Summer 2012
BlueBits
News from USABlueBook®

How far away is that storm?

Summer heat brings lots of thunderstorms. If you ever wondered just how far away the lightning is striking, here's an easy way to find out.

You see a lightning flash almost instantaneously, but the sound of thunder travels at about one-fifth mile per second.

You can therefore figure how far away lightning struck by counting the seconds between when you see the flash and when you hear the thunder. Figure about 5 seconds for each mile.

If you see the flash and hear the thunder at the same time, you know it struck in your backyard.

Of course, it's not safe to work outside near water when lightning is in the area. So get inside, sit back and enjoy the light show!

Basic Locating Techniques

Getting started with your locate

The best way to find an underground pipe or cable is to expose it, but this can be expensive, dangerous and very time-consuming. The next best method is to use a pipe and cable locator.

In most cases, a pipe and cable locator uses a transmitter and a receiver to find an underground utility. Visualize the transmitter as a radio station transmitting a specific frequency, and the receiver as a car radio receiving the signal. For the receiver to pick up the signal, the current must be able to flow from the transmitter, travel down the utility to a ground and then return to the transmitter through the soil to create a complete circle of electric current.

To help with your locate, review utility maps of an area if one is available. Water mains are typically parallel to the street. Small delivery lines (laterals, house connections) are typically perpendicular to the street. If you can identify good connection sites and develop a good circuit, locating should be accurate and easy. The better the circuit, the more signal will be transmitted on the line. Over 70% of missed locates are due to improper use of the transmitter.

Visualize the transmitter as a radio station transmitting a specific frequency, and the receiver as a car radio receiving the signal

Types of locating

There are two types of locating: **active locating** (using a transmitter and receiver) and **passive locating** (using frequencies transmitted by common sources). This article discusses active locating only since it yields the best results.

There are three types of active locating: **direct connection** (clips), **coupler induction** (coupling clamp) and **transmitter induction** (box). Of these three methods, direct connection works the best. It offers the greatest signal strength, lets you use either high or low frequencies, and lets you manipulate the grounding of the transmitter.

Direct connection locating: your best bet

To make a direct connection, clip the transmitter's red positive cord to a metallic conductor attached to the utility, such as copper shielding, a ground wire, a tracer wire, a pipe wall or a fire hydrant. NEVER connect directly to a live electric line!

Grounding is the most important factor in the direct connect method. To ground the unit, connect the black negative clip to the grounding rod or a nearby metal object such as a parking meter or street sign. A metal ground provides a focal point for the signal to travel back to the signal source, which closes the circuit. The greater the ground, the greater the signal strength.

It's important to ground away from the transmitter at a 90° angle from the line. This is because grounding away from the utility allows for a proper return path. Grounding near or over the utility may cause the outgoing signal and the returning signal to interfere. It's also important to avoid grounding over nearby utilities, which can cause the signal to return on non-targeted utilities and create ghosting or interference.

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Dry, rocky or sandy soil conditions create a poor return path for the signal. To improve grounding conditions, either pour water over the ground rod or use a larger ground rod that is deeply buried. Saltwater or water mixed with detergent are more conductive, but can harm plant growth.

Always try using the low frequency signal first. If the signal strength is weak, check the connection of your red lead. You may need to expose more cable surface area to clip to. If that doesn't help, select high power. Lastly, increase the frequency.

Coupler induction locating: using a coupling clamp

Coupler induction is used in situations where you can't use direct connection, such as on energized power lines, telephone lines that can't be interrupted, or wherever you cannot securely attach the red lead. To perform, simply clamp a coupling clamp around an accessible area of the cable or pipe. In order to create a circuit, the utility must be grounded at both the near and far ends of the pipe.

Transmitter induction locating: using the transmitter

Use transmitter induction when you can't use direct connection, when you are tracing energized primary or secondary cable, or when both ends of the conductor are grounded (common bonded). However, a transmitter-induced signal will have less signal strength, and may be present on other lines that are close to the transmitter.

