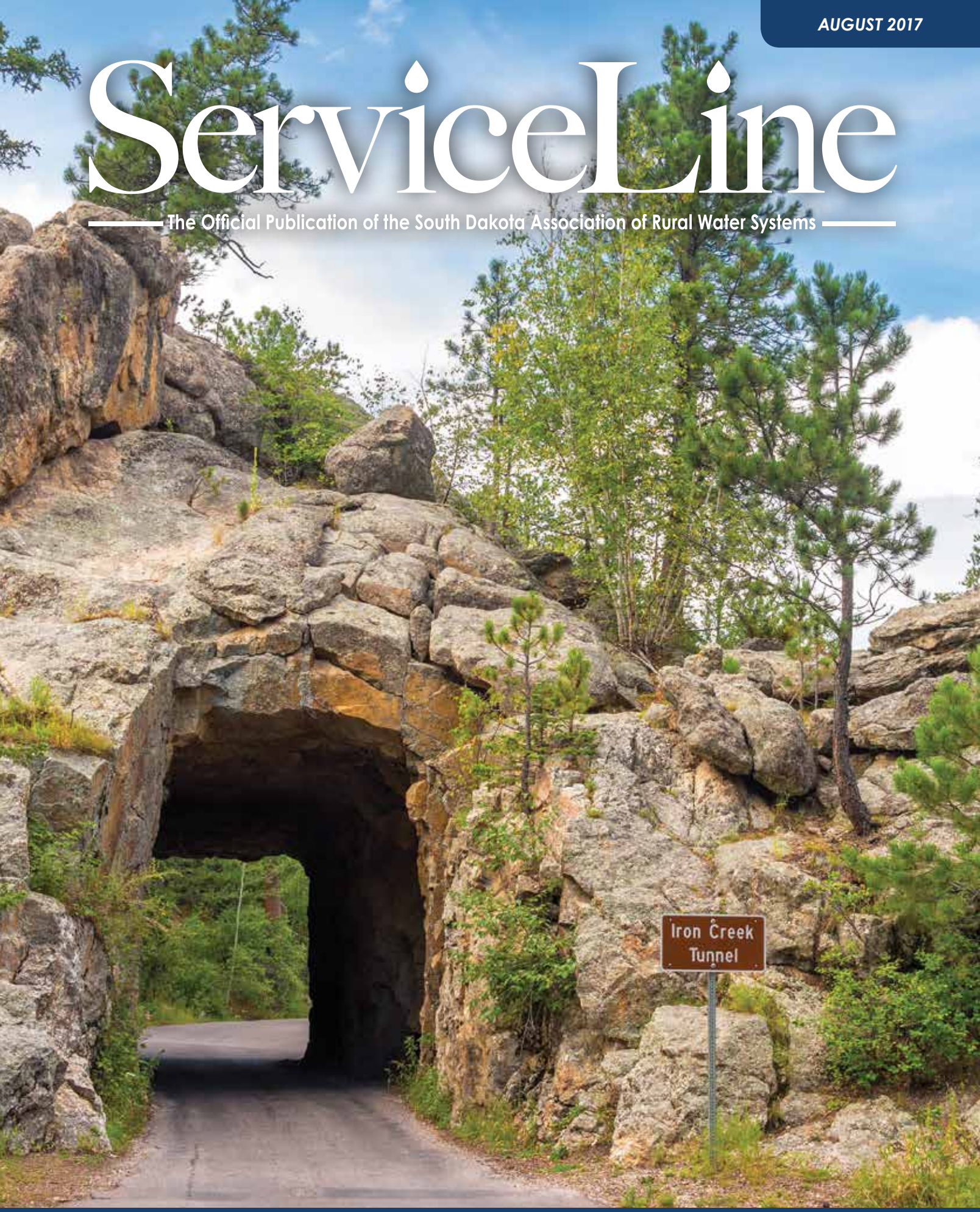
AUGUST 2017

ServiceLine

The Official Publication of the South Dakota Association of Rural Water Systems



TRENCHING & EXCAVATION SAFETY | PRACTICAL CONDITION ASSESSMENT

President's Message

Ron Gillen, SDARWS President

WaterPro Conference

It isn't too early to start thinking about attending this year's WaterPro Conference in Reno, Nevada September 18-20, 2017. NRWA puts on a fantastic show which brings in hundreds of vendors and hosts informative training sessions in operations, management, boardsmanship and governance for those involved in water and wastewater utility systems – large and small, municipal and rural. This year's conference features sessions on Trench Safety, and The Paradox of Intelligent Water Systems, Best Practices in Utility Billing and Payments, Emergency and Logistical Communication to Customers, Financing Options for Rural Water Systems, Advanced Metering Analytics, Data Security and Software in Cloud, and When Robert's Rules of Order Become Disorderly. For more information on this conference, including registration, hotel reservations, and the full agenda, please visit www.waterproconference.org.

Leadership Seminar

Association staff are busy getting ready for our Annual Leadership Seminar which will be held at the Best Western Ramkota Hotel in Pierre November 15-16th. This seminar is geared towards Rural Water System Directors and Board Members and includes informational sessions on water rates, asset management, sustainability, financing, and director and manager panels. The cost to attend Leadership is $140, and includes a meal at the President's Reception on the evening of November 15th. Members of WaterPro will receive a $15 discount. Registration for this event will be available on our website at www.sdarws.com, or by calling the SDARWS office at 605-556-7219. Stay tuned for the agenda in the next issue of *ServiceLine*.

ATC Call for Papers

SDARWS is looking for presentations for our Annual Technical Conference in Pierre January 9-11, 2018. The ATC is our biggest training event of the year and hosts around 400 individuals. If your company is interested in hosting a training session, please submit your abstract online at: www.sdarws.com/annual-conference.html. For more information, please see page 15.

IN THIS ISSUE

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P.O. Box 287, Madison, SD 57042
Phone 605.556.7219, Fax 605.556.1497
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Training Calendar

SEPTEMBER

26-28 – INTERMEDIATE WATER TREATMENT

Rapid City Ramkota
2111 N. LaCrosse Street • Rapid City, SD 57701

This course is designed to assist those who will be attempting a class II & III Water Treatment Exam. This is a multiple day course starting at 8:00 a.m. on Tuesday and ending at Noon on Thursday (all times are local time). A minimum of 18 contact hours will be awarded for full attendance.

OCTOBER

3-5 – BASIC WASTEWATER TREATMENT

Spearfish Holiday Inn
305 N. 27th Street • Spearfish, SD 57783

This course covers the Association of Boards of Certification "Need to Know" requirements for the Class I & II Wastewater Treatment Exams. This course does not cover the material included in the Stabilization Pond Exam. Class begins each morning at 8:00 a.m. local time and wraps up around 4:30 p.m. on Tuesday and Wednesday and approximately 11:30 a.m. on Thursday.

17 – STABILIZATION POND WORKSHOP

Rapid City Ramkota
2111 N. LaCrosse Street • Rapid City, SD 57701

This one-day class covers pond design, pond math, non-aerated ponds, pond microbiology, nitrification, pond problems, and lab work.

NOVEMBER

14-16 – WATER DISTRIBUTION

Sioux Falls Ramkota
3200 W. Maple Street • Sioux Falls, SD 57107

This course is designed to assist those who will be attempting a class I through IV Water Distribution Exam. This is a multiple day course starting at 8:00 a.m. on Tuesday and ending at Noon on Thursday (all times are local time). A minimum of 18 contact hours will be awarded for full attendance.

DECEMBER

5-7 – WASTEWATER COLLECTION

Sioux Falls Ramkota
3200 W. Maple Street • Sioux Falls SD 57107

This course is designed to assist those who will be attempting a class I through IV Wastewater Collection Exam. This is a multiple day course starting at 8:00 a.m. on Tuesday and ending at Noon on Thursday (all times are local time). A minimum of 18 contact hours will be awarded for full attendance.

