

Building Back Better And Protecting What We've Built

*Why better damage prevention is essential today –
and its importance elevated – with the potential
for unprecedented infrastructure investments.*

Introduction

Damage prevention is the process of preventing excavation harm to underground infrastructure, like natural gas lines. Today, damage prevention is undertaken as a stakeholder process with a state-by-state approach to the rules and regulations. In short, the damage prevention process comprises the practices and collaborative efforts linking excavators and utility operators to ensure that every digging project avoids damaging sensitive subsurface infrastructure.

Nearly 30 years ago, industry and government experts estimated that the United States had 20 million miles of underground pipe, cable, and wire.¹ Since then, burying of utilities has only expanded, with millions of miles of telephone and internet cables added alongside new buried energy resource and electrical transmission and distribution infrastructure.

With so much subsurface infrastructure powering and providing the services of modern life, virtually every construction project risks injuring contractors or cutting off services to communities. When power tools strike buried pipe or other services lines, the result can lead to a loss of water, power, phone, and internet and can affect hospitals, schools, businesses, individuals, and in some cases require neighborhood evacuations. Damage incidents can also be deadly, killing excavators and bystanders.

What's more, the risk of excavation damage is increasing. For five consecutive years, excavation damage to critical underground infrastructure has been rising, leading to higher costs, more injuries, and larger populations impacted. The increasing trend is attributable in part to more subsurface infrastructure, and more critically, a failure to systemically employ best practices and innovative information-sharing tools.

While the problem is already significant, federal action may soon increase the risk. The impending infrastructure package – a multi-trillion-dollar investment – all but guarantees to exacerbate the trend in excavation damage. As construction activity ramps up, it is natural to see more excavation damage. However, data shows damage trends are now outpacing construction spending. The increasing rate of damage per dollars spent demonstrates that an influx in infrastructure spending will provoke a new surge of damage, unless systemic changes are implemented now.

Excavation damage costs the U.S. billions of dollars every year. The federal government now has an opportunity to address the trend by including language in a new infrastructure bill that incorporates more adoption of technology aimed at reducing damages into the damage prevention process. With such a provision, a high level of infrastructure spending may not lead to an higher levels of damage incidents, and Congress can safely rebuild while ensuring the protection of America's underground infrastructure, saving lives, and saving the economy billions each year.

¹ Dierker, B. (2020, August 18). *The Longest Running Statistic*. Retrieved from <https://www.aii.org/the-longest-running-statistic/>.

Why does damage prevention matter?

For each of the last five years, excavation damage incidents have continued to increase.² In 2019 alone, **the U.S. economy suffered approximately \$30 billion** in economic loss from excavation damage incidents.³

Data from years of the Common Ground Alliance’s (CGA)⁴ Damage Information Reporting Tool demonstrates a correlation between construction spending and excavation damage. In addition to this correlation, there is cause for further concern, as the rate of damage relative to construction spending has also increased. Since 2016, the ratio of damage per million dollars of construction spending increased by over 22 percent. This means greater damage is not simply a function of more construction activity but reveals a fundamental problem in the damage prevention process. If not addressed, the impact of increasing construction activity will mean that a national infrastructure package is poised to produce a surge in damage.

The currently flawed damage prevention process has been described as needing “systemic improvement” and “comprehensive change” by an industry association with day-to-day interaction with the system.⁵ That is because despite best practices and innovative technologies being widely known and

available, neither are being implemented at high enough rates by stakeholders.

