inspected for leaks and deficiencies, he installed the retrofitting aerobic system inside the existing tank.

Result: By sending less-loaded, higher-treated and oxygen-rich effluent into the drainfield, the clogged biomat around the drainfield trench sides and bottom began to perc and repair itself. Within the next couple of weeks under observation, the visible signs of failure had subsided and clear, bubbling effluent was visible in the tank. Since then, four other properties have been repaired. 800/753-3278; www.biomicrobics.com.



Fitting a residential drainfield in a tight space

Problem: A homeowner preparing to sell a three-bedroom house in North Attleboro, Massachusetts, had an existing leachfield located on an adjacent lot under an easement. The town required the leachfield to be placed on the property, but the site had limited space, setback issues and restrictive layer concerns.

Solution: A system was designed by Dana Clow of Advanced Concepts Engineering to fit on the property and meet the site's challenges using 18 Mantis M5.2 units from Eljen Corporation. The compact size and design flexibility allowed the system to fit within the limited space and work around the site's restrictive layers and features.

Result: The installation was easily and successfully completed by King Excavating, allowing the homeowner to meet the Title 5 requirements to sell the home. 800/444-1359; www.eljen.com.



Rural community care home utilizes pressurized system

Problem: The Burnside Community Care Home in Clyde River, Prince Edward Island, Canada, is a three-level, 40-bed facility. Due to the rural location, connection to a city sewer system was not an option, and Engineering Technologies Canada Ltd. (ETC) was hired to design a cost-effective and environmentally sound onsite treatment system.

Solution: With soil conditions consisting of compact, fine sandy loam glacial till with layers of sandstone rock, Kelly Galloway, ETC principal engineer, recommended an advanced decentralized treatment system with a soil-based, pressurized Infiltrator Systems leaching chamber dispersal field using Quick4 Plus Standard Chambers. The field is constructed in a raised-bed of sand fill and receives effluent from an advanced secondary sewage treatment system. It includes multiple zones, each fed by a mechanical indexing valve, allowing the use of smaller, lightweight pumps and simplifying future expansion. The mechanical distributing valves are fitted with electronic monitors so the system can be monitored remotely.



Result: The system has been in operation for more than a year serving the facility's needs. "At the end of the day, we have what we feel is a green and well-functioning system," says Burnside owner Alan MacPhee. 800/221-4436; www.infiltratorsystems.com. □

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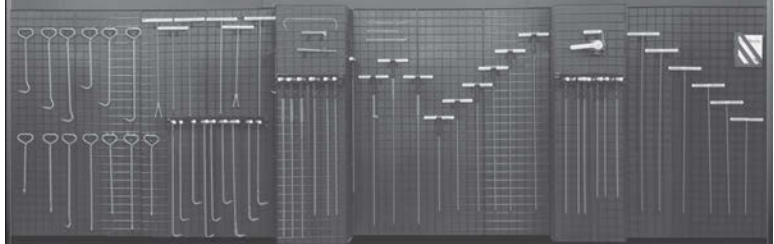
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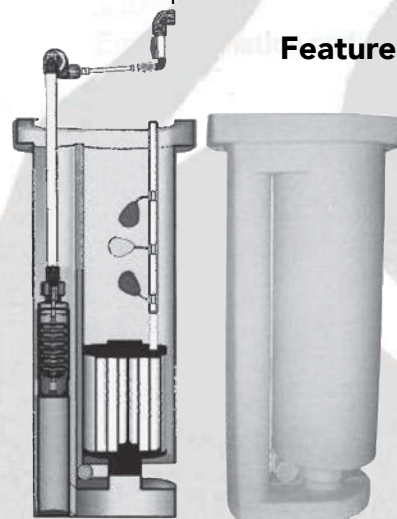
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Trimble construction lasers

The Spectra Precision GL412N/GL422N grade lasers, LL400HV laser level and HV302 horizontal/vertical laser from Trimble feature automatic self-leveling, glass lighthouses, IP66 protection rating, metal sunshade and simple keypads. They can withstand drops of 3 feet onto concrete and tripod tip-overs up to 5 feet. The single- and dual-grade lasers have a radio remote that operates from up to 330 feet. The LL400HV long-range exterior laser has a working diameter of 2,600 feet. The HV302 has a high-visibility beam for simultaneous rotating and 90-degree plumb references. 800/527-3771; www.spectralasers.com.



Water Cannon hot-water pressure washer

The 18H26 model hot-water pressure washer from Water Cannon has a Honda GX 390 engine and choice of General or Cat ceramic plunger pumps. Features include a portable four-wheel push bar frame for support, 4 gpm, 4,200 psi, 118-degree temperature rise and overheat safety valve. 800/333-9274; www.watercannon.com.

Clarus effluent turbine pumps

Effluent turbine pumps from Clarus Environmental Products are available in 11 to 85 gpm capacities with heads to 500 feet. Pumps range from 1/2 to 3 hp and feature discharges of 1 1/4, 11 and 19 inches (27 gpm models) and 2, 35 and 55 inches (85 gpm models). Starting boxes are not required for pumps 1 1/2 hp and smaller and are included with 2 and 3 hp models. 800/928-7867; www.clarusenvironmental.com. □



MOWA presents lifetime achievement awards

The Minnesota Onsite Wastewater Association (MOWA) presented lifetime achievement awards to Jim Anderson, Gretchen Sabel and Ron Jaspersen.

Anderson has been conducting research and providing education on septic systems since 1971. Together with Roger Machmeier, he started the Onsite Sewage Treatment Program at the University of Minnesota. Anderson's soils expertise, combined with Machmeier's engineering knowledge, created a program that trains installers, designers, inspectors and service providers. In addition, Anderson helped develop and update Minnesota rules during 30 years as chair of the Minnesota Septic System Advisory Committee. Anderson retired in 2008 but continues to educate septic service and onsite professionals.

Sabel retired in 2014 after 36 years of state service dedicated to environmental protection. She was on the team that helped pass the Minnesota Groundwater Protection Act in 1989. Her many years of support for local programs resulted in millions of dollars in assistance and development of 250 local programs.

Jaspersen served the onsite community for many decades as a precast tank manufacturer, and through his efforts to improve the industry. He worked on issues that included association finances and bylaws, state septic code and policy, and state statutes.



Pictured from left are Ron Jaspersen, Jim Anderson and Gretchen Sabel.

Subaru Industrial Power redesigns website

Subaru Industrial Power redesigned the layout and functionality of its website, www.subarupower.com. Product pages include 360-degree views. Quick search provides parts accessibility, and illustrated guides help ensure proper selection. □

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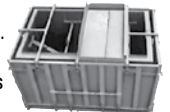
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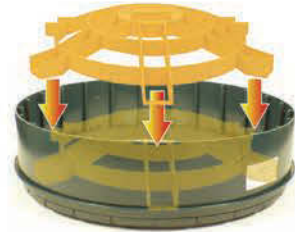


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