AMERICAN LOCATOR MAGAZINE

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Bore planning tools have helped Miller Pipeline simplify bore planning and have made it easier to provide customers with as-built information. Read more, p. 34.

Photo courtesy Vermeer.

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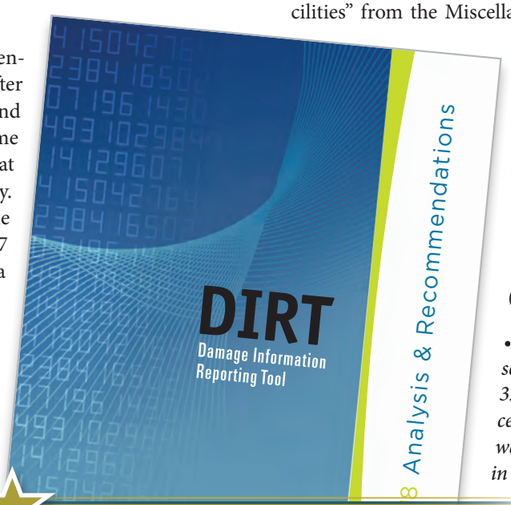
Another Day, Another DIRT(Y) Report:

Reported Damages Reach All-Time High in 2018

On September 26th, 2019, the Common Ground Alliance (CGA) released its annual DIRT report, which collected and analyzed all the voluntarily submitted underground utility damage data for the year 2018. The results, once again, were not encouraging:

"The number of damage reports entered into DIRT, both before and after applying the method to match and weight multiple reports of the same event, reached an all-time high at 440,749 and 341,609 respectively. The estimate of total damages in the U.S. increased from 439,000 in 2017 to 509,000 in 2018, representing a 16% increase."

The Report notes that damages per 1,000 one-call transmissions (the number of times an 811 center notified a member utility of someone's intent to dig) went up by 11%, from 1.87 to 2.08, as did the number of damages per million dollars of construction spending.



> "The estimate of total damages in the U.S. increased from 439,000 in 2017 to 509,000 in 2018, representing a 16% increase" *-2018 DIRT Report*

As usual, the top reported root cause category for these damages was that of "excavation issues," a broad grouping that includes everything from digging in the tolerance zone to excavating before all one-call marks have been made. The other root cause categories for 2018 played out like this:

- **Excavation issues – 31%**
- **Notification not made – 23%**
- **Locating issues – 21%**
- **Other notification issue – 13%**

The single greatest root individual cause is still "Notification not made," which has hovered around 25% for the last six years, and perhaps indicates that the 811 message has leveled off in effectiveness, or at least is not reaching everyone that it should.

These other percentages generally stayed the same as in previous years, with some numbers shifting due to re-classification of causes. For instance, damages due to Locating Issues increased, but mainly due to moving "damages relating to abandoned facilities" from the Miscellaneous group to the Locating group.

A somewhat newer feature of the report offers up some new analysis of when damages most likely occur, and while not exactly surprising, it can be used to help damage prevention groups better focus their efforts:

- *The month with the most damages nationwide in 2018 was August, with 36,571 reported events in DIRT (11 percent of all reported events).*
- *October 2018 was the month with the second-most reported damages, with 32,886 reported events in DIRT (10 percent of all reported events), as daylight waned, and colder weather approached in most of the country.*
- *Wednesday was the day of the week in 2018 when damages were most likely to occur, with 19.7 percent of reported events occurring on the week's middle day.*

Most of the reasoning behind these trends will be familiar to followers of the DIRT Report and damage prevention in general. Factors that lead to more damages to underground facilities include: increased construction spending with extended excavating seasons, cross-country 5G installations, labor shortages and high turnover rates in construction and utility locating, and widespread infrastructure replacement programs.

The President and CEO of CGA, Sarah K. Magruder Lyle, was blunt in her assessment of the challenges that we face to keep damages down: "The key findings in the 2018 DIRT Report serve as important reminders to all damage prevention stakeholders that our hardest work is still ahead of us," she said, "In short, it's time to double down on our commitment to work together to reduce damages to underground infrastructure."

