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SPECIAL REPORT

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CONTRACTOR TOOLS TO AVOID UTILITY STRIKES





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STAYING SAFE BY AVOIDING UTILITY STRIKES

By Mike Kezdi

As I write this, we're halfway through 2024 and another busy construction season is in full swing. For the underground infrastructure construction industry this time of the year unofficially kicks off in April – which many refer to as Safe Digging Month, or Dig Safe Month if you're reading this Canada.

Much like April serves as reminder for everyone to call 811, request proper locates and the overall importance of working safely around underground infrastructure; this new *Trenchless Technology* Special Report focuses on the topic of avoiding utility strikes.

My colleague Bradley Kramer dives into the issue with a look at how key construction industry associations are handling educating the industry on damage prevention. Because, after all, avoiding utility strikes and damage prevention go together like 1x2 Lego bricks.

He spoke with representatives of the Common Ground Alliance (CGA), Distribution Contractors Association (DCA) and the National Utility Contractors Association (NUCA) to understand how these organizations are addressing damage prevention to their members, associated stakeholder groups and lawmakers. Check out that story starting on Pg. 4.

Next, we delve into one of the key components of damage prevention and utility strike avoidance — having concise and accurate data to go off. Special Report sponsor CUES shares a case study on how NPL, a Centuri Co., has leveraged CUES Granite-Net Gas software to provide significant ROI from the ability to centralize and control the consistency, structure and integrity of the data being exchanged throughout all levels of its gas construction program.

The study notes that, to date, NPL has inspected more than 2.4 million lf of mainline and service lateral lines in just 19 months. It averages about 130,000 lf of inspections per month, has completed more than 5,000 new gas service installa-

tions, 6,000 new meter installations and captured more than 315,000 individual GPS points to retain precise locations and depths for gas utility infrastructure perpetually in the Cloud.

But I don't want to give it all away, so scroll on over to Pg. 8 and give it a read for yourself.

I would be remiss if I didn't also acknowledge our second sponsor for this Special Report and that's Vac-Con. As everyone knows, in the last two decades, there has been a seismic shift in how utility companies mandate verification of existing infrastructure, as well as to validate horizontal directionally drilled crossings and that's via vacuum excavation.

Rounding out our coverage is a pickup from *Trenchless Technology* magazine. It offers a deeper look at the CGA's Damage Prevention Institute, which Kramer discusses in his cover story. We also look at the role subsurface utility engineering (SUE) plays in underground infrastructure construction. And more importantly, how more and more projects can benefit from inclusion of this process before and during construction.

As always, if you like what you're reading, be sure to visit trenchlesstechnology.com/subscribe, to sign up for - or renew - your free print or digital subscription to *Trenchless Technology* magazine. If you have any questions, comments or future Special Report topic ideas, don't hesitate to reach out. We'd love to hear from you.

Cheers to working safely!



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PROTECTING THE INDUSTRY

Damage Prevention Best Practices Improve
Safety, Shield Reputation

By Bradley Kramer



Damage prevention is serious business for the utility construction industry. Through education, lobbying efforts and data tracking efforts, contractor trade groups are promoting the importance of safe digging practices.



DCA delegates and other stakeholders in D.C. to advocate for damage prevention provisions within the legislation.

“The PIPES Act, didn’t touch damage prevention,” Wyman says, referring to the Promoting Innovation in Pipeline Efficiency and Safety (PIPES) Act of 2023. DCA, along with a coalition of other industry stakeholders, support the new legislation under review in the House and Senate. “What we care most about is eliminating exemptions from the damage prevention process, requiring mandatory locating of all service laterals. The bill addresses cross bores and robust locator training. We want to push operators to adopt more modern technology to locate facilities, specifically GIS. GIS mapping has been a DCA priority for a while. If we get this language in the final bills, it will do a lot to address damage prevention.”

Ron Peterson is the Claims Avoidance Program (CAP) administrator at NUCA, where he assists members with developing damage prevention programs, damage investigation processes and provides claims review. One of the biggest concerns he sees in the industry is homogeneity of rules and regulation regarding damage prevention.

“In an ever-mobile contracting environment, the lack of consistency in excavation laws and marking standards is an issue,” Peterson says. “Another issue is unbalanced enforcement of the law

We spoke with representatives of the Common Ground Alliance (CGA), Distribution Contractors Association (DCA) and the National Utility Contractors Association (NUCA) to understand how these organizations are addressing damage prevention to their members, associated stakeholder groups and lawmakers.

Sam Hall joined the CGA in 2022 as vice president to establish the Damage Prevention Institute (DPI), which provides performance measurement and accreditation for industry stakeholders (i.e., contractors, facility owners and locating companies) that follow damage prevention best practices. He explained why damage prevention is such an important topic for contractors.

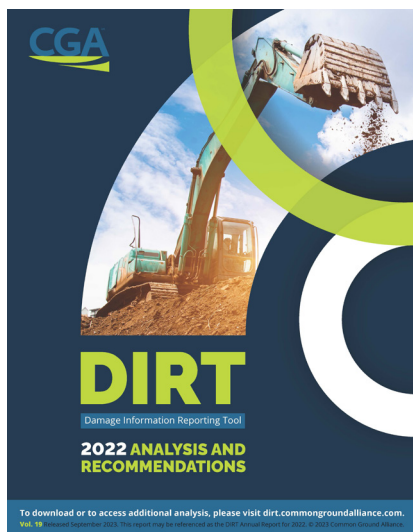
“Utility contractors are on the front lines, in the field with shovels in the ground. It’s their business,” Hall says. “Damage prevention is costly. When damage occurs, it can lead to catastrophe, if you hit a gas utility, it puts workers in danger and it leads to down time. Contractors want to make money and work safely. They want their people to go home safely. There’s also a monetary component. Damage prevention impacts the bottom line and their reputation.”