JANUARY

23-25 – BASIC WATER TREATMENT

Spearfish Holiday Inn
305 N. 27th Street • Spearfish, SD 57783

This course is designed to assist those who will be attempting a class I Water Treatment Exam. This is a multiple day course starting a 8:00 a.m. on Tuesday and ending at Noon on Thursday (all times are local time). A minimum of 18 contact hours will be awarded for full attendance.

30 – STABILIZATION POND WORKSHOP

Mitchell Highland Conference Center
2000 Highland Way • Mitchell SD 57301

This one-day class covers pond design, pond math, non-aerated ponds, pond microbiology, nitrification, pond problems, and lab work.

REGISTER FOR CLASSES ONLINE AT: go.activecalendar.com/sdarws

Course agendas, maps and registration are all available online at www.sdarws.com. All classes are free unless otherwise noted. For more info on these and other events, visit www.sdarws.com or call 605-556-7219.

You can find the "Need to Know" document along with other information @ http://www.abccert.org/testing_services/2017WaterTreatmentExams.asp

SDARWS STAFF DIRECTORY

DENNIS DAVIS

Executive Director
dndavis@sdarws.com
605-201-0166

NICK JACKSON

West River Circuit Rider
njackson@sdarws.com
605-641-4557

JIM ZECK

Training Specialist
jzeck@sdarws.com
605-201-9568

MIKE MOELLER

West River Circuit Rider
mmoeller@sdarws.com
605-270-4989

STEVE ATTEMA

Training Specialist
sattema@sdarws.com
605-270-1766

BRANT AGER

West River Circuit Rider
bager@sdarws.com
605-641-1923

MORRIS ELCOCK

East River Circuit Rider
morrisre@sdarws.com
605-201-9561

JEREMIAH CORBIN

Source Water Protection Specialist
jcorbin@sdarws.com
605-270-3894

GREG GROSS

East River Circuit Rider
ggross@sdarws.com
605-201-6026

ROBYN BROTHERS

Office Manager
rbrothers@sdarws.com
605-556-7219

JERRY HEMEYER

Wastewater Technician
dndavis@sdarws.com
605-201-0170

JENNIFER BAME

Communications & Marketing Coordinator
jbame@sdarws.com
605-556-7219

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SOUTH DAKOTA RURAL WATER
LEADERSHIP SEMINAR

NOVEMBER 15-16, 2017

sdarws.com/leadership.html

WE LOVE GETTING MAIL!

Please send us your letters of support!

The hard work of dedicated SDARWS employees helps South Dakota's rural water and wastewater systems to have safe, reliable and quality water. SDARWS asks for your letters of appreciation in return for our on-site assistance. These letters are used to help obtain funding to continue these programs.

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PRACTICAL CONDITION ASSESSMENT AND ITS ROLE IN ASSET MANAGEMENT

By Delvin DeBoer, PhD, PE, Kellen Grubb, EIT, and Jared Heller, PE, Advanced Engineering and Environmental Services, Inc. (AE$_2$S)

In the June edition of *ServiceLine*, the concept of risk as it relates to operation and maintenance (O&M) and capital resource planning was introduced. This article is the second in a series discussing practical asset management approaches specifically for rural water systems and focuses on condition assessment practices that provide insight into the nature and timing of possible asset failure, and more importantly, how systems can use condition assessment to avoid those catastrophic events

A main objective of any asset management program for a rural water system is to develop the most cost-effective approach to extend the useful life of system assets. In other words, how can I get the most life out of my assets at the lowest cost?

Keys for rural water managers include:

- Fully understanding and monitoring the performance of system components,
- Implementing preventative maintenance practices to prolong efficient system operation, and
- Planning for timely infrastructure replacement prior to the point where the cost to maintain operation at the intended level of service exceeds the cost of replacement.

This article focuses on a series of condition assessment practices that can be employed by rural water systems to jumpstart a new asset management program or enhance an existing program.

At the most basic level, condition assessment involves consideration of age, material, and intended useful life. Beyond that there are metrics and diagnostic tools that reveal the existing and anticipated future performance of an asset. Obtaining the right data is the key to a useful condition assessment. This information can then be used in conjunction with financial operational and capital replacement values to prioritize repair and replacement strategies.

This article outlines a five-phased approach to condition assessment:

- Phase I – Plan,
- Phase II – Inventory,
- Phase III – Assess,
- Phase IV – Prioritize, and
- Phase V – Implement.

These phases are described below, along with some examples as to applicability for pipelines, valves, and pumps.

Phase I: Planning (Statement of End Result)

Without a clear goal in mind, it is difficult to utilize any condition assessment program to its highest potential. One example goal of condition assessment associated with pipeline infrastructure might be to reduce water lost throughout the system. A well-planned effort that specifically identifies the desired result of the condition assessment will decrease the chances of getting derailed from the end result. Table 1 provides examples of planning considerations for common rural water infrastructure.

Table 1: Condition Assessment Planning Considerations

Pipelines	Valves	Pumps/Motors
Are our piping systems operating as intended?	What is the frequency of valve exercising?	Do our pump/motor systems operate without faulting out?
Are any pipeline sections leaking?	How many valves are exercised on an annual basis?	Are the pumps producing the rated head/discharge at the installed efficiency?
Are any potential contaminants entering our pipelines?	What percentage of valves should be operable?	Are the electrical components operating in an appropriate temperature?
Are we losing revenue due to leaks and water lost?		Are the pumps operating without excessive vibration?
What is our goal for leaks/breaks and are we within that?		

Condition assessment methods provide data to determine how the component is meeting the goal.

Phase II: Inventory (Understand Your System)

Like any assessment, the results are only as good as the data used for the analysis. Base-level inventory information about the component, such as (but not limited to) location, material, size, year installed, break history, and maintenance records are vital to the overall success of condition assessment. Records of historical performance of your system will also enhance the condition assessment program. Common questions to consider when gathering historical information on system infrastructure include:

- What kinds of failures are occurring?
- When are the failures occurring?
- Where are the failures occurring?
- Do the failures share a common theme?
- If the component has not failed, has its performance been impaired?

It is useful, but not necessary, to utilize a Geographic Information System (GIS), in this phase. Good paper records or computer-aided design-based maps can also be used as a starting point. Common inventory elements for rural water infrastructure are summarized in Table 2 at the top of this page.

Table 2: Condition Assessment Inventory Considerations

Pipelines	Valves	Pumps
Location	Location	Location
Material	Type	Type
Size	Size	Rated Capacity
Age	Age	Age
Break History	Failure History	Operational Log/Condition Data
Maintenance Records	Maintenance Records	Maintenance Records

Phase III: Assess (Conduct Analysis)

In this Phase, an assessment is conducted to verify that the components believed to be in need of improvements, are actually in need of improvements. Making decisions about capital spending and infrastructure replacement are enhanced when decision makers are provided with good reasoning. Without good reasoning (i.e. a systematic and documented condition assessment), decisions are difficult to defend, which can be problematic for decision makers and lead to unhappy rate-paying customers. An overview of condition assessment methods for pipelines, valves, and pumps/motors is given below.

Pipeline Condition Assessment Methods

There are many ways to assess the condition of pipeline systems. For rural water systems, it might be argued that certain types of today's available technology are "overkill" for assessing the condition of a rural water piping system. The correct approach for each system will depend upon the desired outcome. Common pipeline condition assessment methods are described below.

Direct Method

Direct Method is defined as a test, process, or technology that can attribute a system deficiency to a section of pipeline based on observed data. Depending on the pipeline sample size (100-feet compared to 10-miles), some direct methods will be much more effective than others. Table 3 presents an overview of some common direct methods for assessing pipeline condition.