The traditional responses to issues in the damage prevention system have been to cultivate voluntary standards or add capacity, rather than adopt proven technology systemwide. These responses of refining voluntary best practices or hiring more locators to mark utilities have not decreased damage, as five consecutive years of rising damage proves. The stakeholders have, by and large, not adopted technological solutions, allowing innovative tools and information sharing to replace reliance on voluntary adherence to best practices. Innovative tools are available now with demonstrated ability to reduce damage by up to 67 percent, yet are not systemically implemented.⁶

This issue is important, not only *because* damage happens, but because of what that damage is and who it impacts. Excavation damage in the U.S. is estimated to cost up to \$100 billion in total annual economic harm.⁷ The direct and indirect costs of damage include deaths, injuries, economic losses, business harm, and interruption of critical services like water, gas, and electricity. These harms can be widespread and affect people with no involvement in the construction process – innocent bystanders, neighbors,

² Common Ground Alliance. *Damage Information Reporting Tool, Volume 16*. (October, 2020). At p. 2.

³ *Id.*

⁴ CGA is a member-driven association of nearly 1,700 individuals and 250 member companies in every facet of the underground utility industry.

⁵ *Supra* note 2.

⁶ United States, Department of Transportation, Pipeline and Hazardous Material Safety Administration. *A Study on Improving Damage Prevention Technology*. (2017). Retrieved from <https://www.phmsa.dot.gov/news/report-congress-improving-damage-prevention-technology>.

⁷ Zeiss, G. *Reducing Damage to Underground Utility Infrastructure during Excavation: Costs, benefits, technical advances, case studies, and recommendations*. (2020, April 16). Retrieved from <https://energycentral.com/c/pip/reducing-damage-underground-utility-infrastructure-during-excavation-costs>.

businesses, consumers, and first responders. On top of the risk to human life is the environmental harm caused by excavation damages. When damage occurs, hazardous material may leak, contaminating or disrupting communities and ecosystems.

Who can fix it?

There are three groups responsible for carrying out and overseeing the damage prevention process: stakeholders, state governments, and federal officials. The stakeholders include all of the industry participants excavating, locating, or operating utilities, and the One-Call centers that facilitate communication between them. State and federal involvement includes both legislative and regulatory oversight.

The three approaches for change as we see them are: **(1)** promulgation of better standards by stakeholder groups and One-Call centers that are systemically adopted by industry participants; **(2)** states updating their laws to require available technology and certain vital best practices in the damage prevention process; and/or **(3)** the federal government enforcing a minimal standard across the country for the use of certain proven damage-reducing technology.

Stakeholder Involvement. The current stakeholder process has been ineffective at reversing the trend in damage incidents. Each stakeholder group has a different level of power, influence, and incentives to address excavation damage. This has led to imprecise best practice statements,⁸ hesitance for

reform, and lack of information sharing where it is most needed – at the excavation site.

Excavators, from homeowners to contractors, enjoy free underground utility locating services. Excavators call or electronically notify their regional One-Call center about a planned dig at least two days prior to breaking ground. The One-Call center inputs the dig site into a mapping database that includes identification of underground utilities that may be impacted. If the site and utility maps overlap, the One-Call center sends notifying transmissions to all implicated utility owners or operators. These transmissions cost around a dollar to the receiving utility.⁹ An average excavation notice may result in around five transmissions (i.e., a transmission for each of gas, water, telephone, power, etc.). The receiving utilities then send in-house or contract locators to the site to locate subsurface facilities and mark the ground with paint and/or flags for excavators to see before they dig.

These markings on the ground are often all an excavator sees before breaking ground. “It is a common practice for utility operators and contract locators to capture...enhanced information about locates”¹⁰, including photos, virtual manifests, facility maps, and ticket information, but this enhanced information is not passed on to the excavator.

Systemic improvements are difficult, because excavators use the system for free and have little power to cause the other stakeholders to provide better information. Utility owners likewise cannot cause excavators to notify

⁸ *Supra* note 2 at p. 2, 25-30.

⁹ See Colorado 811. \$1.32 in Colorado. Retrieved from, <https://www.colorado811.org/member-services/#1548233396630-30510c72-b1cf>. (Some utilities may pass these fees on to the rate payer through utility bills).

¹⁰ CGA Best Practice 3.31. Retrieved from <https://bestpractices.commongroundalliance.com/-3-One-Call-Center/331-Enhanced-Positive-Response>.