"The Data Committee sorts the root causes into groups to provide a high-level snapshot of what went wrong in the damage prevention process.*

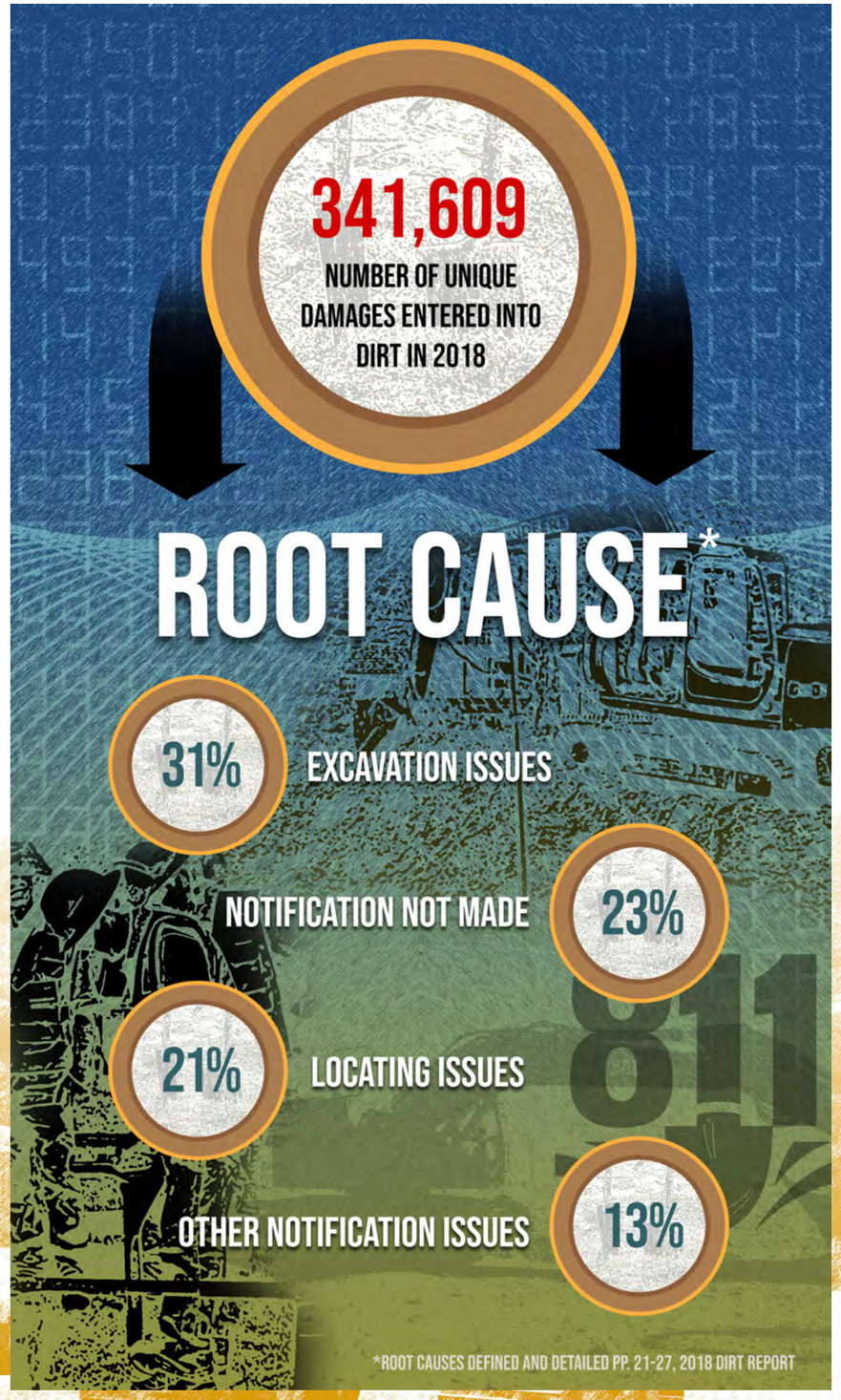
• The process starts with the excavator providing notice of intent to dig to a one call center (i.e. calling 811). Notification Not Made (same as No notification to One Call Center/811) represents damages caused by this step not being followed.