Indirect Method

Indirect Method is defined as a method for estimating condition of pipe based on recorded measures (or calculated metrics) and assumptions that correlate with those metrics. Rather than collecting direct evidence of condition (pressure drop due to leakage), condition is assessed from indirect information that infers the condition. For example, for a system experiencing unidentified water loss, one could assume that a stretch of pipeline that has been in service for 40 years is the culprit – in this case, age is an indirect measure of condition. Although reasonable, age alone is not enough to rule out other possibilities, such as pipe joining method (glued joints vs bell and spigot joint). A calculated metric, such as number of breaks per 100 miles, might provide additional evidence of condition, and the trend of a key performance indicator (number of breaks per 100 miles per year) might be used to establish evidence for replacement. Common factors when applying indirect assessment of pipeline condition include:

- Age
- Installation year
- Material
- Break History
- Maintenance Records
- Soil Examinations (soil type)

Valve Condition Assessment Methods

Valves play a variety of important roles in a rural water system, including controlling flow through the water treatment facilities as well as throughout the distribution system. Reliable valve operation is critical to maintaining adequate supply and pressure to customers, especially when a segment of pipe must be shut down for repair. A valve exercising program provides an excellent example of an approach to assess valve condition. Table 4 on page 12 provides some considerations for a valve exercising program. Operating the valve is a maintenance action (keeps the threads in working order), but additional data (torque during exercising) can be used to evaluate its condition.

...continued on page 12

The ultimate goal of a valve exercise program is that each valve is operated routinely, with some operated more frequently than others depending upon factors such as location and criticality within the system. Critical (more important) valves may include those on primary transmission mains feeding the system, or valves near consecutive system customers or medical facilities. It would be appropriate to operate critical valves more frequently than a regular distribution valve. It can be helpful to assign a numerical ranking system for valves, such as 1 to 5, with five being the most critical and one being the least critical. An exercising program could then be developed to ensure that number 5 valves are operating at 100 percent before addressing number 1 valves.

Figure 1 is an example of data from an advanced valve exercising machine. This machine records the number of turns, the torque, and also Global Positioning System (GPS) location of the valve. Torque can be tracked over time, and maintenance/replacement scheduled when trends indicate pending issues with the valve.

Table 3: Direct Methods for Pipeline Condition Assessment

Testing Method	Definition	Suitable Materials	Ideal Diameters	Disruption to Service?
Hydrostatic Pressure Test	Involves filling the pipe with water and pressurization of the pipe to a specified test pressure. Significant pressure drops indicate that a leak is present.	All Materials	All Diameters	Yes
Flow Monitoring (Water Pumped vs Water Metered)	Requires a flow meter at the pump station. Comparison between gallons pumped and gallons sold to determine water loss.	All Materials	All Diameters	No
Acoustic Leak Detection	Involves recording acoustic activity and positional data, which can then be analyzed to determine the approximate size and location of the leak.[1]	All Materials	Typically Larger Diameter Pipes	Depends on Product
Electromagnetic Pipe Inspection	Includes inducing electric currents inside a pipe to observe the electromagnetic response. A pipe defect will trigger a measurable response.[1]	Metallic Materials Must Be Present	Typically Larger Diameter Pipes	Yes
Ultrasonic Testing	Procedure of introducing high frequency sound waves into the exterior side of a material and reflecting the sound wave from its interior surface to produce a precise measurement of wall thickness.[2]	Metallic Materials Must Be Present	Typically Larger Diameter Pipes	No

1 Pure Technologies US Inc. (2013). *Condition Assessment of Raw Water Transmission Mains*.
2 Duncan, B. (2004). *Benefits of Ultrasonic Testing in Determining Pipe Corrosion*.

Pump/Motor Condition Assessment Methods

Condition assessments of pumps and motors can be a combination of 1) routine observations by operators as part of routine and preventative maintenance activities, and 2) focused performance assessments with specialty equipment or measurements. These assessments all require a baseline assessment against which subsequent data are compared to develop a trend that indicates remaining life, or triggers renewal or replacement of the component. Developing issues with pumps and motors can be signaled by unusual amounts of heat or increased vibration. Loss of capacity can be detected with pump performance tests. Examples of methods to obtain condition assessment data for pumps and motors are summarized in Table 5. Trends of the data are recorded, and departure from normal values receives a less favorable condition score.

Phase IV – Prioritize (Determine Priority of Improvements)

If the desired approach to managing replacement of system assets is to plan improvements around condition data, then

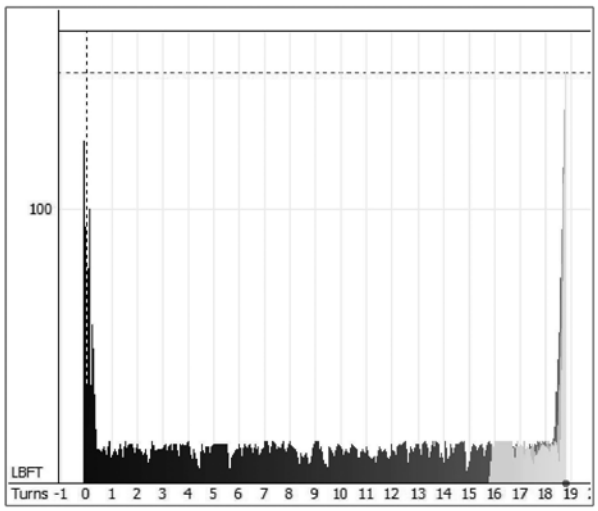
Table 4: Condition Assessment – Valve Operation

Valve Exercising Program Component	Consideration
Valve Operation	Automated valve exercising machine is recommended over a valve key
Valve Location	Consider this when choosing a valve exercising machine – flexibility in ditches, etc
Vactor	Consider need for valve box cleanout – some valve exercising machines have built in vactor
Data	As a minimum, count number of turns to open/close. Advanced machines measure torque, operate by AWWA standards, and record data.

the condition assessment data can be directly translated into a prioritized capital replacement program, beginning with assets that were deemed "poor condition." Ideally, risk assessment data will be incorporated into this step. In the June edition of *ServiceLine*, guidelines for implementing risk assessment as a tool in asset management of a rural water system were discussed. Risk assessment data can be reviewed as a basis for prioritizing improvements in conjunction with condition assessment data.

Figure 1: Example of Valve Exercising Machine Output

ValveId	WMVALVE0006361
Size	6
NormPosn	Open
Close Dir	RH
Condition	Good
Type	Gate
Depth	7
Street	3rd street
Cross Street	edgwood
Notes	
Notes1	
Latitude	46.9184452521672
Longitude	-96.7833364140083
ValveId	WMVALVE0006361
Date	6/1/2016
OperatedBy	john b
Turns	18.9
Position	Open
HighTorque	150
Begin Time	1:02 PM
End Time	1:08 PM
Remarks	
Latitude	46.918445
Longitude	-96.783323
GPS Positions	211
ActivityId	17550



Phase V – Implementation (Solve Issues)

The last step in condition assessment is to implement identified priorities that will correct system deficiencies and promote sustained operation of the infrastructure. Replacing pipes, adding valves to improve hydraulics, or adding more pipe sections to the system to improve looping and system redundancy are all potential examples of solving issues that maintain system performance at the desired levels and provide service of the utmost quality.

Document and Communicate these Proactive Management Efforts

Rural water systems have a variety of options to assess the condition of assets to improve decision making. Trending condition assessment data and interpreting results helps measure progress toward performance goals.

A key feature is to share the findings with your Board of Directors and customers. Educating decision-makers and other stakeholders about your efforts to stay ahead of potential infrastructure failures will support your case when seeking support for capital investments and financial plans, and help achieve overall customer confidence in how the system is being managed.