However, Hall adds that damage prevention requires all stakeholders to do their jobs correctly, from contractors providing proper training to locating companies marking facilities accurately and in a timely manner to asset owners

providing accurate maps.

Eben Wyman, principal of Wyman Associates, represents the DCA’s government relations efforts in Washington, D.C. He explains how damage prevention ties into federal legislation, such as the Pipeline Safety, Modernization, and Expansion Act of 2024 under consideration by the Energy and Commerce (E&C) Committee. The legislation would reauthorize the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the nation’s pipeline safety program. In fact, at the time of this writing, Wyman was hosting





from state to state. States with equal and fair enforcement seem to see far less utility damages.”

Both DCA and NUCA are members of the Infrastructure Protection Coalition (IPC), along with the American Pipeline Contractors Association (APCA), the National Utility Locating Contractors Association (NULCA) and Power & Communications Contractors Association (PCCA), which represents regular users and stakeholders of the nationwide 811 “Call Before You Dig” system and want it to be run safely and efficiently.

“We continue to offer training to our members on all aspects of damage prevention,” Peterson says. “NUCA also participates in the IPC. This group commissioned a study of damage prevention in all 50 states and we are using the results to help identify lapses in the system. We are also working to improve damage prevention laws across the country.”

A Map to Success

Robust and accurate facility maps are a critical tool for excavators in terms of planning and damage prevention. However, mapping is also one of the biggest areas where the industry needs to improve.

“We need better mapping, period,” Wyman says. “And that mapping is GIS. Compared to a static map, GIS maps are 3-D, digital and can be updated in real time. If you pothole a facility, you can keep updating the map in real time. Operators are finding things they didn’t know

about. As an industry, we’re getting back to addressing contractual issues to improve the process through better contract management and through implementing changes through legislations. The PIPES Act was an incremental step in improving a lot of those areas.”

Wyman helped the DCA and other industry stakeholders draft a letter to the House E&C Committee, advocating the need for improved GIS mapping for underground infrastructure.

“Standardized digital data on utility infrastructure yields better construction planning and execution by providing excavators with well-contrived designs that avoid or mitigate utility conflicts,” the letter states. “Virtual design and construction technologies eliminate potential for damages well before construction begins; moreover, these methods expedite construction, providing tremendous cost savings on projects. Consistent success is predicated upon: 1) professionally investigating and documenting existing utilities early in design; and 2) acquiring accurate digital as-built data on all newly installed and exposed utilities.”

Hall agrees that improving underground asset maps is a major priority for the industry.

“Mapping is a big part of the technology issue, and it’s not a new thing,” Hall says. “GIS has been widely available for years. Mapping is challenge for some facility operators. Maybe it’s not built into their business model, and so their maps are bad or weak. In some cases, the operators don’t want to share their maps for a variety reason, whether it’s security, competitive advantage or they’re so bad they don’t want to use them.”

Hall sees plenty of opportunity to improve maps and records in the industry, and adds that there are ways for operators to share their maps with excavators in the field where it can improve the work being done while still maintaining the security of the maps.

“It’s a powerful tool and a large part of our effort in the CGA,” he says. “Attitudes are starting to shift on the part of the owners and operators, and excavators are becoming more vocal in how maps make them better.”

Other areas of concern include stagnation and improving contracts to address



damage prevention, Hall says. Through its annual report on data collected through the Damage Information Reporting Tool — aka the DIRT Annual Report — the CGA found that damages are trending flat over the past three years of reporting, and that six root causes are driving 76 percent of all damages year over year.

“The biggest concern right now is stagnation,” Hall says. “With the six root causes, these persistent challenges continue to be biggest concern. In some cases, the companies are not calling 811. When we delve into the data, there were many drivers in why companies are not calling 811, and one of the drivers is a lack of confidences in the 811 system. Contractors often believe that when they call 811, the facilities are not going to be marked on time and not accurately, and in some cases not marked at all.”

Overcoming stagnation, Hall says, requires proper training, enhancing safety culture and improving locating and mapping accuracy. Stronger contracts could also play a role.

“Locates are funded by the facility owners, where among senior leadership, you might have executives who may believe strongly that damage prevention is their responsibility, but for whatever reason it does not trickle down to the procurement shops,” Hall says. “You often get what you pay for, and if you go cheap, then you may not get strong performances. But if have a strong contract, then I think you’ll see significant improvements. Contracts dictate performance.”

Stop, Collaborate & Listen

While there are still some concerns to address regarding damage prevention



in the underground construction realm, Hall says stakeholder collaboration has resulted in major improvements in recent years.

Hall points to the number of excavators that have joined the Damage Prevention Institute as evidence for improved

collaboration. Of the CGA's 1,400 member companies, 1,100 have joined the DPI, where the focus is on accountability. The DPI is not separate from the CGA and was established to replace the Gold Shovel Standard. The program is free to enroll for all members, and it comprises the

three primary stakeholders in the utility construction industry, including facility operators — everyone from water, sewer, natural gas and telecommunications — excavators and locators.

“One of the components of the DPI is accreditation,” Hall says. “We provide affirmation for participating companies, showing that they adhere to certain best practices under damage prevention and provided training to duties at hand.”

The DPI also has established a new peer review program, where peers in the contractor space and other organizations doing similar work conduct private, protected conversations on the challenges they face, best practices to follow and how they can enhance damage prevention.

“We just finished our first pilot peer review,” Hall says. “One member said it was like having five hours of free damage prevention work to improve safety and the bottom line.”

Hall also highlights the success of the 811 number and the positive impact it has had on the reducing damage.

“When the number first came out in late 2000s, we saw a huge improvement,” Hall says. “While it’s not perfect, it has worked. We need to continue to push on those barriers where we can to improve damage prevention.”