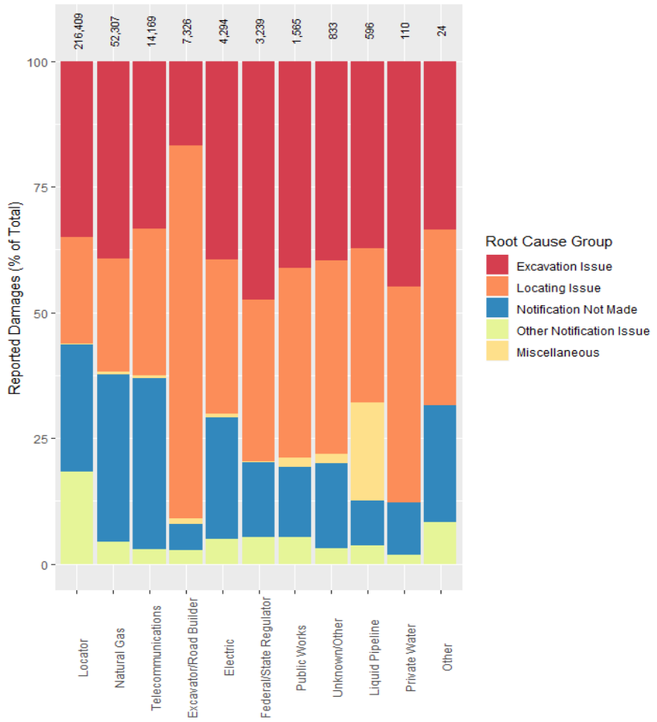
• The next step is the facility operator or contract locator accurately and timely marking the location of buried facilities. Locating Issue captures damages where this did not happen.

• Once 811 notification and marking have occurred, the next step is following careful excavating practices when digging near buried facilities. Excavation Issue captures damages where something went wrong here.

• Other Notification Issue captures situations where an 811 notification was made, but something about it was invalid."

**(p. 22 of DIRT Report, https://commongroundalliance.com/media-reports/dirt-report-2018)*





Root Cause Group by Event Source*

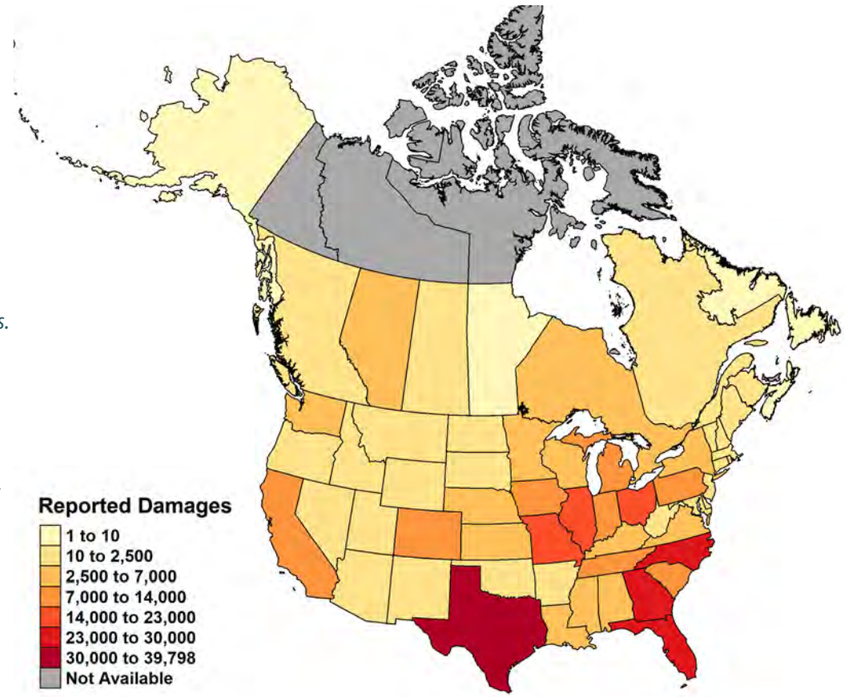
"[Figure on left] shows some significant differences in the root cause group percentages by event source (with total damages (n = xx) by event source labeled at the top of the figure). This number should be considered when interpreting the graph. For instance, the number of damages provided by Equipment Manufacturers, Engineer/Design, and Railroad (combined as "Other") is likely too small to draw any solid conclusions. The figure demonstrates that Natural Gas, Locators, and Telecommunications have similar distributions of root cause groups. For Excavators/Road Builders, Locating Issues are by far the most reported root cause group, whereas it is much lower for Locators. It should also be noted that unknown root data is filtered out, which for Excavators and Road Builders combined was 72% of damage reports. With unknown root causes included, Locating Issues would be 21% of the total for Excavators and Road Builders."