One-Call centers before breaking ground or to premark (or “white line”) the exact excavation site. Further, utilities pay for the system, effectively running it by funding the One-Call centers, and may be incentivized to keep costs as low as possible. Reforms that would threaten jobs or add costs to implement may not make business sense, leaving the stakeholder process to make marginal improvements like revising best practices or advertising the call-before-you-dig phone number (8-1-1). These changes generally address symptoms of the problem rather than the underlying systemic issues leading to higher damage trends.

A truly systemic reform from the stakeholder level may look like a robust certification process, where stakeholders from excavators to locators and utilities are certified in the regular use of best practices, including use of available technology. Additionally, robust sharing of information through One-Call centers would level the informational asymmetry and alleviate confusion at the dig site over the presence and location of underground infrastructure. Despite many recommendations from other groups, the stakeholder process has not made the changes necessary to reverse the trend in damage.

State Involvement. Improvements and oversight at the state government level have been slow and minimal. In addition, this oversight varies from state to state. In the last four years, few states implemented new laws or regulations specifically aimed at facility safety and decreasing excavation damage.¹¹ Improvements that were made, like use of electronic positive response systems, are

often left to voluntary adoption by industry participants or are unenforced, leaving vulnerable excavators at the discretion of the locators or utility operators choosing to share information.

State governments, which range from part-time to full-time professional legislatures, have not made protection of existing underground infrastructure a priority. Many state authorities may view the implementation of 8-1-1 nationwide and state-level One-Call centers in the last several decades as significant enough steps that additional reforms are low priority or unnecessary.

Given the worsening trend in damage, and lack of progress by stakeholders themselves to reverse it, states have a duty to step in, by establishing and enforcing new minimum standards. These standards should encourage information sharing and require the use of innovative technology, as this has been shown to reduce damage more than any other approach and represents the least intrusive option, while having the greatest impact on damage reduction.¹²

Federal Involvement. In 2017, the federal Pipeline and Hazardous Materials Safety Administration (PHMSA) delivered a report to Congress titled “A Study on Improving Damage Prevention Technology” in which the agency tasked with overseeing pipelines and damage prevention from the national level recommended technological improvements to the current system. The number one recommendation in the report was to “develop collaboration and communication tools to foster better communication between

¹¹ Aii. *2020 Damage Prevention Report Card*. (October, 2020). <https://www.aii.org/wp-content/uploads/2020/10/Aii-2020-Damage-Prevention-Report-Card.pdf>.

¹² *Supra* note 6.

the excavator and pipeline operator throughout the excavation process.”¹³ This technological approach – rather than a human approach – would be a systemic shift for the damage prevention system by allowing information sharing directly with the excavator.

The PHMSA report stands as a testament to the importance of technology. Rather than focusing on minor system tweaks, like hiring new personnel, cultivating best practice statements, or improving trainings, the report highlights innovative tools, techniques, and technological approaches to address the problems inherent to damage prevention.

With the prospect of a federal infrastructure investment, the time has never been riper – nor the need more vital – for a damage-mitigating policy to be implemented alongside a rebuilding effort. Doing so in the form of a technology threshold would be consistent with the recommendation of PHMSA. Including a technological damage prevention provision in an upcoming infrastructure bill or package presents an opportunity not only to protect our existing infrastructure, but to prevent foreseeable damage that would arise from upcoming infrastructure investments.

What does an infrastructure bill have to do with damage prevention?

All else being equal, data suggests that current trends will mean more excavation damage per dollar of construction spend this year than the previous year and so on until something changes. We know the costs of

damage incidents are enormous – tens of billions of dollars each year in harm, loss, and destruction. This demands a solution.

