

Spring Issue 2021

70 SW Century Dr.
Suite 100, #353
Bend, Oregon 97702
(541)389-6692
O2WA.org
info@O2WA.org

INSIDE THIS ISSUE

Statements and opinions expressed in these articles are solely those of the author or authors and may or may not be shared by O2WA.

Presidents Message
Affordable Loan Program
Tough Decentralized Challenges
2021 Virtual Conference



Money Available!
Kids NEED TO Apply before July 15th

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bancorp-o2wa-ad-Spring-2021.pdf

BUYERS GUIDE—THANK YOU TO OUR VENDORS AT THE 2020 CONFERENCE...

Bancorp Insurance	541-536-1726	bancorpinsurance.com
Davis Sales	503-522-8239	ashlandpump.com
Ferguson Waterworks	541-225-2095	ferguson.com
FMI Truck Sales & Service	503-286-2800	fmitrucks.com
GT Gordon & Associates	360-566-1470	gordonandassoc.com
HD Fowler Co	503-969-1635	hdfowler.com
Infiltrator Water Technologies	860-577-7030	infiltratorwater.com
Lowridge Onsite Technologies, LLC	425 750-4922	lowridgetech.com
Matzke Sales, Inc.	253-872-2029	matzkesales.com
Affordable Septic Systems	541-928-5074	affordableseptics.com
Orenco Systems, Inc	541-459-4449	orengo.com
Pap'e Machinery	541-463-2900	papemachinery.com
RepCoSalesAgency	503-720-7186	RepCoSalesAgency.com
Roth North America	315-579-3326	RothMultiTank.com
Spartan Tool	800-435-3866	SpartanTool.com
Trade Tool and Supply Corporation	503-221-8665	tradetoolsupply.com
Willamette Graystone	541-727-7666	willamettegraystone.com

For all approved Onsite Wastewater Treatment Products— <https://www.oregon.gov/deq/Residential/Pages/Onsite-Products.aspx>



PRESIDENTS MESSAGE by Dennis Boeger, PE, CWRE

Welcome to this quarter's newsletter. I want to start off with two questions. First, can anyone believe it's already June?! And, how have things gone for you so far this year? I can easily say this has been unique in a number of ways for us at our firm. I've also noticed that the fire recovery (the Holiday Farm Fire is our neck-of-the-woods) seems to be a slow, ongoing process that seems to impact a wide range of folks. I had recently contacted one of Lane County's sanitarians about a couple of projects, and he quickly shared that half his time is devoted to the fire recovery sites. He then went on to explain the many challenges from both the sites as well as the paperwork or application of the rules to these sites.

It's no surprise that many old sites that were flying under the radar were now exposed and have to be dealt with. This ranges from systems too small, too close to the McKenzie River, poor condition of components, etc. He's having to consider solutions far beyond anything normally done due to these conditions. It's also looking like this year will be another dry year with high potential for fires to occur. I hope we can all keep this in mind as we what we do to keep folks humming along for their septic needs.

So what's happening on the O2WA front? The Board is working on a few things during this busy time. The most significant item is the ongoing efforts to revamp the installers certification program. We're now involved with important discussions with DEQ staff and will soon hope-

fully enter into an agreement with them to formalize the changes. These changes include increasing the class to 1-1/2 days from 1 day, and adding some online tasks to perform before sitting for the class as well as taking a pre-test. The additional requirements should allow students to increase their onsite knowledge and preparation for certification and to be a more knowledgeable installer.

We are also working with the National Onsite Wastewater Recycling Association (NOWRA) to create more educational opportunities for onsite folks. And, we are assisting in re-establishing the loan program for Oregonians in need of septic system repairs, and involved with other onsite related bills with the legislature.

Please also note that we're always striving to increase our membership and share the many benefits of being an O2WA member. Please feel free to check out our website at O2WA.org. The contact information for our amazing executive director, Belinda Rasmussen is also on the web site if you desire more information. Thanks everyone - let's be safe and productive as we weave through the summer of 2021!

Dennis J. Boeger, PE, CWRE , President, O2WA

Update Affordable Loan Program this Session - Submitted by John J. Audley on behalf of Craft3

O2WA and 16 organizations support restarting the State of Oregon's affordable loan program that helps families replace failing septic systems or connect to municipal sewer.

The Affordable Septic System Replacement Loan Program Worked for Oregonians

While the program was operating, nearly \$3.7 million was invested in 186 septic systems (or sewer hook-ups) in 91 communities across the state. Customers live in 28 Oregon counties. Program administrator Craft3 secured \$1.9 million in additional funds to support this program, more than doubling the state's \$1.6 million contribution. Over 24 million gallons of wastewater are treated annually because of these new systems. Nearly one out of three families served by this program fall below 80 percent of county area median income. DEQ has responsibly administered the program. Only 4 percent of the funds appropriated by the State Legislature have been used by DEQ to oversee the program.