Implementation of a successful asset management program involves both human resources and capital resources. The next article in this four-part Asset Management series will address how the risk assessment and condition assessment processes and outcomes play into the financial plan for the water system. In a fourth and final article in this Asset Management series, key components of a successful asset management program implemented by a South Dakota rural water system will be highlighted.

Delvin is a Special Projects Engineer with AE2S and can be reached at (605) 275-5620. Kellen and Jared are Engineers with expertise in Asset Management and can be reached (701) 364-9111.

Table 5: Condition Assessment – Pumps/Motors

Objective	Approach	Frequency	Data
General Pump Condition	Operator Physical Observation – See, Touch, Listen	Daily / each visit to the pump system	Abnormal sounds, visible movement/vibration, abnormal heat generation, paint discoloration/rust
Thermal Condition	Infrared Measurements – either thermal imaging (thermography) or infrared thermometer	Annual	Observe unusual heat at bearings, motor or in electrical panel – ID loose connection, overload circuits, insulation failures
Pump Performance	Measure suction/discharge pressures, discharge flow, power requirement	2 to 4 years	Compare head, flow and efficiency with pump characteristic curve to trend loss of performance
Vibration	Vibration test of pump/motor system – measure axial, vertical and horizontal acceleration and frequencies	1-2 years	Measurements are trended to show increased vibration, indicating excessive wear.
Electrical Insulation performance	Megohm Testing	2 years	The higher the resistance the better the insulation – decreased resistance signals impending failure

JANUARY 9-11

ATC 2018

SOUTH DAKOTA RURAL WATER'S
ANNUAL TECHNICAL CONFERENCE

CALL FOR PAPERS

The South Dakota Association of Rural Water Systems is looking for presentations for our 2018 Annual Technical Conference in Pierre, SD January 9-11.

Please submit your abstract for SDARWS's 2018 Annual Technical Conference. Presentation themes may include, but are not limited to the following:

- Drinking water security strategies and tools
- How Water Storage Can Impact Water Quality
- Fair Labor Standards Act
- Hands-on sessions:
  - Control valve repair kits
  - Hydrant maintenance and repair
  - Solution pump repairs (diaphragm and peristaltic)
  - Repair couplers, saddles, wet tapping
- The importance of Cross Connection Control
- Water Rights for public systems
- Ice Pigging to clean water and sewer pipelines
- Source water protection and sustainability of water supplies
- Climate change, water and energy efficiency, and conservation
- Clean Water Act/SDWA connections, nutrient pollution, and Harmful Algal Blooms (HABs)
- Emerging drinking water treatment technologies and optimization of current technology
- State revolving loan fund tools and techniques/green infrastructure strategies
- Small systems: TMF, sustainability strategies, technologies, and compliance
- Trench Safety
- Data management
- Workforce, operator certification, and/or technical assistance initiatives
- Distribution system issues
- Emerging contaminants in drinking water, both chemical and microbial
- Drinking water research
- Sanitation and wastewater management
- Risk assessment, risk communication and consumer outreach
- Implementation of regulations – challenges and successes

If you would like to make a presentation, please submit a one-page abstract with the proposed presentation title, and the name, title, affiliation, and contact information for the speaker to:

South Dakota Association of Rural Water Systems
PO Box 287
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OR SUBMIT ONLINE AT

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All submissions must comply with the following guidelines:

1. Deadline for submissions is September 15, 2017
2. Abstract submissions are limited to text only.
3. The conference planning committee will select submitted abstracts for sessions.
4. Please include a five sentence biography along with a 500 word abstract or description of your presentation.

DISTRIBUTION PLUMBING IN AMERICA

By Nick Jackson, SDARWS Circuit Rider

They were the master farmers of America's Southwest, and engineers of great networks of irrigation canals in the Salt River Valley; they were the Hohokam Indians. They first appeared about 350 B.C., building canals of open ditches, gouged out with stone tools and wooden hoes. The canals spanned almost 250 miles, stimulating trade and commerce between communities of hundreds and thousands of people. No one knows why, whether by climatic upheaval, drought or floods, the Hohokam suddenly vanished in 1450 A.D. – well before Columbus discovered America or the Pilgrims landed at Plymouth Rock.

Developments were similar in North America, the Roman lessons having evidently been forgotten. The idea of a publicly owned water and sanitary system did not really come into effect here until about the mid-19th century. Early settlers obtained water for domestic purposes from lakes, ponds, rivers, streams and springs, and where these sources were not available, shallow privately owned wells were dug to provide the necessary potable water supplies.

In 1652, Boston, Massachusetts incorporated the country's first waterworks which was formed to provide water for firefighting and domestic use. The water was stored in wooden tanks from which citizen's filled buckets. In later years, wooden pipes were used and the forces of gravity would move the water from higher to lower elevations. In 1677, the first public well was dug in front of the old fort at Bowling Green, Manhattan. The construction of water supply systems in the U.S. dates back to the early 1700s in New York. In 1754, the system for the Moravain settlement of Bethlehem, Pennsylvania, was built. This system consisted of spring water forced by a pump through bored logs.

Early settlers knew nothing of lead or iron pipe – they knew only to build with wood, the country's bounty. The earliest water-mains laid in America were chiefly of bored logs, preferably made from hemlock or elm trees. The trees would be cut into seven to nine foot lengths, their trunks around nine to ten inches thick. The bored logs would be jammed together in a series, and then sealed at the joints using a bituminous tar. In later times, they would split the log and hollow it out, put it together, connect the logs with iron hoops or wrought bands. Philadelphia was another early system similarly using bored logs at about this time, but utilizing horse driven pumps to move the water, as did Cincinnati. Such systems did not last more than a few years. In 1801, Philadelphia had the first use of large steam engines for municipal water conveyance.

In 1804, Philadelphia, Pennsylvania earned the distinction as the first city in the world to adopt cast iron pipe for its water mains. Shortly thereafter, many of America's cities were replacing the old wooden mains with cast iron ones. The joints of cast iron pipes were normally of the spigot and socket type, caulked with lead, but flanged joints were used for connecting to valves and other fittings. Methods of joining pipes have changed over the years. From about 1920 until about 1955, some cities used a sulfur type compound in place of lead. This material was cheaper and easier to use, however, it produced an extremely rigid joint, which contributed to cast iron main breaks. In about 1920, a bolted mechanical joint was introduced. The next development was a rubber ring gasket, which was used in place of the lead or sulfur caulking on bell and spigot pipe. Since 1955, new cast or ductile iron pipe has been installed with a rubber gasket that fits in a groove in the bell. This method produces a watertight joint with a good deal of flexibility.

The first steel water mains were being laid in the US in about 1860. Early steel pipes were riveted, but welded pipes were introduced in 1887. These pipes were more susceptible to corrosion than cast iron.

In 1948, with science and technology improving, a different kind of cast iron pipe – having the favorable characteristics of both steel and cast iron – was invented. Called ductile iron, it was less brittle than its predecessors, collectively called gray iron, and showed superior strength, flexibility, and impact resistance. National standards for this pipe were first published in 1965. Over the past few years, virtually all cast-iron pipe produced has been ductile iron.

Today's manufacturers are not content to rest on past successes; research and development have helped produce better pipes, valves, fittings and fixtures. Advances in metallurgy and materials science have led to relative reductions in the cost of construction of water and sewer systems, which has led to a significant improvement in public health. The materials have evolved from stone and wood, lead, copper, ceramics and clay, cast iron, ductile iron, concrete, steel and most recently, plastics. What's next?