The increased adoption of new technologies to improve damage prevention has been another success story, Hall says, mentioning the use of more powerful locating technology that integrates GPS and GIS tools to improve accuracy as well as intelligent machine innovations that can detect when equipment is approaching a facility or out the bounds of the approved digging area. Data management software has also helped stakeholders manage assets and one-call tickets.

“The industry is collaborating and seizing the opportunity to address challenges,” he says. “We’ve seen a 50 percent reduction in facility strikes in the last five years. It’s becoming clear that communication and working together is a huge tool in preventing damage.”

Bradley Kramer is a contributing staff editor for *Trenchless Technology*.

NPL, A CENTURI COMPANY, TRANSFORMS GAS OPERATIONS WITH CLOUD SOFTWARE IN METRO CHICAGO



A Case Study Vignette

By Joe Purtell, CUES Software Division Director

NPL is a trusted provider of natural gas and construction services across North America. For just over one and a half years, NPL has been using a Cloud-based software solution to more efficiently manage its gas line locating, maintenance installation and replacement program in the greater metropolitan City of Chicago area.



After a review of multiple solution Providers with field demonstrations and pilots, NPL selected a comprehensive utility asset management, damage prevention, and construction decision support system from CUES, Inc., a sixty-year-old manufacturer of infrastructure inspection equipment, software and professional services. Cues is a subsidiary of SPX Corp, (New York Stock Exchange ticker symbol 'SPXC') which is a global leader in the Detection and Measurement space with a \$5.5 billion market cap and a singular mission to create infrastructure solutions for a smarter, more environmentally sustainable, productive future.

The synergies between NPL's mid-West region and CUES began to surface in 2021 when technologists from its parent, Centuri Group, were evaluating vendors of Artificial Intelligence (AI) software, capable of interrogating pipeline videos to look for anomalies. CUES had created AI models to use machine learning to detect defects in

CHALLENGE: Find a comprehensive, Cloudbased utility asset management, damage prevention, and construction decision support solution that can work for NPL and its community of contractors to have a single 'playbook' to work from.

pipelines. As the technologists saw the core software platform that CUES had been providing to the water and wastewater industry, they immediately saw crossover potential for NPL's operations as well. Introductions and demonstrations were made, and soon both parties were preparing for a pilot to evaluate the potential ROI of utilizing the platform.

NPL works in the metro Chicago area performing natural gas line installation, maintenance and replacement. It serves several very large gas utilities who rely on NPL to

perform a wide variety of services to ensure safe gas construction, precise locating, and state-of-the-art damage prevention.

Prior to implementing the NPL Gas solution, planning the work to be done, sending out projects to both NPL internal crews and dozens of Contractor crews, managing data collection, performing analysis and ensuring secure archival was largely a manual, spreadsheet-driven process with many portable hard drives loaded with inspection videos being exchanged.

NPL realized the need to invest in technology that would provide the ability to scale. This required a cloud-based solution so that information could be made available from anywhere to permitted users from any browser-based device. The solution needed to be highly secure to prevent malware virus attacks, offer map-driven task management and leverage affordable GPS technology to precisely tie the work performed to exact, timestamped, sub-meter locations.



What exactly does NPL do?

NPL oversees natural gas line installation and replacement throughout the Chicagoland region with over 200 miles of homeowner gas service construction activities. They ensure safe, reliable gas services to ratepayers who may have very old metal gas lines needing replacement or for subdivisions that are being installed with or switching to gas from heating oil.

NPL has approximately 100 foremen who oversee construction projects located throughout the region based on prioritized plans determined by the gas utility. NPL performs turn key services as a prime contractor for the Gas utility. In addition to having its own inspection and construction crews, NPL subcontracts work to about two dozen approved contractors who are an extension of NPL's labor force. On any given day, upwards of 200 users can be using the NPL software platform, hosted and managed by CUES on the AWS Cloud.

You may be familiar with gas construction, but if not, keep in mind that a massive amount of planning, scheduling of labor and equipment, safety oversight, and

highly detailed project management is necessary to orchestrate the full process of gas utility construction. Because installing gas pipelines underground is most efficiently done using a drilling machine, called a Horizontal Directional Drill (HDD), choosing the safest bore path for the drill is critical to success. If a mistake is made, the drill can penetrate through or damage another buried utility – like a sewer line, fiber optic line, drinking water pipeline, etc. This is called a “cross bore” when it happens, and with natural gas, it can lead to dangerous accidents. For this reason, utilities like NPL have a cross bore mitigation strategy as part of their overall integrity management program. The investment in the NPL GraniteNet Gas software platform helps NPL execute its safe construction operations program.

What does the NPL GraniteNet Gas platform do?

The GraniteNet Gas solution is a fully customizable software platform for managing infrastructure assets. There are out-of-the-box and custom forms created for inspectors to fill out information using internet-connected devices such as iPhones, iPads Android Phones, Tablets, Microsoft Surface Pro PC's, etc. NPL uses most of the forms shown here to complete specific tasks performed by many types of field crews and inspectors.

The platform provides NPL with a web app called “WebInspect” to provides mobile field users with a browser-based inspection application for performing inspections and completing tasks on virtually anything. In the NPL Gas scenario, the specific task forms are named “Prelocate Push”, “GPS



DOOR HANGER

PRE LOCATE GPS MAINLINE

PRE LOCATE GPS LATERAL

PULLBACK GAS SERVICE

POTHOLE MAINLINE

POTHOLE LATERAL

POST VERIFICATION LATERAL

HDD GAS MAIN

HDD GAS SERVICE

EXCAVATION MAINLINE

EXCAVATION LATERAL

Gas Meter,” “GPS Door Hanger,” “HDD and Pullback,” etc. Both the Prelocate Push and HDD and Pullback tasks collect video with the inspections which are uploaded to the Cloud where supervisors can analyze the media and authorize follow up tasks. For example, a new gas service installa-



tion, a request for potholing (digging), or other risk mitigation actions for detected anomalies.