The Septic Program is More Important Now than Ever Before - DEQ and the U.S. Environmental Protection Agency estimate that, of the over 450,000 septic systems currently in-use across the state, 10 percent (45,000) of septic systems fail each year. Recognizing these failures as a problem for water quality, public health, and family

resilience, the State Legislature established an affordable septic loan program in 2016. State agencies estimate that the homes of 1900 Oregon families relying on septic systems were damaged or destroyed by the 2020 wildfires. In many instances, these homes are located in critical watersheds, where waste management must meet higher standards. These families need support from the State to help them return to their property and rebuild their lives, including support for septic systems repair or replacement.

We also now know that many cultural specific and rural communities have been historically underserved by wastewater treatment serves. Properly funded, the affordable septic loan program will be able to help these families live healthier, more productive lives. COVID-19 has increased the need for septic repairs; as designed, this program helps people and families in emergency situations, promoting community resilience, housing stabilization, and water quality. Due to a lack of state support, in July 2020, the program was suspended by Craft3 (the program administrator). The total amount of funding needed for the program to operate during the 2021-22 biennium is estimated at \$4 million; a \$2 million dollar grant from the state would restart the program while the third-party administrator works with DEQ to access additional loan capital.

ONSITE EXPERT BRIAN RABE TAKE ON TOUGH DECENTRALIZED CHALLENGES IN THE PACIFIC NORTHWEST

Article compliments of the Onsite Installer & Cole Publishing

When it began, Cascade Earth Sciences had two purposes: onsite work and soil mapping. Over the past 44 years, there have been changes.

In 1998, Cascade was acquired by Valmont Industries. Founder Terry Rahe retired in 2006. Depending on customer demand and the experience of employees, the company branched out into other services such as land application, municipal biosolids, residuals management work for the pulp and paper industry, and bioremediation for mines, says Brian Rabe, the company's managing soil scientist.

Through all these changes, Cascade remained true to its original purposes with new services never far from the core of the company, because everything Cascade does is about what happens at the intersection of water and soil.

FAR-REACHING SERVICES



Cascade is decentralized. Rabe works at the main office in Albany, Oregon. Other offices focus on jobs specific to their locations. One office, for example, is in Spokane, Washington, and works consistently with food processors, especially potato processors. Another staffer was on special assignment in China for a few years, working primarily on large-scale land application of process water, Rabe says.

Early in his career, Rabe designed systems for single-family homes. "I still, in select and unique circumstances, do things at the single-family-residence level. It's not very often," he says.

There was one client he helped in northeastern Oregon, a job notable because it was done remotely.

"I told him, when I first called him back, I don't mean to sound judgmental, but I don't think you can afford me because it would take me eight hours to drive there, and that cost alone would be prohibitive for a residential system," Rabe says.

The customer still wanted Cascade, so they worked out an agreement. The customer collected information. Rabe made comments on it and worked on the design. This helped the customer and the regulator because the client intended to do his own installation. "And the regulator was concerned because there aren't a lot of resources in that remote, rural part of the state, and it's not

the regulator's job to consult," Rabe says.

Work on community systems is uncommon in Oregon because of the state's land-use and planning rules. Those push most development to urban and suburban areas where homes are often within reach of municipal sewer. Portland, Oregon's largest city, has metropolitan planning, which adds another layer of review above the municipal governments.

"I've known installers who have told me if it's work in Multnomah County (Portland), they're going to add a 10% premium because they just know it's going to be more time and hassle to get it done," Rabe says.

He's been working with a church there. After three years of review, the architect believes there is hope the project may soon go into final design.

LOOKING FOR A CHALLENGE

The projects Rabe likes best are those where the site has some limitation, typically soil depth or a high-water table. The advantage of being a soil scientist, he says, is being trained to think about how limited soil can be built up so it performs as it would on a good site. And Oregon has plenty of limitations, many of which involve a lack of water.

"Most people, when they think of Oregon, they think of the western side of the state as being wet and green," he says. "When you get to the eastern two-thirds of the state, we've got parts of eastern Oregon that are true desert at about 6 inches of rain per year."

Interesting projects can come about when other designers miss something. About five years ago, there was a job at a residential drug and alcohol treatment facility with a commercial kitchen and more cleaning and disinfection than is common in a typical home, he says.

"The system was struggling to perform as intended, and I think there may have been an underappreciation for the strength of the waste stream," Rabe says.