South Dakota Rural Water AWARD NOMINATIONS

Do you know someone who is doing a great job? Goes above and beyond the call of duty? Has your water system achieved excellence this year – or has overcome some amazing challenges?

Give recognition where it is due by completing our Awards Nomination Form. Awards will be presented at the Awards Brunch at the ATC – Janaury 11, 2018. **Application deadline is October 27, 2017.** Eligible nominees must be affiliated with a system member in good standing. The online form can be found at **www.surveymonkey.com/r/ATCawards**, or through a link on our website at: **www.sdarws.com/annual-conference.html**.

WE ARE ACCEPTING NOMINATIONS FOR THE FOLLOWING CATEGORIES:

RURAL WATER SYSTEM OF THE YEAR: a member system who puts forth exceptional efforts to properly manage, operate, and maintain their drinking water system.

RURAL WATER MANAGER OF THE YEAR: Recognition for a manager of a Rural Water System for outstanding performance in operating a Rural Water System.

RURAL WATER OFFICE PERSON OF THE YEAR: Recognition for an administrative employee of a Rural Water System for outstanding performance in office management and procedures

RURAL WATER SYSTEM OPERATIONS SUPERVISOR OF THE YEAR: Recognition for a State of South Dakota Certified Operator who is actively working a supervisory role for a Rural Water System, and has demonstrated outstanding leadership ability and/or accomplishments in drinking water.

RURAL WATER SYSTEM OPERATIONS SPECIALIST OF THE YEAR: Recognition for a State of South Dakota Certified Operator who is actively working for a Rural Water System with outstanding leadership ability and/or accomplishments in drinking water.

MUNICIPAL MANAGER OF THE YEAR: Recognition for a municipal manager for outstanding performance in managing a municipality.

MUNICIPAL OFFICE PERSON OF THE YEAR: Recognition for an administrative employee of a municipality (i.e. clerk, finance officer, etc.) for outstanding performance in office management and procedures.

MUNICIPAL OPERATIONS SPECIALIST OF THE YEAR: Recognition for a State of South Dakota Certified Operator who is actively working for a municipality with outstanding leadership ability/accomplishments in water.

CARROLL ANDERSON MEMORIAL: The Carroll Anderson Memorial Award is a tribute to the exemplary work of Carroll Anderson who gave generously of his time, talents, and efforts to the Kingbrook Rural Water System and the South Dakota Association of Rural Water Systems. This award recognizes an individual's outstanding voluntary contributions to the advancement of rural community water systems in South Dakota, and is the greatest tribute the Association can bestow recognizing an individual's contributions to both the member system and to SDARWS.

FRIEND OF RURAL WATER: This distinguished honor is awarded to agencies, organizations, or individuals who have lent a hand in supporting this fantastic phenomenon we call Rural Water. The ability to provide life's essential need, water, to all the citizens of South Dakota was not done by one person or organization; it is a collective effort encompassing many.

SPIRIT OF RURAL WATER: This award is presented to an individual, business or group that goes above and beyond for a rural water system or rural water cause. South Dakota Rural Water wants to recognize exceptional rural water advocates that stand out from the pack because of their commitment to rural water issues and/or their passion for the job. Eligible candidates include rural and community water consumers, employees, directors, as well as lawmakers, businesses, or any person or group that puts forth a noble effort to advance rural water.

DONALD B. POSPISHIL: This award honors the work of Don Pospishil who dedicated many years of his life to helping small water systems across South Dakota. The Donald B. Pospishil Award is awarded to individuals who demonstrate leadership abilities in the water supply field, provide quality services to consumers, and exhibits professionalism and dedication while operating and maintaining a small water system.

South Dakota Rural Water

2017 AWARDS NOMINATION FORM

This form is also available online at: **www.surveymonkey.com/r/ATCawards**
or through a link on our website at: www.sdarws.com/annual-conference.html

Name of Nominee_____ Title_____

Employer _____ Years with System _____

Name of person making nomination _____

Address_____

City_____ State _____ Zipcode_____

PLEASE INDICATE AWARD:

- ☐ Rural Water System of the Year
- ☐ Rural Water Manager of the Year
- ☐ Rural Water Office Person of the Year
- ☐ Rural Water Operations Supervisor of the Year
- ☐ Rural Water Operations Specialist of the Year
- ☐ Municipal Manager of the Year
- ☐ Municipal Office Person of the Year
- ☐ Municipal Operations Specialist of the Year
- ☐ Carroll Anderson Memorial
- ☐ Friend of Rural Water
- ☐ Spirit of Rural Water
- ☐ Donald B. Pospishil

SUPPORTING INFORMATION: Please provide a narrative for why this nominee deserves the award. (Outstanding accomplishments, contributions to system and state association, certifications, awards, exemplary work on legislative Issues, leadership, civic activities, etc.)

_____

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DEADLINE TO APPLY IS OCTOBER 27, 2017

Please complete this entry form and mail to:
SDARWS | Attn: Jeremiah | PO Box 287 | Madison, SD 57042
or scan and email to atc@sdarws.com

Form is also available online at: www.surveymonkey.com/r/ATCawards
or on our website at: www.sdarws.com/annual-conference.html

LOCATING SERVICE LINES

By Mike Moeller, SDARWS Circuit Rider

It happens in every system, whether it's a major rural water system, or the smallest town in South Dakota – your service lines are never mapped. The problem is, over time with the changing of operators and maintenance personnel, the information for the location of these service lines becomes lost.

What is a service line? It the water line (usually small in diameter) that brings water from the water main into the residence or business. The service line enters a residence or home through the basement or crawl space. In a city or town setting the service line has a valve on the end of it right before the water meter, and is connected to a curb stop located just a few feet off the water main. In the rural water setting the service line comes into the residence or business and may have a valve, but the water meter might not be located there. In a lot of rural water systems, the meter is usually located in a meter pit situated at the edge of the property.

Now that we know a little bit about what a service line is, how do you locate it when the flow of information over the years has been lost? One method that can be used is with a metal detector. Most curb stops have a metal top, and can be located by using a metal detector. Metal detectors can detect metal objects that are buried a couple feet into the ground – which makes them useful for finding old or neglected curb stops. Once you have located the curb stop, there is a very good chance that the service line runs in a straight line directly to where it enters the residence or business.

Another method used to locate a service line is to use line tracing equipment. Line tracing equipment can be hooked up to the service line and introduces a small electrical charge into it that can be detected by the receiver. Most of the line tracing equipment will tell you if you are directly over the top of the service line and how deep it is. Keep in mind for this to work, the service line the line itself must be a metallic line such as copper (or galvanized if it is a very old one) for the electrical current to follow.

What if you must trace the line with line tracing equipment but the service line is not made up of metallic pipe? The chances of the service line being metallic are very slim. Most service lines that are put in are usually made of a poly pipe and can't be traced. SDARWS has a locating option for these also. We have what we call a trace wire that we run through the inside of the pipe. This can be done even with water being left on to the residence, but it is preferable to shut the water off if there is a valve. SDARWS has fittings that the trace wire will fit through as to not leak around it. In a worst case scenario when a valve is not present in the home or business, the water main may have to be shut down while the trace wire is being used.

After the trace wire is pushed into the service line – just like with the metallic pipes – a small electrical charge is put into the wire and then the receiver is used to follow the trace wire and tell the depth of the wire.

One last way that is used to locate service lines, or even water lines for that matter, is water dowsing (witching). Dowsing is not a proven science and is not always 100 percent accurate, but for those who can witch, it can save a lot of time. For those who can't witch you may prefer one of the other methods previously mentioned in this article. If your system needs assistance locating curb stops, give SDARWS a call at 605-556-7219 and we'll put you in touch with a circuit rider who can help.