**(p. 26 of DIRT Report, https://commongroundalliance.com/media-reports/dirt-report-2018)*

Damages By Location*

"[The North American map on the right] displays ranges of damages by location as reported via DIRT. Because participation in DIRT is voluntary and varies by state, the damage ranges indicated may not provide a complete picture of damages and damage prevention efforts. Specifically, higher damages may indicate a higher level of voluntary reporting rather than a higher level of actual damages. As a result, [the map] should be interpreted as an indication of which states and provinces are providing damage reports and not an assessment of which are experiencing the most damages."

**(p. 18 of DIRT Report)* ★



CASE STUDY HDD Pulls Back 26 Ducts

When major tollways and highways expand, other utilities are impacted. Everything from storm drains, water mains and pipelines, to electric and telephone cables must be relocated out of the zone of new construction. There are times when these conflicting utilities can be major impacts on a road expansion project and add considerable time. On a recent project to relocate communication infrastructure, 26 ducts were pulled over 2,000 feet in three drill shots under a railroad, a drainage culvert and a major eight-lane tollway. This project required a significant amount of time and planning just to get started.

Left: Attaching conduits to pullback head.
Below: Managing drill mud with a hydrovac unit.

This was the case when a major telecom company awarded Electric Conduit Construction the job of relocating 26 ducts that would ultimately carry fiber optic cable. This extremely large duct package represents a very important communications link, and the project could not fail.

1. Attaching conduits to pullback head

Directional drilling an 18 inch diameter hole, near other utilities and underneath railroad tracks, is serious work. Engineered drawings were provided along with a scope of work. As a contractor, our job is to make sure that we execute the plan, follow the permit limitations and complete the project safely. This project required three separate drills, open cut work and termination of the duct package in manholes. Work areas close to moving traffic and moving rail cars required spotters and flaggers to maintain a safe work zone. Access through a park required building a mat road and restoration after the project was completed. Critical to the success of the project was the accurate location and identification of all foreign utilities. This was accomplished with preliminary locates followed by slot trenching and potholing utilizing a hydrovac unit. The utilities were then marked and the depth noted.

2. Site preparation and rig setup

Pathways for the drill and track hoes were cleared, and the surface was lined with mats. Silt fence and erosion controls were installed. The Vermeer 100 was the directional drill used on the project. It generates 100,000 pounds of pullback force and 14,000 pounds of rotational torque. This drill had plenty of power for the drilling, reaming and pullback operations.

3. Mat road to drill entry point

Pulling back 26 1½ inch ducts is risky. The alternative is multiple drills and fewer ducts on each drill. Our customer opted for a single drill and one pull. This minimized the chances for problems with the bore holes and any subsidence that might occur under the railroad tracks. We added three more ducts to make sure that if we did have a duct separation, we would still have 26 ducts to work with. The project required two months for ROW clearing, road preparation, utility location, equipment and material move in and other site preparation.

4. Conduit reels, conduit ready for pull back

The horizontal directional drill required 10 days to drill, ream and pull back 26 ducts, along with the three spares, for a total of 29 in all. No ducts separated from the reamer head, and the drills were completed successfully. The remaining open cut work and manhole work was carried on simultaneously, while the other drills were in progress. All ducts were spliced together. The project was

completed by finish grading the disturbed areas and removing mats and work zone protection structures. Actual seeding was not required due to the future road work on the site.

With new ducts in place, the way was cleared for toll road expansion to begin. Electric Conduit Construction crews carried out this work safely and on time for tollway expansion.

Project Notes:

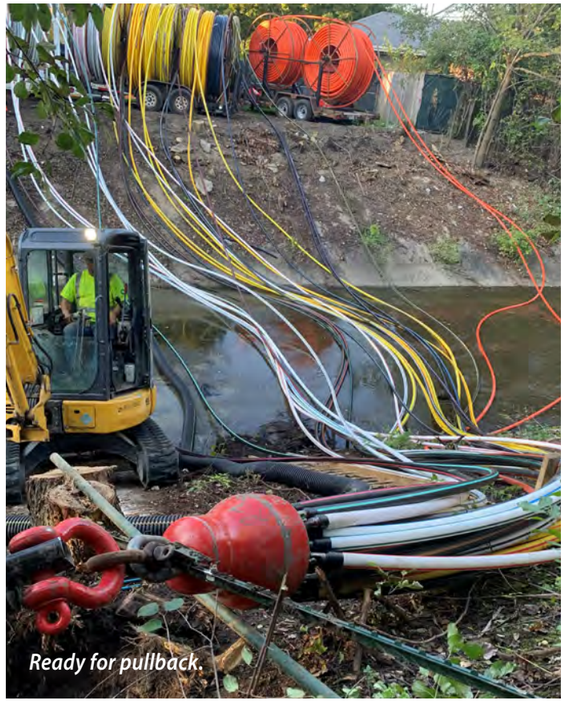
- *Three drill shots: 1,300 feet, 860 feet and 900 feet*
- *Drill and ream to an inside diameter of 18 inches*
- *Pull back of 29 1 ½ inch ducts for fiber optic cable*
- *Drill equipment: Vermeer 100*