BOD was more than 300 mg/L, which is Oregon's upper limit for residential-strength waste, he says. Looking only at the hydraulic load, he says, a designer could have thought the installed units were properly sized, but calculating the mass load told a different story, because the manufacturer recommended a lower BOD for best performance. Rabe's solution was to intercept water between the septic tank and the treatment unit and send it through a BioMicrobics HighStrengthFAST unit.

"We took the discharge from the FAST unit and ran it right back into the septic tank so that 24 hours a day we always had flow to our little side loop," Rabe says.

What the modified system produces are small, continuous doses of wastewater moving through treatment. "We were designing to hit the maximum hydraulic limit of that treatment device spread out over 24 hours with little, tiny doses; I think it was on the order of 12.5 gallons every six minutes," Rabe says.

MINDING MICROBES

What Rabe did there illustrates a core idea: Microbes do best when fed in small amounts around the clock.

“When I’m trying to explain it to people, I use the Thanksgiving meal as a comparison,” he says. “When you think about what most of us do at Thanksgiving, at 2 o’clock you fill your plate, and you can’t help but go back for seconds, and then dessert rolls around, and by the time you’re done you’re moaning and groaning, lying on the floor, trying to stay awake and watch a football game or visit. And you’re miserable because you’ve eaten so much at one time.

“If you were to take that same amount of food and start at 6 a.m. when you get up, and take a bite, walk around, come back in a few minutes and take another bite, and do that all through the day, you could actually eat more food and never be uncomfortable because your body can process little bits at a time. Microbes are the same way.”

Most of his designs try to achieve this steady state of little bites around the clock, he says. And there are many new components that enable this and weren’t available 30 years ago, he adds.

What Rabe does was inspired by Bill Stuth, inventor of the Nibbler, who introduced Rabe to the concept about 30 years ago. Stuth was big on putting in a surge tank and feeding wastewater through a system in small doses, Rabe says.

In any design, Rabe works first to meet permit limits, and then he considers soil loading. As soon as effluent reaches the soil, bacteria begin to build a biomat that restricts flow and becomes a limiting factor in drainage. In rapidly draining soils, it’s harder for a biomat to form, and that means less capture of pathogens and nutrients by the biomat, which means more nutrients and pathogens moving to groundwater, he says. That’s when you need low-pressure distribution, Rabe says, so effluent is spread out and there is more opportunity to capture pathogens.

MENTORS MATTER

Rabe credits much of what he is to the people he’s learned from. There’s Bill Stuth, of course, and there’s Dan Bush, who was once a regulator for Columbia and Clackamas counties and the state. Rabe recalls having lunch with him and Terry Rahe when Bush was thinking about starting his own business.

As a regulator, Bush saw many systems that were not maintained well and thought he could do better. He did start his own company, and over the next 20 years became an expert in operations and maintenance, Rabe says. Because he had a degree in biology and environmental health, Bush had a better understanding of onsite system function than most people, Rabe says. And because Stuth was one of Bush’s mentors, he was primed to think about dissolved oxygen, pH, and what kinds of microbes were present in a system at any given time.

“There’s folks out there who barely have a clue about what they’re doing, and then there’s folks who pay attention, go to school, and listen to folks like Dan, and strive to get better,” Rabe says.

A significant number of his designs, Rabe says, have been inspired by needs that Bush identified from his field-work.

Rabe grew up in a house with a septic system. As a child, he says, he was fascinated with biogas, built a digester in his bedroom using manure from the family’s ani-

mals, and was thrilled when he applied a match and saw the methane ignite. It fed the nerd in him, which is what work at Cascade does.

He learned what onsite systems are during a summer internship with the Oregon Department of Environmental Quality. Shortly after he graduated (and a couple of times after that) he was invited to join the state. But he took the job offer from Cascade, and he stayed.

“I have relationships with many of the regulators, and I’m sure I would do OK in that position, but I’m sure parts of their jobs would drive me nuts,” Rabe says. “What I would miss, and the part I really appreciate, is that creative side: coming up with a different way to do something, a new way to do it.”

Passing along onsite knowledge

Among all the day-to-day tasks, it’s easy to lose sight of what will happen to a business after retirement. Brian Rabe was intentional about the future for Cascade Earth Sciences in Albany, Oregon.

When Terry Rahe founded Cascade in 1976, it was with an emphasis on onsite wastewater and soil mapping. “So I said, I’ve carried the torch for all these years, and I don’t want that torch to go out when I leave,” says Rabe, the company’s managing soil scientist.

After 33 years at CES, he knows retirement is not that far in the future. So a few years ago, when he hired Chris Cotton coming out of Oregon State University with a master’s degree in engineering, Rabe was clear about his goal.