Photo Captions:

1. Circuit Rider Nick Jackson using a metal detector to locate a curb stop.

2. Curb stop located 18" deep.

3. Tracer wire pushed into service line.

4. Line tracing equipment being used on a copper line.

ServiceLine

South Dakota Association of Rural Water Systems

Reaching the Water and Wastewater Industry of South Dakota!

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Advertising in *ServiceLine* allows you to showcase your products in print and online to a highly targeted audience.

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Our members are key decision makers who include operators, managers, board members, engineers, consultants and other professionals responsible for making purchasing decisions for their systems.

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Full Page	$400	$350
Half Page	$275	$250
1 Column	$200	$175
1/2 Column	$150	$125
2 Column x 2"	$150	$125

**Ad rates are per issue*

- **December 2017**
  – *10.20.17 deadline*
- **February 2018**
  – *12.15.17 deadline*
- **April 2018**
  – *2.16.18 deadline*
- **June 2018**
  – *4.20.18 deadline*
- **August 2018**
  – *10.19.18 deadline*

If you are interested in advertising in *ServiceLine*, please contact Jennifer Bame by calling 605-556-7219, email: info@sdarws.com, or go online and visit: www.sdarws.com/ad-rates.html

SDARWS HOSTS 31ST ANNUAL RURAL WATER OPEN

By Jeremiah Corbin, SDARWS Source Water Protection Specialist

A field of 160 helped make the 31st annual Rural Water Open a success on July 18. With the multi-year upgrade project at Elmwood complete, the West Course and North Course were utilized for this year's tournament, (at least by most teams!).

At shotgun time the field consisted of 40 four-man teams. This year marked the third year for the WaterPAC Putt Challenge. Along with raising $685.00 for WaterPAC, the 19th hole also offered a refreshing glass of beer to eager participants courtesy of sponsor Direct Automation.

When it comes to golfing, the Rural Water Open brings out an array of talent. Scores were competitive this year with 20 teams posting scores below par. Scores ranged from thirteen under (58) to nine over par (80). The average score this year was up a few strokes to a 70.4; we did not have mulligans at this year's tournament but rumor has it they will make a return in 2018 – for a fee. The Corporate Sponsors who helped make this event possible are listed on page three. Without their continued support, it would be impossible to award prizes to all players. All of the team prizes, in both flights, were awarded prizes based on our Corporate Sponsor donations.

Following Rural Water Open traditions, the tournament format included four person teams playing an 18-hole scramble with no Championship or Amateur Division. After the scores were posted and verified by our scoring whiz Jim Zeck, all team scores were listed from lowest to highest and then the field was split in half with 20 teams in two flights. To summarize, the 1st flight teams ranged from -13 to -1; 2nd flight ranged from even to +7. Needless to say, with 40 teams participating we had numerous ties. For example, four teams tied at even and five teams tied at 4 over. To determine proper team places we reverted to a scorecard playoff starting with the number one handicap hole. Congratulations to the winning teams!

Our first-place team from the 1st flight consisted of a group of Munsons, including freshly retired Sid Munson. Our winners from flight two were a team of water operators from Clay Rural Water. Our last place team was Gene Wilts and the gang from Brookings-Deuel Rural Water System.

Our Flag Prize winners include: Joe Jensen, Closest to the Pin on #4 received $100 donated by Visu Sewer. Music Man Larry Hudson had the longest drive on hole six, and he received $100 provided by Micro Comm. Jerry Adler won $100.00, provided by HR Green, for being closes to the Pin on hole 8. Waylon Blasius won $100.00 donated by Ditch Witch for being closest to the pin on #12. Mike Adams was closest to the pin on hole #12, and he received a $100.00 donated by Clark Engineering. Josh Kuehl sunk the longest putt on hole #18 winning his team assorted golf merchandise provided by AE_2S.

The Government Relations Committee's WaterPAC was again held on a par 3 hole. The WaterPAC hole gives each

...continued on page 27

GOLF RECAP: continued from page 25...

golfer who buys a $5 chance an opportunity to be entered into a drawing for $100.00 if they hit their drive on the green; if they do not make the green they are still entered into a consolation prize drawing. This year the WaterPAC hole raised $875, which brought our total WaterPac donation to $1,560. Special thanks go to SDARWS Past-President Dan Carlson, Vice President Dale Thompson, and Government Relations Committee members Larry Wasland and Glen Gilbertson for manning the WaterPAC hole. A special thanks to Lori Seten for volunteering to keep order at the WaterPAC hole this year.

The 19th Hole Putt Challenge returned to offer another wrinkle to the golfing experience this year. Participants attempted to sink three balls from about 12 feet. For each putt made the challengers were entered into a drawing. The challenge turned out to be quite a feat! No one was able to sink three putts this year, but $50 was awarded for two putts, and a pack of balls was awarded for one putt.

In conclusion we would like to thank all the sponsors, participants, and volunteers who helped make this event successful. Golfers, please remember to check out the corporate sponsors on page three, and when they stop by your facility let them know you appreciate their generosity and continued support. Mark your calendars for the 2018 Rural Water Open, it will take place on July 17 at Elmwood.

SDARWS CLASS REGISTRATION IS AS EASY AS 1-2-3!