About Electric Conduit Construction

Headquartered in Elburn, Illinois, ECC is an award winning, national utility construction company that provides turnkey construction services to build telecommunication and electric infrastructure systems. ECC specializes in start-to-finish execution of the design, build and optimization of utility networks for major public and private utility owners. ECC's work has allowed its clients to connect their existing networks and rapidly expand their utility footprints throughout the country. Learn more at: www.electricconduitconstruction.com. ECC offers a full range of construction services including: HDD, fiber optic cable placement, testing, splicing and termination; electrical work; traffic control signal work; civil work including grading, foundations, manholes and handholes. ★

Vermeer 100 drill used on the project.

Attaching conduits.



Ready for pullback.

On the Road

A Field Visit With Joink

Joink is an internet service provider that operates in Illinois and Indiana. Their headquarters are located in Terre Haute, Indiana and they've been growing for many years now, originally starting as a dial-up internet service provider before jumping to wireless. While continuing to be a big part of the modern IP-based world that is constantly evolving around us, Joink also specializes in other technologically challenging areas. "[Joink] helped develop the base code for the Asterisk open source telephony project, we were pioneers in hosted voice applications, and we jumped into hosted applications and virtualization," reads an informational section on their website. "Today, we are applying our expertise across our Midwest footprint and nationwide as we move more and more into hosted applications and telephony solutions."

In 2019, a company that provides high-speed internet, hosting services and other technology services plays an important role in everyday life. From the practicality of installing internet cables and networking infrastructure, to the intellectual innovation of the next hosting service or internet security system, it's clear that Joink's impact on the Midwest will continue to grow. Joink serves not only home users but business users as well, so they're undoubtedly counted on by many people on a regular basis.

Like other utility companies, Joink has their own installers set up the internet services for a given client. This requires them to occasionally go back and locate their own services at the different places they've been installed at. This can still present its own unique challenges, even though it is their own utilities they're locating. This year, Joink faced some difficult locate situations involving tracer wire for some of their fiber conduits they were looking for. Understanding all of the technology that is being used throughout a locate is important to understanding how to accurately complete the locate itself.

NEPTCO Trace-Safe®

Trace-Safe® is a water blocking tracer wire system from NEPTCO and is meant to make locating jobs a lot easier. It features connectors that allows you to connect the ends of the tracer wire without having to strip them, as well as a locate clip with a water blocking cover that is easy to remove any time one has to perform a locate. It saves money, eliminates many safety issues, and strengthens the signal to the tracer wire because of the way it stops water from affecting it. "Ideal for the gas, sewer, water, reclamation, and telecom markets, Trace-Safe is the only water blocking tracer wire on the market today. It features a 19-gauge solid copper conductor at its core, polyolefin insulation material, specially designed water blocking yarns and an HDPE outer jacket. This unique construction gives Trace-Safe its unparalleled tensile and break strength and ultimately extends the life of the tracer wire," reads part NEPTCO's 2011 press release of the system.

Many companies and municipalities use Trace-Safe as well, including Aqua America, a leading provider of drinking water, and XTO Energy, which uses it for both their gas and water lines. It really is one of the only tracer wire systems of its kind and was being used on the following specific locate job for Joink, which makes it even more confusing that the locates were giving the Joink workers trouble.

Assisting Joink with Locating

On this particular job, Joink noticed that a lot of the markings that were made based on what the locating instruments showed were not that accurate, with some of the readings showing that their conduit was several feet away from the marked location on the ground. Staking University and Planet Underground TV President Mike Parilac traveled down to Brazil, IN to see exactly why they were experiencing inaccurate locates. Once there, Mike had the Joink team look for both a peak and a null response from the locator. The peak and null responses were approximately three feet from each other. "Our issue with this locate is that things other than our tracer wire are also being energized. Something else made of metal is taking some of our transmitter's energy, and the field that this non-target conductor produces is affecting our field on our target conductor—the tracer wire. We call that a not-round field, and a not-round field means inaccurate," Mike told Joink personnel Timothy McCombs, Patrick McCombs, and Matt Loughmiller.