To perform transmitter induction, simply place the transmitter on the ground over the pipe or cable with the arrows on the transmitter lined up. The transmitter emits a field which couples to the underground cable or pipe. The energy travels down the cable and pipe to the far end, returns through the ground and onto the utility at the near end ground.

Transmitter induction only works at high frequencies. As a result, all cables and pipes around the transmitter will carry the signal, which can make it hard to identify the target pipe.

Common problems with inductive location

Two problems can occur during inductive location. **Air coupling** occurs when the receiver is too close to the transmitter. This makes it seem as if the receiver is detecting a pipe or cable when in fact, the receiver is seeing the transmitter signal directly through the air. The solution for air coupling is to move the receiver further away from the transmitter.

Overhead interference occurs when the user inadvertently transmits the inductive signal directly onto overhead power lines through the air. Users often mistake this self-caused event as some sort of interference from overhead power lines. The solution for overhead interference is to reposition the transmitter away from the overhead lines or re-position the transmitter on its side, so that the signal does not reach the overhead lines.

A good way to check for both problems is to lift the receiver straight up in the air. If your signal strength increases as you raise it you know one of these two problems have occurred.

High frequencies vs. low frequencies

High frequencies are great at getting through different hurdles on the line. Hurdles include sheath fault, rubber gaskets on water pipes, poorly conductive cast-iron pipes, rusty pipes, poor grounding conditions and problems getting a signal on the line. However, a high frequency signal can jump to a good conductor when you are actually trying to locate a poor one.

High frequencies are required for coupler or transmitter induction—the higher energy allows the signal to jump on a line. High frequencies are not good for congested areas where many lines run next to each other, because the signal can bleed over or jump onto nearby lines. It also does not work well over long distances.

Low frequencies work well on lines that conduct easily, such as cable TV, telephone lines and power lines. They are ideal for congested areas, as they tend to hug the line and not jump onto other lines like high frequency signals do. Low frequency signals also work well over long distances. However, they don't overcome hurdles well, nor do they work well on poor conductors or for inducing.

In review

When locating, it's best to use direct connection along with low frequencies whenever possible. By adjusting the ground, you can control the amount of signal strength on a conductor. You should only use high frequencies in cases where you can't use low frequencies. Coupler induction and transmitter induction only work with high frequencies, and don't allow for much manipulation.

ASK DON

USABlueBook Technical Training Manager

A Little Known Fact

All operators know that they need to have continuing education to keep them aware of all the new rules, technologies and practices. Knowing what is coming down the pipe (excuse the pun) is essential for ensuring public health and safety.

But did you know that USABlueBook partners with both water and wastewater organizations to provide expert training in a wide variety of topics for operators? We conducted numerous trainings at conferences in 2012, as well as full day to multiday seminars across the country.

USABlueBook: not just an equipment supplier

USABlueBook is an equipment supplier, true. We also believe that service in all areas, including training, is vital to developing the long-term relationships that will improve water quality throughout the United States.

All USABlueBook training seminars are interactive and technology-based, with an emphasis on helping you develop your skills as an operator. We use nationally recognized NESHTA Certified Environmental Trainers to ensure the most qualified instruction is provided.

Have questions? We have the answers!

Come with your questions and challenges facing your system, as our instructors are skilled operators and are able to pool the resources of the classroom to ensure you'll leave the class with the answers you need.

In order to sign up for these classes, please contact your State Rural Water Association and ask for USABlueBook training in your area. For more information about what topics are available, please see the Resources page at www.usabluebook.com.

If you want additional information, please feel free to contact me, Don Van Veldhuizen at dvanveldhuizen@usabluebook.com or 503-544-0456, or LoAnn Mayer 847-377-5162.

It's a Heatwave!

Cooling bandanas are one way to keep the heat down. See page 1687 of our Master Catalog 123 for more cooling products.