“When we were doing the interviews, I said the goal of this hire is to hire my replacement,” he explains. “I want the opportunity, with a few years of overlap, to download what’s between my ears to the next generation to carry the torch.”

In the beginning, he told Cotton as much as possible, using sketches, plans and worksheets from other projects to reinforce important details. As time went on, Rabe says, he talked less and released Cotton to do more work on his own, letting him ask questions when he needed help or wanted to learn more.

“I’ve seen too many people who either worked on their own or, when they retired, didn’t have that opportunity. And I’ve known a couple, like Dan Bush, who did an exceptional job of passing on their knowledge to the next generation,” Rabe says.



THANK YOU TO OUR PRESENTERS

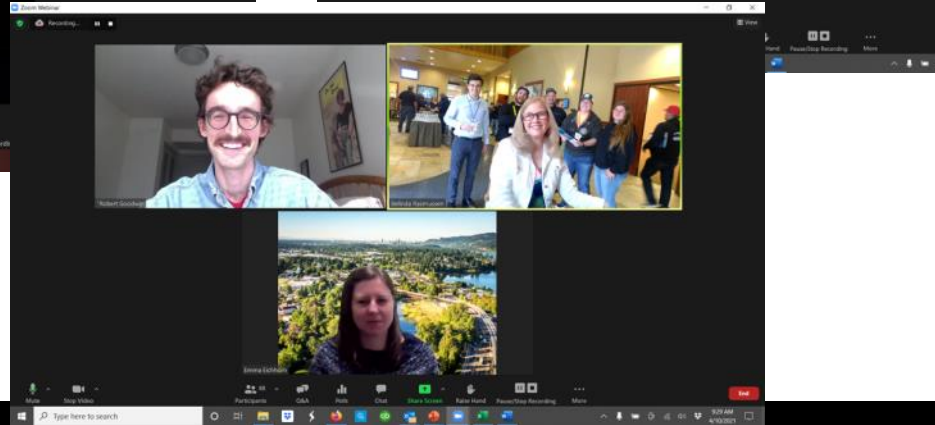
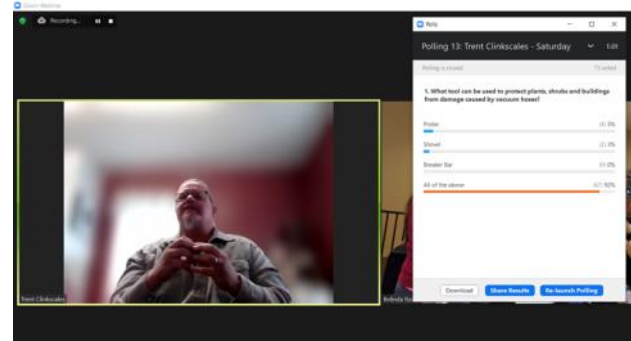
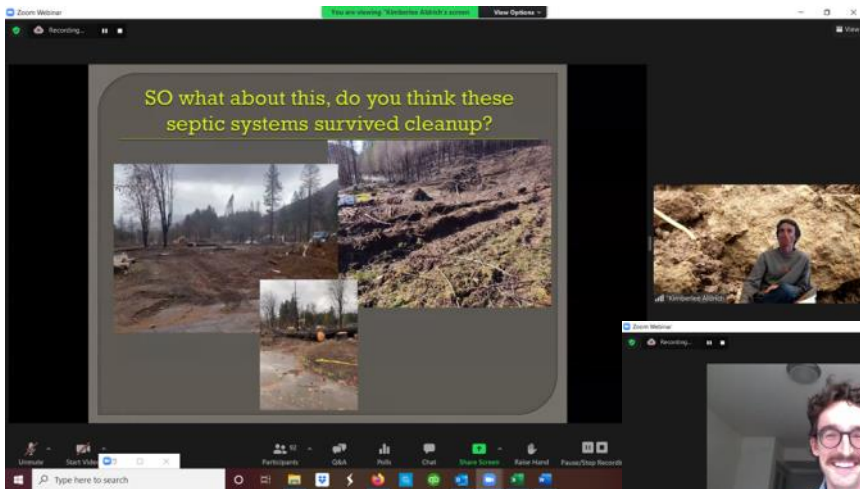
2021 Oregon Onsite Wastewater Conference

A Virtual Experience

Email request of recording to info@o2wa.org

We had over 90 people participate in this first time all virtual two day conference. Thank you to the presenters for their time and dedication to the industry.