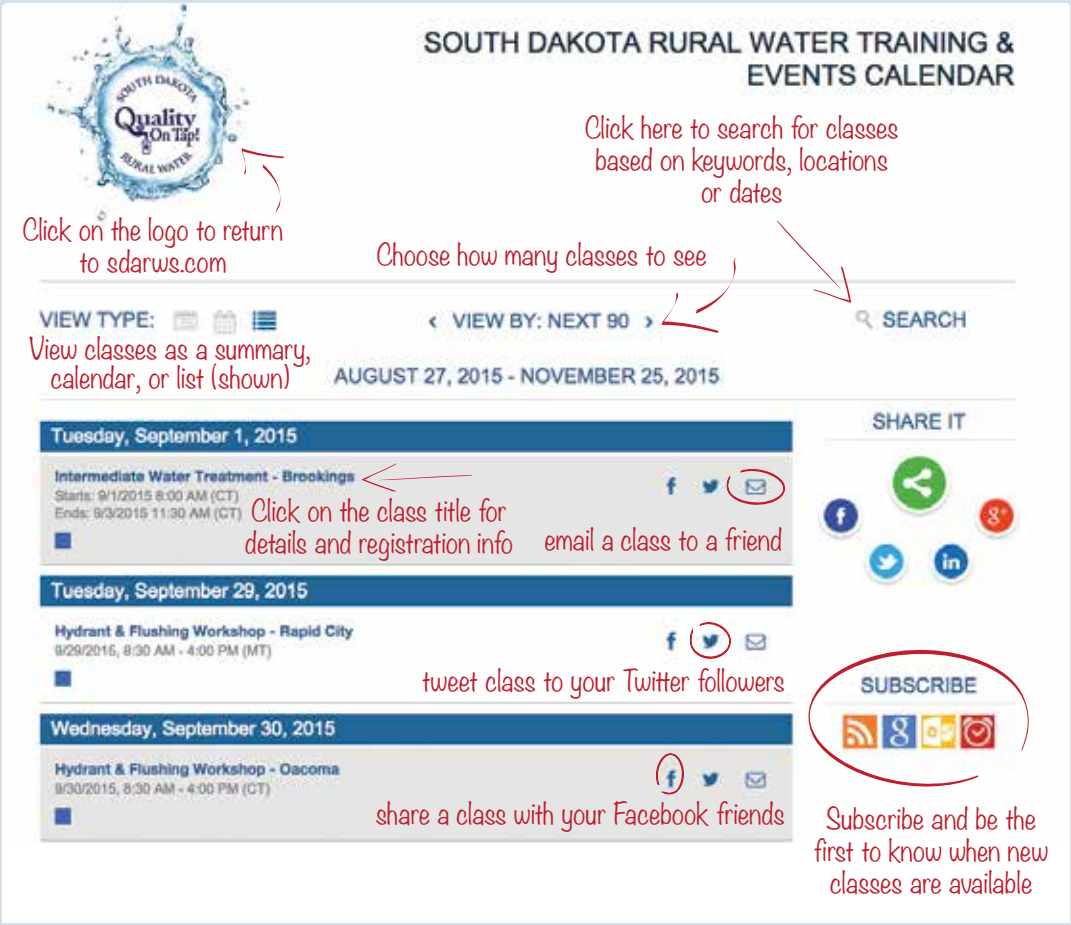
FIND A TRAINING CLASS

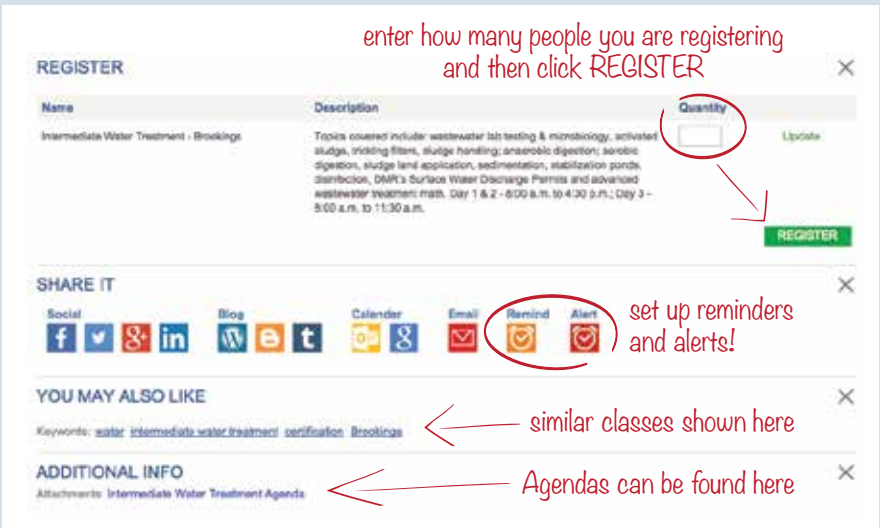
1. VISIT THE SITE

go.activecalendar.com/sdarws

2. VIEW UPCOMING CLASSES

Pick the view that works for you: summary view, calendar view, list view OR search for a class by clicking on the SEARCH icon





REGISTER FOR A CLASS

3. REGISTER

Under the REGISTER section - enter the number of registrants in the QUANTITY box, click REGISTER, fill out the form, and submit. ***It's that simple!***

GO.ACTIVECALENDAR.COM/SDARWS

TRENCHING AND EXCAVATION SAFETY

By Steve Attema, SDARWS Safety Trainer

Trenching and excavations can be a necessity when working at a water utility. In the United States an average of two workers are killed every month from trench collapses. Weather your utility contracts out to have your trench dug or you dig it yourself you need to be aware of the dangers involved in trenches and excavations. The greatest hazard involved with trenching and excavations are cave-ins. The weight of one cubic yard of soil can weigh as much as a car. Other hazards include falls, falling loads, hazardous atmospheres and mobile equipment in and around trenches. Any one of these hazards can cause death or serious injury. To combat these hazards protection systems should be in place to protect workers in a trench. These protection systems include:

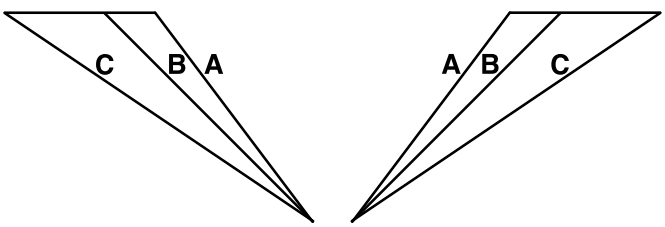
- Benching: a series of horizontal levels or steps
- Sloping: cutting back the soil at an angle away from the excavation. The type of soil determines the amount of slope needed.
  - Class A: most stable – dense heavy clay and previously undisturbed.
  - Class B: silt, sandy loam, medium clay
  - Class C: least stable – gravel, loamy sand, soft clay. Also Class C if saturated with water, which is the case with most water leak excavations.
- Shielding: protects workers by using trench boxes or other types of supports to prevent soil from caving-in on a worker.

In addition to these protection systems there are some general rules that should be followed in trenching and excavations.

- A ladder or other safe means of exit should be within 25 ft. of any worker
- Keep heavy equipment away from trench edges.
- Identify other sources that might affect trench stability.
- Keep excavated soil (spoils) and other materials at least 2 feet (0.6 meters) from trench edges.
- Know where underground utilities are located before digging.
- Test for atmospheric hazards such as low oxygen, hazardous fumes and toxic gases when > 4 feet deep.
- Inspect trenches at the start of each shift.

SIMPLE SLOPE EXCAVATION

CLASS	MEASUREMENT	DEGREES
Class A	3/4 : 1	53°
Class B	1 : 1	45°
Class C	1 1/2 : 1	34°



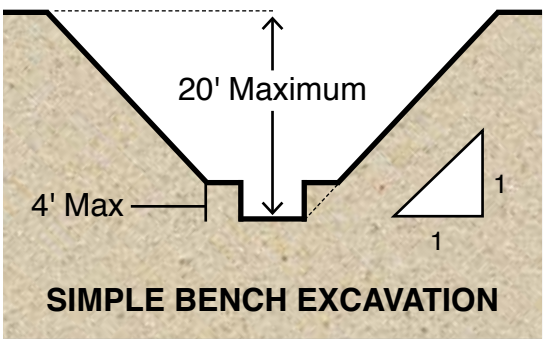
- Inspect trenches following a rainstorm or other water intrusion.
- Do not work under suspended or raised loads and materials.
- Inspect trenches after any occurrence that could have changed conditions in the trench.

- Ensure that personnel wear high visibility or other suitable clothing when exposed to vehicular traffic.

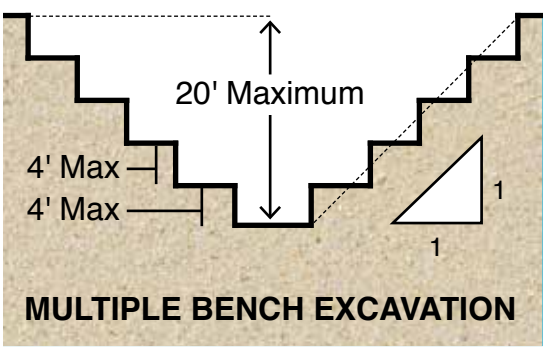
With all the hazards involved in trenching and excavations a competent person by OSHA's definition should oversee any trenching and excavation operations at your utility. This competent person definition is: an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions.

For more information go to OSHA.gov and for a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations.