This made sense because there was a telephone duct within the vicinity of the fiber conduit they were looking for. There were multiple telephone structures that were above ground that provided a clear visual of how the nearby telephone ducts could interfere with the locate. Mike then suggested that they try to read the depth at each mark using a method called depth validation. This is where you go over one of the marks and lift the locating instrument about a foot off the ground to see if the depth reading becomes a foot deeper. The first time they tried this over one of the marks, the depth reading on the screen did not change at all, which means that the accuracy of the mark could not be trusted.

At this point, the next step was to change the grounding system of the transmitter. Initially, the transmitter was grounded to a driven four foot ground rod within the hand hole which could have

On this particular job, Joink noticed that a lot of the markings that were made based on what the locating instruments showed were not accurate, with some readings showing that utilities were multiple feet away from the actual utilities in the ground. *-PU*

Background: *Joink crews were having trouble confirming locate readings onsite. Tracer wire was found not to be the issue.*
Foreground: *Mike Parilac speaks with field team from Joink while investigating the source of anomalous locate readings.*

Top: *Mike Parilac hooks up his transmitter to test the tracer wire viability on the job, which checks out ok.*
Top Right: *These above ground telephone structures indicate the presence of parallel-positioned telephone duct.*
Bottom: *The 4-foot ground rod (left) was used before being switched with a portable ground rod (right).*

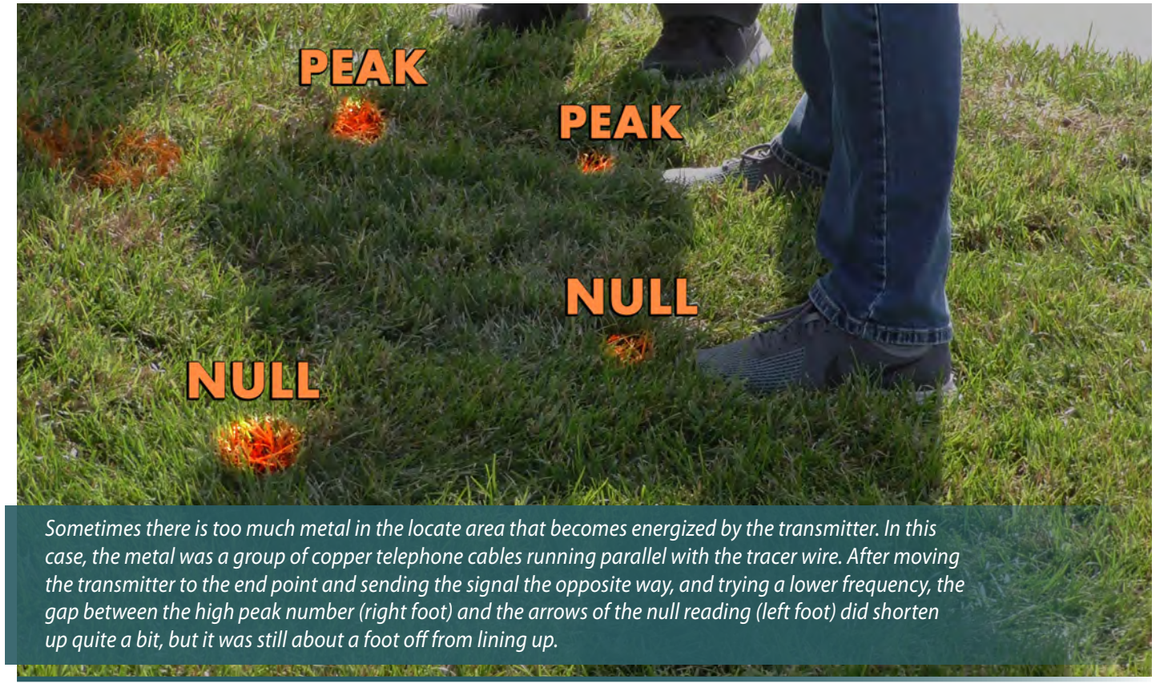
Visual graphic of the initial peak and null readings that did not match. They started out several feet apart,so the goal was to try to match them as closely as possible.

resulted in the signal latching on to cables of an adjacent phone duct that weren't being targeted. Due to less metal mass, changing to the portable grounding device that comes with the locating instrument would potentially reduce the amount of signal on the telephone cables. This procedure did reduce the gap between the peak and null response, although not by much.