- Impacts of COVID-19 on Septic Systems & TSS – Sources, Impacts and Solutions - Sara Heger, University of Minnesota
- Large System Considerations - Brannon Lamp, REHS, Aqua Resource Design & Consulting
- Setting Up Pump Systems for Septic Tanks - Scott Hammerschmith, Orenco
- Tank Installation - Matt Gibbs, Roth USA
- Basic Electrical Theory & Panel Troubleshooting Basics - Mark McCollum, SJE-Rhombus/CSI Controls
- Septic Systems and the 2020 Beachie Creek Fire - Kimberlee Aldrich, WWS Marion County Public Works County
- Hours of Service of Commercial Vehicle Drivers - Paula Hartland, ODOT
- Soils - Robert Goodwin, Marion County Public Works County
- Hydrosplitters The Principles & Practices of Pressure Assisted Distribution - Brian Rabe, CPSS, WWS, Valley Science and Engineering
- Pumpers Best Practices for Customer Service - Trent Clinkscales
- Design with O&M in Mind - Dennis Boeger, PE, CWRE, Boeger and Associates



Resources for Managing Your Business

National Onsite Wastewater Recycling Association (NOWRA)

3 Part Easy to Review online - Marketing your business...

How's business for you? Hopefully it's good, or at least improving, but if you aren't getting the results you want, you might wish to take a look at how you're marketing your services. Perhaps it's time to shake things up a bit.

There are a number of ways to approach how you market your business. In fact, there are so many they are really beyond the scope of a single column, a 3-part series of marketing tips for onsite industry businesses.

National Association of Wastewater Technicians (NAWT)

Pumping Code of Practice

Learn more at <https://www.nowra.org/library/resources-for-industry-professionals/managing-your-business/>

Join US Online at <https://conta.cc/3uiirU7>



OREGON ONSITE
WASTEWATER ASSOCIATION
www.o2wa.org

541-389-6692
www.o2wa.org
info@o2wa.org
Founded in 1994

Thank you for joining O2WA & NOWRA

In September of 1994, the Oregon Onsite Wastewater Association was incorporated to give a voice to members of all disciplines and trades, to encourage the free exchange of ideas, to upgrade skills through education and training, and to promote the development of new and improved practices, policies, and uniform standards. Your participation is important.

Contact your board

Dennis Boeger	President/Engineer	DBOEGER@BOEGERASSOCIATES.COM
Larry O'Connor	Past President	larry@repcosalesagency.com
Erik Englebert, REHS	County Regulator	eenglebert@clackamas.us
Scott Davis	Secretary/Treasurer/Tank Manufacturer	scott@davissales.com
Brad Routh	Manufacturer	brouth@infiltratorwater.com
Emma Eichorn	EHS	emma@envmgtsys.com
Claudia Hill	Soil Scientist	claudia38702@gmail.com
Edward Varga	Septic Installer	info@eandasystems.org
Lisette Hamer-Richardson	O&M	lisette@affordableseptics.com
Kevin Riddle	Pumper	kevin@swsmodoc.com
Pat McVay	Industry at Large	pat@sporthaven.net

Members Discounts on Fees for Training and Conference The Oregon DEQ requires continuing education credits for maintenance of your certifications. The O2WA is facilitating a number of timely and highly pertinent training programs throughout the state. O2WA members receive a discount at the Conference & Training Classes.

Promoting Members on the Website More accessible presence on the internet.

State Advocacy There are several legislative issues that have great importance to the Onsite Program. These legislative actions will directly affect O2WA members and our businesses. It is the goal of the board to keep the O2WA members informed. The board would like to help you with positive actions that keep your local legislators aware of our needs as an industry and promote onsite support in your community.



Quarterly Industry News Each quarter there is new and important information delivered to our members. There are several facets of our industry that are covered in the Quarterly News.

Industry Connections 2021 We will be facilitating our traditional meetings online via Zoom. Mark your calendar for an in person is currently scheduled for March 2022.

Scholarship Program Each year the O2WA Members and their family may apply for a scholarship. Applications can be found at www.o2wa.org.





Don't Let Money Get In the Way of Your Kid's Education O2WA SCHOLARSHIP PROGRAM PLAN BENEFITS MEMBERS...

NOTE: Application deadline has been extended to July 15, 2021

Complete program & online application @ o2wa.org

PURPOSE OF PROGRAM

The purpose of this scholarship program is to: Promote the education of members of the Oregon Onsite Wastewater Association (O2WA) and their sons or daughters in any field of higher education, and

Promote education in the environmental sciences or other related academic pursuits that apply to the field of onsite wastewater treatment.

Twenty (20) percent of the weight in scoring applications provides an incentive toward fields of study related to the onsite industry.