Now, we are faced with an existing crisis on the one hand and a proposed action that could aggravate existing damage trends on the other. The current administration has made it a priority to *build back better*. That means taking steps to revitalize and build up U.S. infrastructure. Damage has historically correlated to construction activity, and recently data demonstrates damage per dollar spent on infrastructure work has increased, with damage incidents even rising against a backdrop of virtually flat spending.

The potential of a massive multi-trillion-dollar infrastructure package will mean new construction activity across the country. Because building projects involve breaking ground, that may mean risking harm to existing underground infrastructure on the path to building up new infrastructure. In order to avoid taking two steps forward and one step back, Congress must ensure that technology is incorporated to bolster the damage prevention system.

In addition to the loss of human life and physical damage to property, excavation damage can be environmentally hazardous and may impact low-income and urban environments disproportionately due to higher concentrations of natural gas distribution infrastructure in urban areas.¹⁴ By incorporating innovative technology, we can prevent damage, reduce methane and hazardous material leaks, and prevent critical service interruptions for the most vulnerable.

¹³ *Supra* note 6 at p. 5.

¹⁴ Of the 2.8 million miles of pipeline in the U.S., approximately 2 million miles are natural gas distribution lines, which run short distances to end users, primarily in urban and suburban centers.

There may also be additional benefits of using innovative technology, such as the reduction or elimination of truck rolls to the excavation site thereby reducing carbon emissions.

Additional areas to explore

Excavation damage has a broad societal impact, not only costing human lives and economic value, but also leading to indirect harms affecting people, communities, and the environment. The data speaks for itself, and regardless of one's framework or worldview, damage prevention is a worthy endeavor.

Whether approaching improvement in the damage prevention process in order to save lives, promote efficiency, or to achieve social justice, each framework will lead to the same conclusion: we can and should do better.

While some may assign different value to reforms in the system – like reducing economic losses or dismantling power disparities – there are important questions to explore and research. These include: what specific communities are being impacted by excavation damage; are financial interests of the stakeholder groups getting in the way of effective damage prevention reforms; does an imbalance of power and influence benefit certain stakeholder classes at the expense of others?

As we study excavation damage, new data points are always valuable. To understand why changes are not being made and who is impacted by them, we must continually ask new questions. This will help us not only underscore the importance of damage prevention, but identify which technologies and innovations are best suited to improve areas of the system.

Recommendation and Conclusion

Congress must tackle the rising excavation damage crisis facing the nation. Whether through stand-alone legislation or regulations, a federal solution is the most practical approach to reduce damage and reverse the current trend, because it addresses the entire nationwide trend of rising damage. In 2017, PHMSA recommended several technological approaches to Congress in an effort to address increasing damage incidents. Among the recommended technology was one practice, Enhanced Positive Response (EPR), proven to reduce damage by 67 percent. While systemic incorporation of technology is not the only improvement needed, it must be included in a federal infrastructure package.

The impending infrastructure focus comes in the midst of a five-year trend of increasing damage. The need for infrastructure spending has been a long time coming, but we must recognize that excavation damage is correlated to construction spending. In order to take a stride forward and strengthen America's infrastructure, we must protect the nation's existing underground infrastructure that provides the energy, resources, and services we rely on every day.

Congress must act and seize on this opportunity to ensure that any infrastructure or surface transportation package intended to build back better starts with a provision to improve the current damage prevention process. This will help safeguard the environment, protect the vulnerable, and encourage and unleash innovation and technology to solve problems and create value for America and the world.



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About Aii

The Alliance for Innovation and Infrastructure (Aii) is an independent, national research and educational organization that explores the intersection of economics, law, and public policy in the areas of climate, damage prevention, energy, infrastructure, innovation, technology, and transportation.

The Alliance is a think tank consisting of two non-profits: the National Infrastructure Safety Foundation (NISF), a 501(c)(4) social welfare organization, and the Public Institute for Facility Safety (PIFS), a 501(c)(3) educational organization. Both non-profits are legally governed by volunteer boards of directors. These work in conjunction with the Alliance's own volunteer Advisory Council.

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