Often when utilities are planning to perform work in a neighborhood or an office park, representatives will go door-to-door to let people know about planned work coming and will place a “Door Hanger” at the structure or inside the mailbox with a phone number to call if there are any questions. NPL uses GraniteNet to document where and when door hangers have been provided to parcels that will potentially be affected by upcoming gas utility work, including capturing any notes from residents about points of interest such as where they believe the existing gas line or gas meter may exist, the assumed path of the water line or the wastewater line and the cleanout location if known. NPL crews canvas the work locations with smart phones and tablets using GraniteNet Gas to record information about the Door hanger tasks. They can also capture GPS coordinates for each one left behind, as well so that parcels can be identified in maps as places where confirmed structures exist.

Next, NPL deploys dozens of CCTV contractor crews that specialize in locating buried wastewater utilities. Many water/wastewater pipelines were installed in Chicago before GPS technology was available, so the best way to locate the pipe is to insert a camera with a tracer into the line and use a detector (Locator) to physically trace the path of the line between the street and the home. Using the preferred, Microsoft-based, desktop version of software used in CCTV vehicles called “GraniteNet Basic”, NPL designed custom Pre/Post Locate task forms, complete with digital Bore Card Sketching capability, integrated Decimeter/Centimeter-level GPS software tracking for precise, archive-able line tracing and a full suite of rich, automated reporting features that can allow sophisticated Project Management and data extraction for risk analysis. To unify its contractor community, NPL determined that providing the software to the contractors at no cost to them as a SAAS (software-as-a-service) would be the most efficient way to orchestrate its entire workflow for the many specific tasks that are necessary for NPL and its specialized contractor crews to complete the cycle from “door hanger to happy ratepayer.” CUES’ experienced staff installed the software on all of the contractor CCTV vehicles regardless of manufacturer and trained the crews in a single Training Day at a local

community college auditorium with about 70 operators. NPL minimized downtime to just a single day to transform its process.

From a technology perspective, it’s important to note that the vehicle software installed includes a CUES technology called “WebSync” which uses encrypted internet connectivity to transmit inspection data and video from the field (trucks and mobile inspectors) wirelessly to NPL’s Cloud environment. There’s no need for carrying hard drives with media. Operators simply finish the inspection and the Cloud transfer begins automatically while the CCTV truck operator starts a new inspection or packs up to move to the next location. Data exchange from NPL’s contractors is seamless without data collisions because the data and media is truly synchronized with NPL’s database. The process happens in minutes so that QA/QC reviewers do not have to wait for inspectors to physically return to the office with storage drives. NPL can also immediately send out the next set of Tasks so that the following crews can initiate their work on top of what was just completed. This speeds up time to completion and reduces ratepayer inconvenience with the presence of construction crews and equipment crowding their streets.

How does NPL increase precision?

In addition to the software’s architecture, another transformational advantage offered by the solution is the ability for NPL to leverage affordable GPS technology that is integrated into NPL’s GraniteNet platform. Human error in the field involving incorrectly associated Locate data to the wrong parcel is not only the worst-case risk but is now virtually eliminated by the NPL GraniteNet platform because of its



spatial location visibility and validation. Using the real time map in the software shows field crews where they’re standing and creates a breadcrumb as they walk the parcel to shoot coordinates and depths. For example, all digital sketch & bore cards capture GPS precision metrics, including the time stamp of the capture, and “who” performed it – and for virtually any NPL task. Remote Supervisors can see on a map exactly where their crews are located to understand current status.

The savings from high resolution GPS in the field visualized by NPL’s GraniteNet Gas platform makes it possible to definitively know the proximity to known utilities – to know how close or far away an asset may be to trigger the need to hand dig a trench, dig a pothole or to know if the distance falls outside of the ‘no conflict’ zone and HDD is fine to proceed. Shown here is one of the tools used that combines a Trimble Catalyst with a depth locator and a tablet running the NPL GraniteNet gas application - to map the GPS points and depth measurement of buried sewer and gas lines.

Task: "HDD and Pullback" on GS "20231120120852-GS-5318569" of 11/20/2023 12:13 PM

Find related tasks

Task Inspection

Task Type: HDD and Pullback

Asset ID: GS 20231120120852-GS-5318569

Start Date/Time: 11/20/2023 12:09 PM

Project Name/Work order: 1211798

Created by: Robert Erickson

Creation date: 11/20/2023 12:09 PM

Asset Type: Gas Service

Status: Completed

End Date/Time: 11/20/2023 12:13 PM

ASSIGNMENTS

Code	Modifier/Severity	Direction	Distance	Service Depth	Service South Deviation	Service West Deviation	Comments
Service		From the Street	1.0 ft.	36 in.			
Service		From the Street	18.0 ft.	26 in.			
Service		From the Street	36.0 ft.	18 in.			

VIDEO (1)

GALLERY (2)

MAP

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TRENCHLESS TECHNOLOGY

10

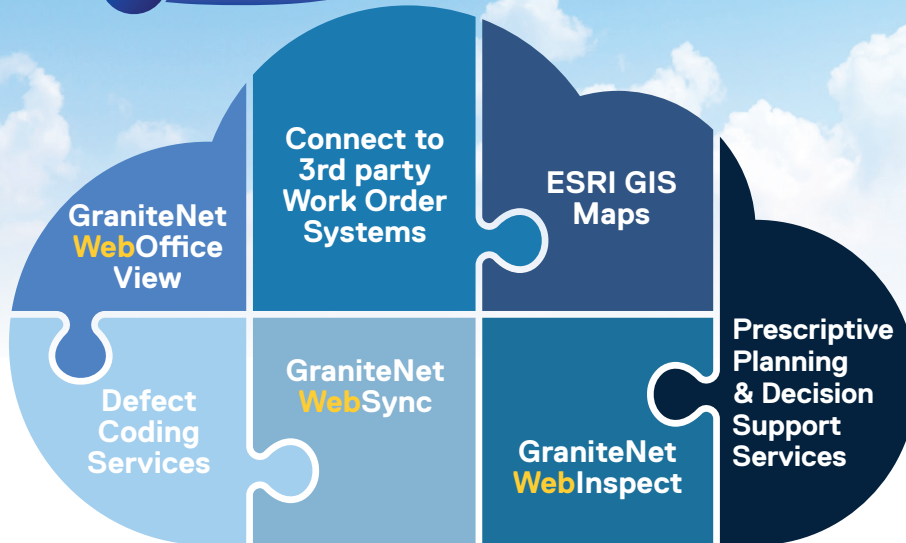
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Internet to the Cloud