ELIGIBILITY

Candidates must meet the following criteria:

1. Be a child or dependent, age 25 or less, of a current O2WA Member (Individual or listed Corporate Member) in good standing as of May 31 of the preceding year planning to study or currently studying in any field of higher education. A child or dependent is defined as a son or daughter (including step-children) living in the members household or primarily supported by the member; or
2. Be a non-O2WA member interested in pursuing an education beyond high school through study in fields related to onsite wastewater treatment. Students are limited to relevant fields of study that apply to the field of onsite wastewater treatment, including, but are not limited to, public health, environmental science, soil science, engineering, construction technology, or biology.

Candidates must:

Be a high school senior or graduate who plans to enroll as a full-time student or is already enrolled as a full-time student in a technical or undergraduate field of study at an accredited vocational school, two-year college or four-year college or university; or
Be a college graduate pursuing an advanced degree specifically related to onsite wastewater treatment; and
Complete and submit the scholarship application and all required attachments by the stated deadline. Candidates need not be Oregon residents or attend Oregon schools. Further, O2WA pledges not to discriminate on the basis of race, color, age, sex, marital or veteran status, creed, religion or disability.

Value and Number of Awards

The Scholarship Committee may award multiple scholarships of \$1,500 or more, depending on fundraising, in any given year to one or more graduating high school students and/or one or more college students, as per Section IV B.2. above. The number of Awards, combination of Awardees, and amount of each Award will be at the discretion of the Scholarship Committee. A larger scholarship amount or additional scholarships may be made in any year with prior approval from the Board of

Directors. A special scholarship, in the amount of \$5,000 or more, may be awarded for students pursuing advanced degrees specifically related to onsite wastewater treatment.

The scholarship award(s) will be made directly to the scholarship winner(s) following submission of proof of registration and attendance by an appropriate faculty member for the current academic period.

Applications

- A minimum of three references attesting to the applicant's qualifications must be submitted on the prescribed application form. Two of these references must come from the following sources:
- A non-family O2WA member in good standing;
- A member of academia who has personal knowledge of the applicant's performance in education; or
- A community member who has personal knowledge of the applicant's community service or work history

Completed applications, letters of acceptance, and documentation of all grades and test scores should be forwarded to:

Oregon Onsite Wastewater Association
Scholarship Committee
70 SW Century Drive, PMB #353
Bend, Oregon 97702

Documents originating from a high school, college, university, or testing organization should be mailed directly from that institution to O2WA at the address listed above. This information should not be provided directly by the applicant except in cases where written permission is granted by the Scholarship Committee Chair.

Any activity listed in the citizenship or extracurricular activities section, should include a contact and phone number to confirm participation in the activity.

YOU'VE GOT THIS!

Scoring Graduating High School Students Application

- 20% O2WA Member or Direct Relative
- 20% Field of Study Related to Onsite Wastewater Treatment
- 40% Academics
- 10% Citizenship
- Examples Student organization participation
- Scouting, High school ROTC, etc. Charitable, civic or religious organization
- 10% Extracurricular
- Examples, Athletics, Music, drama, debate, etc.
- Employment

Scoring College Level Students

- 20% O2WA Member or Direct Relative
- 20% Field of Study Related to Onsite Wastewater Treatment
- 40% Academics
- Examples - GPA. Academic achievement awards/honors
- 10% Citizenship
- Examples
- a. Student organization participation
- b. Charitable, civic or religious organizations
- 10% Extracurricular
- Examples - Research, Internships/Assistantships, Athletics



National Onsite Wastewater Recycling Association

Join US Online at <https://conta.cc/3uiirU7>

NOWRA is the largest organization in the U.S. dedicated to representing the onsite and decentralized wastewater industry. We work to protect water resources and promote the economic, environmental, and public health benefits of septic systems.

Membership Benefits

Contact the NOWRA Office at 978-496-1800 or [by email](#) for additional benefits. New benefits are being evaluated and appropriate offerings will be added in the coming months.

Representation in Washington and in Your State

Septic Locator

Every NOWRA member receives a free listing on the [Septic Locator](#), the only national, searchable directory of providers of onsite wastewater management services. Your listing is controlled by you—you can change contact information, services offered, and other information in real time. Coming soon you will have the chance to enhance your listing as well.

Errors & Omissions Insurance for Designers and Inspectors

We've partnered with [The Powderhorn Agency](#), to endorse their [Errors and Omissions insurance coverage](#) for septic system designers and inspectors. If your design or inspection work is primarily residential, you may find this coverage to be significantly less expensive than similar coverage from your insurance carrier.

Pro-Sept Residential Septic Repair and Replacement Plan

You can help your customers protect themselves against catastrophic septic repairs or system replacement by recommending they consider the [Pro-Sept warranty program](#). You help yourself at the same time, as NOWRA members earn \$30 for each customer referral.