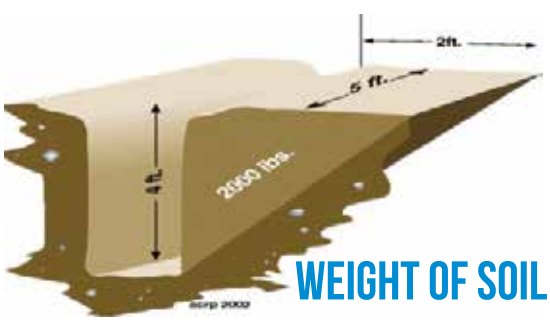
TYPE B SOIL EXCAVATION



SIMPLE BENCH EXCAVATION



MULTIPLE BENCH EXCAVATION



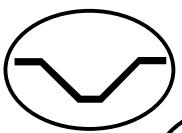
WEIGHT OF SOIL

OSHA® QUICK CARD™

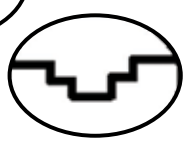
Working Safely in Trenches

Two workers are killed every month in trench collapses. Each worker in a trench shall be protected from a cave-in by an adequate protective system. Some of the protective systems for trenches are:

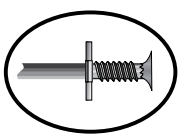
- Sloped for stability; or

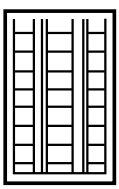


- Cut to create stepped benched grades (Type A or B soil only); or

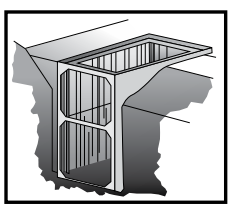


- Supported by a system made with materials such as posts, beams, shores or planking and hydraulic jacks; or

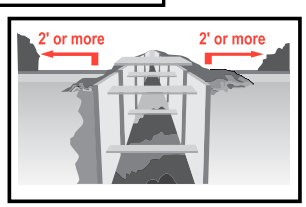




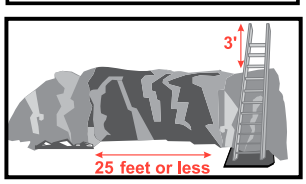
- Shielded by a trench box to protect workers in a trench.



Excavated or other materials and equipment must be at least 2 feet back from the edge of a trench; and



A safe way to exit must be provided within 25 feet of workers in a trench.



A competent person must inspect trenches daily and when conditions change. An unprotected trench is an early grave. Do not enter an unprotected trench.

For more information:

OSHA® Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)
TTY (887) 889-5627

OSHA 3243-09R-11

Test Your Knowledge

Certification Practice Questions

The Association of Boards of Certification (ABC) has recently updated all of their water & wastewater certification exams. In this process, they have also updated the "Need to Know" requirements for each specific exam and also updated the formula sheets used in the exams. The following link will take you to the ABC website where you can find this updated information at: www.abccert.org/testing_services/default.asp.
You can then click on the 2017 exam information and download the information you need.

1 Minimum pressures in a distribution system should never be allowed to drop below?

a. 20 psi
b. 40 psi
c. 60 psi
d. 76 psi

2 Which of the following is a member of the Total Coliform group of bacteria?

a. Vibrio cholera
b. Entamoeaba coli
c. E. coliform
d. Escherichia coli

3 What chemical can be used to dechlorinate drinking water?

a. HTH
b. Sodium Thiosulfate
c. Vitamin D
d. Potassium Permanganate

4 What is an MRDL?

a. Minimum Required Disinfectant Level
b. Mean Residual Disinfectant Level
c. Maximum Residual Disinfectant Level
d. Midian Residual Disinfectant Level

5 What is the MRDL for Chorine and Chloramine?

a. 0.3 ppm
b. 0.8 ppm
c. 2.5 ppm
d. 4 ppm

6 When do you monitor for MRDL?

a. Daily
b. Weekly
c. Every time you take a Total Coliform Rule Sample
d. Every time you take a Disinfection By-Product Sample

7 If your flow into your system was 85,000 gallons per day and you desire a chlorine dosage of 2.5 mg/L, how many lbs. of gas chlorine would be required.

a. 0.85 lbs/day
b. 1.77 lbs/day
c. 2.45 lbs/day
d. 10.6 lbs/day

8 Yesterday your flow from you well was 380,000 gallons, you weigh your chlorine cylinders and find that you fed 6 lbs. of chlorine gas, what was your dosage in mg/L?

a. 3.8 mg/L
b. 1.1 mg/L
c. 2.4 mg/L
d. 1.9 mg/L

9 3 log giardia removal/inactivation requires you to remove or inactivate what percentage of giardia?

a. 99.9%
b. 9.99%
c. 999%
d. 89.9%

10 How man logs of cryptosporidium inactivation is required for a conventional surface water treatment plant using chloramination?

a. 99%
b. 99.9%
c. 99.99 %
d. 0, this facility only gets credit for removal, not inactivation

Answer Key 1) A 2) D 3) B 4) C 5) D 6) C 7) B 8) D 9) A 10) D

FY2018 AG APPROPRIATIONS BILL GAINS COMMITTEE APPROVAL

DENNIS N. DAVIS, EXECUTIVE DIRECTOR

The Senate Committee on Appropriations approved the FY2018 Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Bill with funding for programs that support American agriculture, conservation and nutrition programs on July 20, 2017.

The bill provides $145.4 billion in discretionary and mandatory funding, $4.85 billion above the President's budget request and $7.9 billion below the FY2017 enacted level. It contains $20.525 billion in discretionary funding, $352 million below the FY2017 enacted level, and includes $124.9 billion in mandatory funding. It was approved 31-0.

This appropriations bill was written to support U.S. Department of Agriculture (USDA) agriculture, rural development, conservation programs, and food and drug safety. It also provides essential nutrition assistance for children, families, and seniors.

"This bill funds many important programs that directly influence U.S. agriculture, public health, and the overall quality of life in rural America. It adequately supports federal initiatives to improve agriculture production, research and support for rural economies," said Appropriations Committee Chairman Thad Cochran (R-Miss.). "I commend Senators Hoeven and Merkley for their bipartisan work on this bill. It deserves the support of the Senate."

"Our farmers and ranchers do a tremendous job in spite of challenges from low commodity prices to natural disasters," said U.S Senator John Hoeven (R-N.D.), chairman of the Agriculture Appropriations Subcommittee. "We worked hard to put together a strong agriculture funding bill to support their efforts. This legislation maintains a robust safety net and rejects cuts to crop insurance and commodity programs, while also making strong investments in farm service programs, ag research and rural development to support our producers and rural communities."

Bill Highlights:

- Rural Development – $675.3 million for Rural Development salaries and expenses, the same level as FY2017.
- Rural Utilities – $1.25 billion for rural water and waste program loans, the same as the FY2017 enacted level; $394 million for water and waste grants, and $18 million for the Circuit Rider program. The bill also provides $6.94 billion for rural electric and telephone infrastructure loans and $30 million for broadband grants.
- Loans and grants were funded at $550,383,000 ($571,190,000 last year).
- Circuit Rider funding was increased to $18,000,000.
- Source Water Protection was funded at last year's level ($6.5 million).
- Wastewater Technicians were funded at last year's level ($20,000,000).

	INITIATIVE	FY 2017 ENACTED	FY2018 REQUEST	FY2018 HOUSE APPROPRIATIONS (REPORTED)	FY2018 SENATE APPROPRIATIONS (REPORTED)
USDA	Circuit Rider Technical Assistance	$ 16,897,000	$ 17,404,000	$ 16,897,000	$ 18,000,000
	Grassroots Source Water Protection Program	$ 6,500,000	$ 6,500,000	$ 6,000,000	$ 6,500,000
	Wastewater Disposal Technical Assistance	$ 20,000,000	$ 20,000,000	$ 20,000,000	$ 20,000,000
	Water & Waste Disposal Loan & Grant Program	$ 571,190,000	$ 600,000,000	$ 472,700,000	$ 550,383,000
	Water & Waste Disposal Revolving Loan Funds	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000
EPA	Technical Assistance and Training	$ 12,700,000	$ 15,000,000	$ 12,700,000	TBD
	Clean Water State Revolving Fund	$ 1,393,877,000	$ 1,350,000,000	$ 1,143,887,000	TBD
	Drinking Water State Revolving Fund	$ 863,233,000	$ 1,020,500,000	$ 863,233,000	TBD

South Dakota Rural Water
203 W. Center Street
P.O. Box 287
Madison, SD 57042

www.sdarws.com