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EDIT INSPECTIONS



PERFORM & VIEW INSPECTIONS /
REVIEW TASKS



FIELD INSPECTIONS



MOBILE
INSPECTIONS

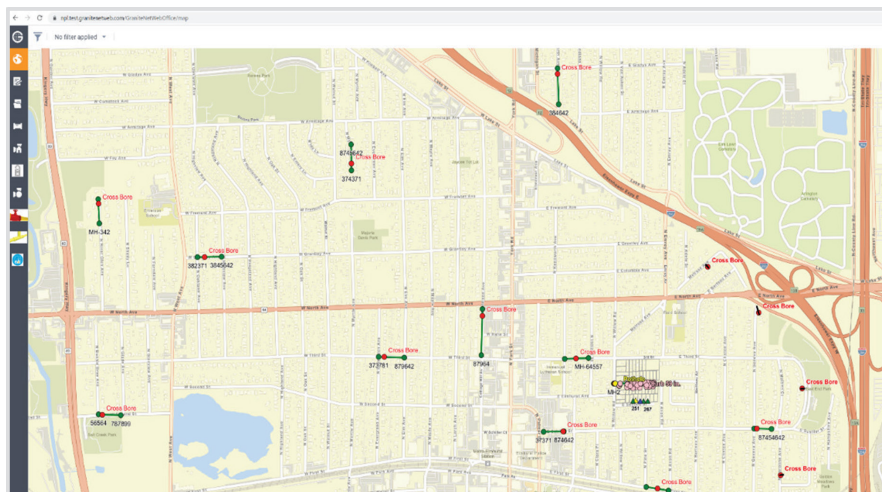
Now is the time to change how you work. Use the GraniteNet Cloud as your solid foundation for the future. Contact CUES today for a discussion and an online demonstration.

*Web Applications cost extra and require internet connectivity.



SCAN THE QR CODE TO
REQUEST A FREE DEMO





NPL makes more informed decisions about the necessity to trigger sequential follow-on task decisions. A high-accuracy locate can determine whether a proposed HDD path will be acceptable. In many cases, lack of precision causes more complex and costly construction methods – which can result in millions of dollars in unrequired costs and project completion time delays.

NPL deploys camera inspections into HDD bores in the ground to inspect them for any evidence of cross bore or other anomalies that warrant further investigation. These kinds of inspections are called “Pull Back” inspections because a specialized camera is placed onto the end of the bore (drill) and pulled back through the newly drilled future path for a new gas line connection as shown earlier in this article.

Once uploaded to the Cloud, decision makers can review the Pull Back inspection videos in near real time and, if clear, authorize them for new gas line installation to the meter at the parcel by creating the Task for the crew to complete.

Each step in the process captures detailed GPS location information, Task information, timestamps and video/still images to document NPL’s Safety Best Practices. Being able to have crews executing their respective tasks in proper sequence accelerates NPL’s time to project completion many times faster than its previous, manual process. It is driving ROI and profitability as a result.

How does NPL Manage all of the data?

With NPL’s GraniteNet Gas platform,

its users have access to data hosted in the Cloud from wherever they work by logging into an app called “WebOffice.” NPL has unlimited seats of WebOffice. For office users, it provides secure, real-time access to information and media using a browser-based connection to view inspection statuses, run queries, generate PDF/Excel reports, see dashboards, review observations/measurements/defect details, media, photos, etc. from any internet connected device. It streamlines operations by enabling map-driven views into the condition of the system, as well as the status of tasks assigned to crews to provide greater efficiency and productivity. Supervisors can see in real time where critical issues may be located to route crews that specialize in mitigation:

The NPL Gas WebOffice application also has built-in, role-based user privileges and permissions to allow advanced administrative functions to manage who can edit (modify, create, delete, etc.) data. While the Foremen and Field Supervisors have free read-only access to view information and generate reports, etc., NPL purchases a few SAAS seat licenses annually for several of their Advanced Office administration users.

Since the platform is hosted on the AWS Cloud by CUES, the service has relieved NPL of staffing database admins, maintaining servers, upgrades and patches, purchasing new computer hardware, storage systems, and other expensive and tedious IT support operations. NPL can focus on its core competency. Also, the GraniteNet Cloud SAAS federates with Google Authenticator, Facebook, OKTA, DUO, Azure AD, etc.

Conclusion

CUES offers a proven, comprehensive utility asset management, damage prevention, and construction decision support solution for infrastructure management companies. Whether it be for utilities who manage infrastructure for water, gas, fiber, electric – virtually any linear asset network – or asset managers who perform services on behalf of utilities, the GraniteNet software platform is an enterprise-wide, extensible solution used to orchestrate advanced asset management with both SAAS (hosted on AWS) and on-premise software deployments.