Higher humidity makes working in the heat more dangerous because it slows the evaporation rate of sweating (the body's natural cooling system) down. This causes your body to retain more heat than it would in dry air.

This heat index is a measure of what the weather "feels like" to the average person for various temperatures and relative humidities. Sunstroke and heat exhaustion are likely when the heat index reaches 105°F.

Relative Humidity	Air Temperature (°F)						
	70	75	80	85	90	95	100
	Apparent Temperature (°F)						
0%	64	69	73	78	83	87	91
10%	65	70	75	80	85	90	95
20%	66	72	77	82	87	93	99
30%	67	73	78	84	90	96	104
40%	68	74	79	86	93	101	110
50%	69	75	81	88	96	107	120
60%	70	76	82	90	100	114	132
70%	70	77	85	93	106	124	144
80%	71	78	86	97	113	136	—
90%	71	79	88	102	122	—	—
100%	72	80	91	108	—	—	—

80–90°F: Caution

90–105°F: Extreme caution

105–130°F: Danger

130°F +: Extreme danger

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Look inside for:

- Basic locating techniques
- It's a heatwave!
- Continuing education for operators

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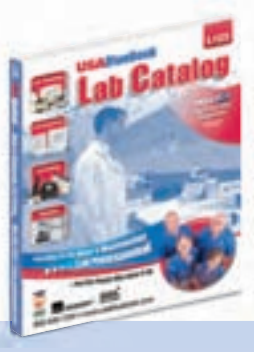
We'd like to give you $50. Just send your interesting work stories (or photos) to stories@usabluebook.com. If we print it, you'll receive a $50 gift card from giftcertificates.com or a $50 USABlueBook credit!

USABlueBook DALLAS DISTRIBUTION CENTER

Yeee-haw! Our latest DC location is in Dallas!

USABlueBook has recently opened our newest warehouse location in Dallas. With warehouse locations now in Chicago, Las Vegas, Atlanta, Boston and Dallas, you can be assured of even faster shipping times and lower shipping costs, no matter where you live in the country.



Lab Catalog 123: look for it in August!

Attention water & wastewater lab professionals: our 336-page Lab Catalog 123 has everything you need for your busy lab. It includes lab instruments, chemicals and supplies from our Master Catalog, plus dozens of new items. Look forward to it in August. Call 800-548-1234 to reserve your copy today.

Stop by and see us at the following tradeshows:

LRWA Annual Conference	Alexandria, LA	July 15-20
FVOA Conference	Algonquin, IL	Aug 16
Kentucky RWA	Louisville, KY	Aug 20-22
Oregon Assc Water Utilities	Seaside, OR	Aug 20-23
StormCon	Denver, CO	Aug 20-22
Arkansas RWA	Hot Springs, AR	Aug 26-29
Evergreen RW of Washington	Vancouver, WA	Aug 28-30
SCRWA	Myrtle Beach, SC	Sept 9-12
NYRWA Equipment Expo	Rhinebeck, NY	Sept 13
NY Watershed Conference	West Point, NY	Sept 13-14
NHRWA	Newbury, NH	Sept 1
Oklahoma RWA	Hulbert, OK	Sept 12-14
NY AWWA/Tift Symposium	Liverpool, NY	Sept 17-19
NJWEA	Eatontown, NJ	Sept 17-20
AWT	Palm Springs, CA	Sept 19-22
WaterPro	Nashville, TN	Sept 24-26
Tri-State Seminar	Primm, NV	Sept 25-27
WEFTEC	**New Orleans, LA**	**Sept 29-Oct 3**
CWWA	Bahamas	Oct 1-7
NAWC	Miami, FL	Oct 7-10
NWWOA	Wisconsin Dells, WI	Oct 9-12
Delaware Onsite Wastewater Recycling Assc (DOWRA)	Dover, DE	Oct 15-16
NJ RWA	Atlantic City, NJ	Oct 17-18