Onsite Journal

NOWRA has resumed publication of the *Onsite Journal* magazine. This 4-color magazine offers useful information about national developments affecting onsite wastewater, reports from state affiliates and industry vendors, and updates on NOWRA programs and services of interest. Published quarterly.

Continuing Education Opportunities

NOWRA has established the Installer Academy as the national educational entity for the decentralized wastewater industry to ensure that quality training programs are available for all industry practitioners. By participating in NOWRA's Education Programs, members gain a learned foundation that continuously builds personal and professional opportunities.

Resource Library

NOWRA's [Resource Library](#) is intended to be a one-stop portal to help you identify critical information online which can help you manage your business. Published industry research, how-to manuals, regulations, financing, public outreach materials, and archived training materials are among the valuable items contained in this always growing library.

PLUS...

Leadership

Affiliate Support

National Backhoe Roe-D-Hoe® Competition

Equipment Loan Discounts

Office Supplies Discounts

8 Steps to Keep Your Excavator Away from Profit-killing Downtime with the Mechanic

By Kyle Rogers Reprint from Pumper - Cole Publications <https://www.pumper.com>

Many installers rely on their tracked excavators every day to reliably dig trenches and drainfields, as well as move dirt to drop new tanks in the ground. What happens when contractors neglect critical upkeep on these hard-working earthmovers?

Your crew sits on the sidelines as your machine is hauled away for an emergency repair. Consequently you miss important customer deadlines. And a big fat bill from the mechanic shows up in the mail. Strike three and you're out!

Keeping up on maintenance for especially hard-wear items on these complex machines will keep your workload on track, your crews on the clock and your customers happy. Consider these eight important areas of tracked excavator maintenance:

1. Bucket teeth, pins and bushings among the high-wear items to watch

"Bucket teeth are an important item to keep an eye on because worn teeth make it hard to fill the bucket, which affects productivity," says Michael Boyle, product consultant manager for John Deere.

He says when bucket teeth come off or become worn through to the tooth adapter, they should be replaced by cutting off the adapter and welding a new one back onto the bucket.

Pins and bushings also experience high wear.

"Pins and bushings get a workout because excavators constantly move," says Adam Kolacki, senior service engineer for Caterpillar. "If you don't grease, you get an unpleasant noise. More importantly, you will get pin galling, which can lead to expensive repairs."

2. Make sure you have the proper track sag/tension

"Increased wear occurs to the undercarriage if the tension is too loose or too tight," says Boyle.

To adjust track sag, lift the tracks off the ground about 3 or 4 inches with the hydraulics of the boom and arm, Boyle explains. Then rotate the tracks while the machine is off the ground — three times forward and three times in reverse to get the material out of the track rails. Go to the center of the undercarriage and measure the distance between the bottom of the roller mainframe and the top of the grouser.

"The specification is different for each excavator, so you have to check the operator's manual for the correct distance," Boyle says.

If the tracks are too loose, the operator will likely complain about the machine rocking and you'll be able to see extra wear as the pin moves in the sprocket. When turning, the tracks may crack and pop or come off if the machine is on a slope. If the tracks are too tight, the excavator loses track power and extra wear occurs.

"It is better to have tracks too loose than too tight," Boyle says.

3. When tackling scheduled maintenance, figure in the job's time constraints

"If the job is on a time schedule, it would be best to check if the engine oil and filter are due for a change or the hydraulic oil and filter," Boyle says. "It might be better to complete a required service prior to starting the project versus causing downtime during it to complete the service."

He also recommends regularly checking for leaks, frayed hoses, broken parts or cracks in components and replacing or repairing as needed.

4. Take into account job site conditions

Maintenance practices will have to be changed depending on the conditions of the job site. For example, says Boyle, in a sandy environment, a contractor might want to keep the tracks looser than usual to prevent sand buildup in the rails. In a high-debris environment, extra cleaning will be required to keep the cooling cores debris-free. John Deere offers reversing fans on most of its excavators to help with this.

"The operator can set the reversing fan on automatic, where it will reverse once an hour for 25 seconds or the operator can manually reverse the fan by pushing a button or switch," Boyle says. "This feature keeps debris and dust off the radiator/coolers, reducing the need to shut the machine down and clean cooling cores."

5. Before making repairs, consider the environment

"Leaks or simple component changes can be done in the field," says Kolacki. "Anything that requires extreme cleanliness for disassembly — such as pumps, valves, engines or fuel systems — ought to be done in the shop."

6. Don't be stingy with the grease

Among items that often get overlooked by operators is applying an adequate amount of grease to the linkage, Kolacki says.

"It's typically missed, particularly in more extreme applications," he says. "I can't stress enough how important it is to keep the machine greased daily and even hourly in certain applications."

7. Problem warning signs

A few top indicators of a problem include abnormal noises, bad oil samples and overheated components.