The NPL GraniteNet Gas software platform is providing significant ROI from the ability to centralize and control the consistency, structure and integrity of the data being exchanged throughout all levels of its gas construction program. In fact, to date, NPL has inspected over 2.4 million linear feet of mainline and service lateral lines in just 19 months. It averages about 130,000 linear feet of inspections per month which accelerates completion while incorporating safety through precision. NPL has completed over 5,000 new gas service installations, 6,000 new meter installations and captured over 315,000 individual GPS points to retain precise locations and depths for gas utility infrastructure perpetually in the Cloud. It has approximately 55,000 inspections archived that can be accessed in the Cloud with GPS, map, video, still image, and task history available with the click of a mouse.

This translates into competitive advantage for NPL because permitted users have access to information in real time to view the most current status of the tasks, see customized productivity dashboards and share infrastructure information to make quicker, more informed decisions that, in aggregate, comprise a highly efficient gas construction and cross bore risk mitigation strategy.

For more information and a live demonstration, please visit the CUES website or scan the QR code.



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WHAT IS THE DAMAGE PREVENTION INSTITUTE?

Addressing Damage Prevention's Systemic Challenges through Shared Accountability

By Sam Hall, Vice President of the Damage Prevention Institute,
Common Ground Alliance

The Common Ground Alliance (CGA) was founded on the principle that reducing damages to underground utilities is a shared responsibility among all damage prevention stakeholders. For more than 20 years, CGA has been dedicated to reducing utility damages through a variety of initiatives that raise awareness of the 811 system, collect and analyze damage data, catalog industry best practices, evaluate emerging technologies and more.

With experience spearheading countless efforts to drive down damages, CGA has found that the truly impactful solutions to damage prevention's greatest challenges only happen when all stakeholders are involved and accountable to each other.

Reducing Damages through Metrics and Accreditation

Damages to buried infrastructure can re-

sult from errors made by any stakeholder, so accountability must be shared among all of those involved, and must be measured by balanced, unbiased metrics against an established benchmark of quality and efficiency. By measuring the success of organizations involved in damage prevention and accrediting those committed to safety, we can address the systemic inefficiencies impacting the industry to improve the reliability of the damage prevention system for all of those involved.

To this end, CGA founded its newest initiative, the Damage Prevention Institute (DPI), in 2022 to foster shared accountability among damage prevention stakeholders. The DPI will act as CGA's accreditation and metrics arm, using a stakeholder-driven approach to develop performance benchmarks that reflect commitment to CGA Best Practices and dedication to proven safety measures that reduce damages.

The DPI was launched in conjunction with CGA's announced acquisition of the Gold Shovel Association (GSA) and builds upon insights from CGA's Next Practices Initiative to generate a model of shared accountability among all stakeholders. The DPI functions on the premise that what gets measured effectively gets managed effectively. Through comprehensive, impartial appraisal of all participating stakeholders, we can better understand and address inefficiencies within the system.

In the spirit of collaboration that is central to the DPI, becoming an accredited participant is open to CGA members in the locator, excavator and owner/operator stakeholder groups. Other organizations may participate; however, the DPI is currently only accrediting locators, excavators, and facility owner/operators at this time. The actions of facility owner/operators, locators and excavators all affect damage outcomes, and must be measured and evaluated without bias to significantly reduce damages to buried infrastructure.

The DPI Accreditation Process

To become DPI accredited, participants must be committed to advancing safety and demonstrate this commitment through the application of CGA's Best Practices and Next Practices within their organization. Accreditation requirements build on GSA's criteria, and include a leadership commitment to the DPI, whistleblower and stop-work authority for employees, investigation and corrective action policies and procedures, and damage prevention training for employees, among others. Organizations must also submit data to a specialized, DPI-focused version of CGA's Damage Information Reporting Tool (DIRT) so that performance and progress may be measured.

Initially, DPI's metrics are based upon



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the work of the GSA metrics committees. The metrics are intended to be tailored toward each stakeholder group and provide balanced, unbiased measurement of stakeholder performance:

- **Excavators:** Work hours damage rate and damages per 1,000 transmissions
- **Facility Owner/Operators:** Mapping quality and timeliness of map updates
- **Locators:** On-time performance and damages per 1,000 locates

As the DPI matures, the newly established DPI Metrics Committee will work to identify new and revised metrics that rely upon verifiable data. By establishing consensus-based metrics for all stakeholder groups – not just excavators – DPI will create an efficient and transparent means of measuring damage prevention stakeholder performance.

This transparency will also extend into the DPI's peer review process, which is currently in preliminary stages of development. This process will allow committed damage prevention participants to share key successes and challenges in reducing

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damages to buried infrastructure with organizations that have similar profiles, and to collaborate on industry efforts to decrease damage rates. CGA is working with other industry organizations to

understand their peer review practices, with the goal of launching a pilot of the DPI peer review process this year.

The collaboration and accountability that the DPI demands will help prevent silos within industry groups and individual organizations that have slowed progress in reducing damages. It should also increase stakeholders' adoption of strategies that are proven to drive damages down. By maintaining the vision of shared responsibility that CGA is built on, and utilizing comprehensive metrics and benchmarks to evaluate progress, we believe that the DPI is what the industry needs to bring damage prevention into a future of shared accountability.

The DPI is still in a phase of development and growth, and we look forward to sharing progress with our stakeholders and learning from everyone involved in damage prevention as we advance. If your organization is interested in participating in the DPI, visit dpi.commongroundalliance.com to learn more and begin the enrollment process.

Common Ground Alliance

CGA is a member-driven association of more than 2,700 organizations representing every facet of the underground utility industry. Established in 2000, CGA is committed to saving lives and preventing damage to North American underground infrastructure by promoting effective damage prevention practices. CGA's Damage Prevention Institute is focused on providing the industry with powerful insights and opportunities to reduce damages through a metrics-focused, peer-reviewed model. CGA has established itself as the preeminent source of damage prevention data and information in an effort to reduce damages to underground facilities in North America through shared responsibility among all stakeholders. For more information, visit CGA on the web at commongroundalliance.com.



Sam Hall is vice president of the Damage Prevention Institute, Common Ground Alliance.