The next thing tried was changing the frequency. The frequency from the first couple of tries was at 9.5 kHz, so Mike had Joink drop the frequency to 512 Hz, which was the lowest available transmitter frequency. Lowering the frequency helped, but the peak and null readings still did not line up as hoped. Mike then tried using another manufacturer's receiver set to 512 Hz. However, after trying the new equipment, it was clear that locating equipment wasn't the issue, because they both were having the same exact problem pinpointing the utility.

"We've changed the grounding system and we've changed the frequency. I'd like to move the transmitter [down to the other end] and come back and see what our results are." After moving the transmitter to the end point and sending the signal the opposite way, and trying both a higher and lower frequency, the gap between the high peak number and the arrows of the null reading did shorten up quite a bit (around four inches or so), but it was still about a foot or so off from lining up. At this point, there wasn't much else that could be done as far as changing the equipment setup. "From a direct hookup standpoint, we've done everything we can here. Nothing else to try; this is the best we can do. "But when peak and null disagree, peak is almost always closer to being right than null," Parilac pointed out to the crew.

As Mike stated previously, this is a scenario where you go with the peak reading and use that to determine where you're going



Sometimes there is too much metal in the locate area that becomes energized by the transmitter. In this case, the metal was a group of copper telephone cables running parallel with the tracer wire. After moving the transmitter to the end point and sending the signal the opposite way, and trying a lower frequency, the gap between the high peak number (right foot) and the arrows of the null reading (left foot) did shorten up quite a bit, but it was still about a foot off from lining up.

Patrick lifts the receiver to read the depth at a second elevation to validate the initial depth reading.

to mark the utility. Another thing to note in this situation, is that the tracer wire does need to be grounded properly, especially if it's being used on multiple utilities. But it was determined that it was not a problem the way the tracer wire and Trace-Safe system were installed. "I like those locates that we had on peak, but there's nothing we can do to get the null to agree with the peak, because the signal on the transmitter is getting on other things," Mike declared to them. This location proved to be as tough a job as Joink originally mentioned, but it is important to try absolutely everything you can to help prevent the signal from energizing other metal, even if it means following redundant procedures that may seem like they won't make any sort of difference. It's good to know every method and every step possible to be as sure as can be when you're on a locating job.

Joink brought Parilac to a second location down the road that was having the same issue. "I can't wait 'till you can see how far this one is off [compared to] where [the fiber conduit] is actually at," Timothy (last name) jokingly told Parilac upon arrival. The first step was exactly the same as the first location: to find where the peak and null readings were at. The crew started with a frequency of 9.5 Hz. The peak and null readings did not agree with each other and depth reading did not validate. After switching to 512 kHz, the peak and null readings agreed over the location of the conduit.

Conclusions

So after trying all of the methods that were mentioned above on two different locations in the Brazil, Indiana area, Joink was able to locate the utilities more accurately, even though it is not always going to be 100% accurate from a peak and null standpoint. The goal is to get them as close as possible, and even with the tracer wire, it can still prove to be a challenging task. The knowledge of how to improvise in these types of situations is the most important thing though, and it's safe to say that the Joink crew learned a lot from the information that Parilac gave them. "I appreciate you coming out. There are quite a few things I learned today. I especially didn't know about raising [the locator] up when I get the false read, and we've never isolated it out like that before. It was pretty informative," Patrick told Mike at the end of the lesson.

Locating utilities is an interesting job, because while the technology is a huge part of being able to be as accurate as possible, it's really only half the battle. The knowledge the user of the locator has on how to perform the best locate depending on the environment or the situation is really important as well.

Technology like tracer wire and the Trace-Safe system make things a lot easier and only help the industry, but knowing how to adjust a grounding system, validate depth by lifting the instrument, and test different frequencies is the key to making the locate as smooth and efficient as possible.

"The art of the locate" is a really crucial part to the future of the underground utility industry, because the longer time goes on, the more utilities are going to be put in the ground, which means that pinpointing/isolating the right utility will be that much more invaluable for damage prevention, protecting workers and the public. ★