"For the do-it-yourselfer, refer to the owner's manual for guidance," Kolacki says. "If you like to have it done by a professional, contact your local dealer. Their service techs are trained to do the work right."

8. Operating tips

Damage or premature wear can also be avoided by regularly practicing certain operating procedures. For example, the machine's arm and boom joints can potentially be damaged by sweeping large piles of material too quickly with the bucket.

"Many times an operator will swing into large piles at full swing speed and cause extra stress on the joints," Boyle says.

He also recommends using a pivot turn when moving the machine to reduce track wear. "To make a pivot turn, the operator lifts the front of the tracks off the ground about 3 to 4 inches and uses swing torque to turn," Boyle says.

Kolacki adds that operators should be sure to use the appropriate tool attachment for the application.

"Don't use a bucket as a hammer. Pick the correct tool for the application and the machine," he says. "At Caterpillar, we have matching guides to help operators do just that and maximize the machine's performance."



Working in extremely hot conditions can be dangerous for anyone, but the danger escalates for construction workers who are out in the heat all day and working hard. It is essential that construction companies have safety policies in place to keep workers safe during the hot weather, and regular training sessions during the summer to make sure everyone knows what to do if the heat starts to have a negative effect on a worker's health.

The Dangers Of Working In The Heat

Heat exhaustion and sunburns are the two most dangerous parts of working in the summer heat. If you notice a co-worker who says they feel cold in the intense heat, is experiencing headaches, and has nausea, then that could be heat exhaustion. You should get that person into a shaded area and get them cold water. It is vital that they get medical attention as quickly as possible.

Severe sunburns can sneak up on workers who are toiling out in the sun, and they can become so intense that the only treatment is to rush that person to a hospital burn unit. The primary signs of intense sunburns are red skin that might even be bubbling, disorientation, and nausea. As with heat exhaustion, it is important to get someone with a severe sunburn into a cool and shaded area, get them cold water to drink, and get them medical attention immediately.

Dress For The Heat

A construction worker can significantly reduce the chances of heat-related injuries by dressing properly for the hot weather. This means wearing light-colored clothing that is lightweight and loose fitting. Sunglasses are mandatory for summer work, and it is also important to cover your neck with a light colored scarf or bandana.

Take Breaks

During the summer, construction companies should have locations throughout the work site that give workers cool shelter and offer cold water. Workers should be sure to drink cool liquids three to four times every hour and get out of the heat for a few minutes every hour.

Adjust Work Schedules

In many parts of the country where it is hot all year round, construction companies start work very early in the morning and finish by early afternoon. When the summer rolls around, the areas of the country that are used to snowy winters should consider adjusting their work schedules to accommodate for the heat. The heat is at its worst just after noon on any given day, so it would be helpful to have work shifts call it quits for the day in the early afternoon.

Avoid Sugar-Based Drinks

Construction workers sometimes feel that a cold soft drink is ideal for the hot summer sun, but this is far from the truth. Energy drinks and soft drinks are packed with sugar, and so are summer favorites such as lemonade and fruit punch drinks. Construction workers should avoid all sugary drinks during the summer work season and stick with drinking cold water throughout the work day.



Grilling Safety Tips For All Grills

- Your grill, whether gas or charcoal, should be on a level surface outdoors, away from anything that could be ignited by flames (bushes, fences, etc.)
- NEVER use a grill indoors. Odorless carbon monoxide fumes could kill you
- Keep your grill clean and well-maintained. Check parts regularly to determine if replacements are needed
- Never leave a hot grill unattended or let children play near it

Grilling Safety Tips For Charcoal Grills (from Kingsford.com)

- Do not add lighter fluid directly to hot coals. The flame could travel up the stream of fluid and burn you
- Never use gasoline or kerosene to light a charcoal fire
- Use flame-retardant mitts and long-handled barbecue tongs, as coals can reach up to 1,000 degrees
- To dispose of coals, allow the ashes to cool for at least 48 hours before disposal in a non-combustible container. If you cannot wait 48 hours, carefully place coals

individually in a can of sand or bucket of water

Grilling Safety Tips For Gas Grills (from the NFPA)

- Check your grill's hoses for leaks before using it for the first time each year. Apply a light soap and water solution to the hose. A propane leak will release bubbles. If you have a leak, and it will not stop after the grill and gas is turned off, call the fire department. If the leak stops when the grill and gas are turned off, have your grill serviced by a professional
- If you smell gas while cooking, immediately get away from the grill and call the fire department. Do not move the grill
- Do not keep a filled propane tank in a hot car or trunk. When getting containers refilled, make that your last stop before going home
- Store propane tanks in an upright position, and never indoors

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