SUE AND PROJECT PLANNING

Knowing What's Below Key to Avoiding Delays, Catastrophes



By Mike Kezdi

In the underground infrastructure construction world, a good proverb to adhere to is, “An ounce of prevention is worth a pound of cure.”

In this world, that ounce of prevention comes in the form of subsurface utility engineering (SUE), a branch of civil engineering practice dedicated to managing the risks of underground utilities. It goes beyond designating and locating utilities and includes the review of utility data and managing the data in the form of maps and other digital models. It is a key component in the design phase of projects.

While some form of SUE has been a component on construction projects for decades, the formalized practice of SUE didn't start gaining traction until 2002. That's when the American Society of Civil Engineers (ASCE) released ASCE 38-02 Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data.

As stated in the original abstract, “Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data presents a credible system for classifying the quality of utility location information that is placed in design plans...Whether used as a reference or as part of a specification, the standard will assist engineers, project and utility owners, and constructors in developing strategies to reduce risk

by improving the reliability of information on existing subsurface utilities in a defined manner.”

With the explosive growth of the industry since the release of ASCE 38-02, it's been updated and renamed in 2022 as ASCE 38-22 Standard Guideline for Investigating and Documenting Existing Utilities. The update also bred a companion standard, ASCE 75-22 Standard Guideline for Recording and Exchanging Utility Infrastructure Data; the former focuses on the utilities already underground and the latter establishes criteria for the new utilities going in the ground.

The Road to SUE

James Anspach, P.G. (ret.), Dist.M.ASCE, who chaired both the

writing of ASCE 38-02 and its recent update, is one of the people who has stood at the forefront of the SUE industry, and is often heralded as the father of the industry. While Anspach doesn't shy away from this title, he is fast to point out that he was not alone in this endeavor.

Anspach's journey and the roots of SUE can be traced to 1978 and his work at Heath Consultants. That's where the recent Penn State grad - with a degree in geology, geophysics and geochemistry - got his start. Heath Consultants specializes in pipeline leak detection and corrosion management and hired Anspach as a traveling consultant.

"If you want to find a leak in a pipe, you have to first know where that pipe is. In those days, knowing where the pipe is, was called witching because it was witchcraft," Anspach recalls. "I was the only geologist on staff, and I was able to say that it's not witchcraft. It is an inexact science, but it's actually an application of near surface geophysics tools to sense the presence of a pipe or linear structure in the ground."

From Heath, he went to work for Garon Stutzman, at So-Deep Inc., which was geophysical methods and air vacuum systems to measure and locate exactly where utilities were located. Anspach, intrigued by this new endeavor and new use of technologies, joined So Deep where he looked after the company's work locating underground utilities using geophysical methods. It was during his time at So-Deep, that Anspach and his colleagues honed what would become SUE and ASCE 38-02.

Anspach recalls that in 1990 he could count on his hands the number of firms doing this work, in the early 2000s that number blossomed to about 100, thanks in part to an effort by Paul Scott the Federal Highway Administration (FHWA) and, as a result, departments of transportation adopting a SUE approach to projects in their rights of way. By 2010, Anspach checked and stopped counting at about 500.

"The real touch points of the

development of the profession were developing that concept of designating, locating and data management and then adding in the utility coordination," Anspach says. "Beyond that, it was the development of ASCE 38-02 and then the development of the Utility Engineering & Surveying Institute (UESI) at ASCE. These are the lynch pins of getting utility engineering accepted as a valid field of civil engineering. There were little steps along the way that helped, but these were the big ones."

Establishing a New Engineering Practice

With the establishment of UESI in 2015, utility engineering became a recognized branch of civil engineering that focused on the cradle-to-the-grave lifecycle of underground infrastructure systems. Utility engineering, according to UESI, includes the planning, position, design, construction, operation, maintenance and asset management of any and all utility systems, as well as the interaction between utility infrastructure and other civil infrastructure.

"I can't put a number on it, but the industry has grown substantially in the last decade. It has become a well-defined industry and a service many engineering firms now provide," says Impulse Radar USA Inc. president Matthew Wolf. "We sell GPR equipment to that industry and it's been a big part of our growth in the last 10 years."

One of those department of transportation employees who was an early adopter of SUE practices is John Campbell, P.E., M.ASCE. He currently works as the Texas branch manager for T2 Utility Engineers (T2ue), arguably the largest SUE provider in North America, but before that, Campbell spent 27 years with the Texas Department of Transportation (TxDOT) as a utility engineer, director of its right of way (ROW) engineering department and then as director of the TxDOT Right of Way Division.

"My responsibilities [as director of ROW engineering] at that time were

for the existing utilities on TxDOT's 1.2 million acres of right of way property. I immediately had this concern, coming from my management background, that if I am responsible for these existing assets, I've got to have some mechanism to inventory them and know where they are," says Campbell. "That really started a personal pursuit to figure out how we could better identify where existing utilities are."

While Campbell was interested in this from a DOT standpoint, Lawrence Arcand, P.Eng., M.ASCE, was tasked with helping the industry grow in Canada. In 2003, Arcand joined the new joint venture of U.S.-based Tampa Bay Engineering and Canada-based Totten Sims Hubicki to help drum up SUE work in Canada. Known as TSH/TBE JV, it completed the first SUE project in Canada in 2002. The company would eventually grow to become T2 Utility Engineers.

"It was brand new. There was a lot of, 'Oh, we don't need to do that. We don't need SUE. We do it this way.' It was many, many years of hearing the reasons why they didn't need SUE," recalls Arcand, who worked at the JV and T2ue into 2020. He left the company and started 4Sight Utility Engineers in Ontario.

"It's grown by leaps and bounds here in Canada. It went from 20 years ago not a single soul had even heard of it, to now in Ontario it's commonplace to list SUE and the ASCE 38 standard in all major civil RFPs," he says. "It's becoming more common in other parts of Canada, particularly Alberta and [British Columbia]. There are now way more people who provide the service. It's a bigger pond with more fish."

SUE and Trenchless Technologies

As an industry, SUE has its use on any project - public or private - that breaks the ground from residential developments to new building construction and major road work to the installation of underground utilities using open cut and trenchless. It's the latter where the benefits of SUE shine.



All on the panel agree that it is of the utmost importance to know – to the best of your ability – what is beneath the surface especially when using trenchless installation methods that can go thousands of feet before seeing the light of day.

“On trenchless, SUE becomes extra important because there is no opportunity to identify anything else,” says Arcand. “With shallow trenchless HDD, microtunneling and the like, you’re boring right beside existing water, sewer and electrical. If you don’t know where that is, that becomes a pretty scary endeavor.”

So the question becomes: At what point does an owner or contractor decide that a SUE approach is needed on their trenchless project?

According to Wolf, it comes down to what level of risk the owner and/or contractor are willing to assume. It’s not a damage prevention tool, so much as it is a smart design tool, Wolf notes.

“I would argue that a SUE approach

should be used on every project. The decision must be based on the information that you have,” he says. Adding that maybe in a rural setting — where utility congestion is at a minimum — a Quality Level D approach will be sufficient. “The records might indicate there is one facility in that corridor. So, you might take a Quality Level B approach there to verify using GPR or electromagnetic (EM) systems. But do you need a stamped engineers drawing for that? Probably not.”

It’s the assignment of the Quality Levels D to A to each segment of the underground utilities, and the stamped record by a certified engineer that are the hallmarks of the practice.

“It’s the product that makes SUE different from a Call 811 product. The product you get from 811 is the response, and maybe their deliverable is paint on the ground, so you now have some indication on the ground of some utility location that is within a wide area,” says Campbell.

“Our deliverable, when you perform a comprehensive utility investigation, is the attempt to depict, document and preserve that information for later use by your client. Our product will be signed and sealed by a professional to effectively transfer that risk of the unknown of the subsurface over to the investigator. We’re a professionally licensed engineering company, so we can put an engineer’s seal on the deliverable, and the deliverable is in accordance with the ASCE 38 standard.”

Arcand adds, “In my mind, SUE is one level of protection. If a contractor is going out to build something and they don’t have accurate drawing that shows where the underground utilities are, they’ve already failed.”

He notes that the role of a locator called out on a One Call ticket should be the last level of protection as opposed to the first and only level of protection on a project. “It should be that you have an accurate drawing of what’s there. That way, the designers

can design the projects safely. Either not as close to existing infrastructure or with the necessary protection schemes in place if it is close. Then the role of the locator is to mark those points out,” he says.

ASCE 75 – The Road Ahead

With an established standard in place, it is ASCE 75 that foreshadows what is to come for the field of SUE as it is quite literally the roadmap to mapping and document the new infrastructure going in.

“The industry will always struggle until we get better utility as-built record information. There never existed any standard, in the United States, by which to record as-built information,” says Campbell. “That’s what ASCE 75 sets out to do. It was written with the understanding and expectation that the evolution in technology is such that we need to be thinking in terms of how the information we collect will contribute to a future world of 3D design and modeling of utility infrastructure.”

The standard, which draws from and expands on the Canadian CSAS250 standard, specifies essential elements for documenting the location, geometry and feature attributes of underground and aboveground utility infrastructure, with a particular focus on enabling creation of 3D digital twins for newly installed and/or exposed utility infrastructure.

“ASCE 75 is really what points us towards the future as the essential element that will contribute the most. Because ASCE 75 offers that structure of the minimal attributes that need to be captured at installation. Here are the suggested processes and procedures for doing that capture. And here is the structure that the data should be in so that it can be transferable,” says Campbell. “That to me is the most important part of it. ASCE 75 is looking to inform future investigations by incorporating that precision in the vertical dimension and gathering the data at installation.”

Arcand and Campbell both joked that if every project used SUE, eventu-



ally there would be no need for people in the SUE field. Though they – along with Anspach and Wolf – realize that there is much work to be done going forward.

“There are still people who don’t get it and can’t accept that when you run this process that there is a financial windfall downstream, but you must pay upfront to get it,” says Wolf. “The decision-makers who don’t have the foresight and don’t understand that an upfront cost can save a lot of dollars downstream – that’s the only thing slowing growth. The data is in, it makes zero sense not to use a SUE process to head-off problems.”

That’s where the panel agrees that associations and sanctioning bodies play a critical role, as a place where all stakeholders in the process can gather in a common discussion area to get this education. A few of the organizations helping educate and inform are UESI and FHWA, the American Association of State Highway and Transportation Officials (AASHTO), Buried Asset Management Institute-International (BAMI-I), Common Ground Alliance (CGA), National Utility Contractors Association (NUCA), the North America Society for Trenchless Technology (NASTT) and the Subsurface Utility Engineering (SUE) Association. Just as important are university-based activities

like those taking place at Iowa State University, where Anspach is now teaching a graduate class, developing further classes, and conducting further research and outreach.

“I think the future is in getting our younger neophyte engineers and constructors to understand the issues of utilities and give them a toolbox to work through those issues,” says Anspach. “That toolbox will be a big toolbox. It’s not just going to be contract locating for damage prevention and SUE for planning and design. It’s going to be a host of technologies that are digital, in the cloud and instant.”

With an established and updated standard, a new standard and a recognized field of practice via UESI, SUE is poised for continued growth and acceptance across North America and – in some form – across the globe.

“The common problem that we have is there are a whole bunch of utilities in the ground that are in the way of a whole bunch of new infrastructure projects, and they can create health, welfare and safety issues to the public,” says Anspach. “It’s not rocket science what we’re doing. It’s common sense.”

**Mike Kezdi is managing editor of
Trenchless Technology.**