Unseen Threats to the U.S. Economy

The importance of damage prevention for saving billions in preventable harms

Introduction

The United States is home a dynamic and powerful economy, generating over $20 trillion in value every year. Despite its economic strength, there is both greater potential for economic growth and potential to remove economic harm by improving the protection of buried infrastructure during excavation.

Problem

Every year, over 500,000 excavation incidents occur in which a pipe, cable, or wire is damaged or severed during excavation. These incidents create drags on the economy that include both direct and indirect harm to individuals and communities. The direct losses relate to infrastructure and repair costs, lost product like oil and natural gas, lost productivity for businesses, and litigation. Additional rippling impacts capture community and regional economic harm such as medical bills associated with injury and death, loss of service and lost productivity, traffic and detours around incident sites, and delayed construction timelines due to the inciting incident, repair, and remediation.

Estimates for the total direct and indirect economic harm from excavation damages amount to as much as $100 billion annually.[1,2] These costs are nearly five-year-old estimates, which puts them before historically high national inflation and new record high excavation incident numbers.[3]

The above costs related to excavation damage – the economic harm done by striking buried infrastructure and social impacts from it. Perhaps counterintuitively, another distinct economic drag comes from the damage prevention system itself that exists to protect both workers and buried infrastructure. Inefficiency and waste within that system adds up to an additional estimated $61 billion[4] every year. Unique from the direct and indirect damage costs, this economic drag is tied to miscommunication, unnecessary locate requests or site visits, and reliance on physical processes instead of virtual processes where applicable.

Altogether, the top end estimate means that as much as $161 billion in economic harm is attributed annually to the damage prevention industry – from both the system itself and failures of the system when excavation damage occurs.

---

[1] Common Ground Alliance. (2020). *DIRT Annual Report for 2019*. Volume 16. https://commongroundalliance.com/Portals/0/Library/2020/DIRT%20Reports/2019%20DIRT%20Report%20FINAL.pdf?ver=2020-10-14-185343-180. (While this report provides an estimated range of $12b to $60b, and a median value of $30b, these estimates were produced when damage rates and inflation were significantly lower).

[2] Zeiss, G. (2020). *Cost of underground utility damage represents a major drag on national economies*. Between the Poles. https://geospatial.blogs.com/geospatial/2020/04/cost-of-underground-utility-damage-represents-a-major-drag-on-national-economies.html. (This source indicates estimated damage costs for the U.S. from $50b to $100b.)

[3] Dierker, B. (January, 2023). *Improving Upon Our Dig Laws: Why Data Must Take Center Stage to Reform Damage Prevention.* Alliance for Innovation and Infrastructure. https://www.aii.org/wp-content/uploads/2023/01/Improving-Upon-Our-Dig-Laws-2021-Data.pdf.

[4] Infrastructure Protection Coalition. (2021). *811 Emergency: $61 Billion Lost to Waste, Inefficiency in System to Protect Underground Utilities*. https://www.ipcweb.org/images/reports/US-RPT.pdf.

Over a ten-year period, this is $1.6 trillion – the size of some of the largest federal spending packages. The latest major legislative package at this scale was the Infrastructure Investment and Jobs Act, which is aimed at improving and building American infrastructure. Because there is a correlation between construction spending and excavation damage, in all likelihood, part of the benefit of this very legislation will be lost as a result of greater excavation damage and costs. This means that while the current state of the problem is staggering, it could grow, causing ever greater economic harm and drag.

Potential Improvement

The act of calling 811 to notify one-call centers about a pending excavation project is critically important. Within that system, however, a number of reforms should be adopted to reduce the waste and inefficiency of the damage prevention system itself as well as to lead to a reduction of damage per dollar of construction spending.

To achieve these cost savings and to streamline the process, the industry will need to embrace systemic use of technological best practices. In particular, the use of virtual processes that can prevent unnecessary site visits, improve communication, and reduce informational asymmetries to improve excavation safety. Fortunately, two basic options can achieve both efficiency and damage avoidance.

While calling 811 puts utility companies on notice that digging is taking place near their infrastructure, it still leaves opportunities for miscommunication and error. Notification made directly on the one-call center website – rather than by phone through the middleman of a one-call center – may help improve the precision of excavation notices. Web-entry tickets have been shown to reduce damages by half relative to notice made by phone when excavators are able to draw their dig site on a map.[5] And when it comes to economic costs, halving potential damages translates into costs saved. The use of web-entered tickets has also enabled one-call centers to reduce overhead and operate with fewer well-trained staff.[6]

A key enhancement to the needed shift toward web-entry tickets is the process of electronic white-lining (EWL), or pre-marking of the dig site on a virtual map. This unlocks the full potential of web-entry notification to streamline the process, eliminate waste, and narrow the scope of the dig site to further reduce the potential for damage. Electronic white-lining gives excavators the opportunity to draw the exact parameters of their project on a visual representation of the site rather than describing it over the phone, which can lead to miscommunication. EWL prevents unnecessary and repeat site visits by excavators and locators, sparing financial resources and improving the efficiency of the process.

Because it provides locators with narrower and more precise dig sites, EWL has been identified by stakeholders as the reform with the greatest return on investment.[7] Stakeholders and

[5] Dierker, B. (2022). *Safer Digging Part 2: Click don't Call*. Alliance for Innovation and Infrastructure. https://www.aii.org/safer-digging-part-2-click-dont-call/.
[6] *Id.*
[7] Common Ground Alliance. (2021*). Next Practices Initiative: Pathways to Improving U.S. Damage Prevention*. https://commongroundalliance.com/Portals/0/Next%20practices%20Pathways%20Report%202021_FINAL4.pdf?ver=2021-10-12-180926-957.

regulatory agencies also elevate EWL for both improving efficiency and preventing damage.[8] These cost-saving impacts tackle economic concerns from both ends.

Another well-established technique that does not require systemic overhaul of the system is the use of enhanced positive response (EPR) by locators. When an excavator calls 811 (or enters a web ticket), utility companies receive a notice and send locate technicians to the site to identify and spray paint the path of subsurface facilities. A *positive response* is when the locator then passes along to the excavator information that their job is completed. An *enhanced positive response* follows this same process, but includes the locator sending the excavator digital photographs of their completed site markings, ticket descriptions, manifests, and in some cases, facility maps so that the excavator has a more robust set of resources to ensure that as they dig they can cross reference information to avoid striking pipes, cables, and wires that may be below the surface. Enhanced positive response was found to reduce damage by upwards of 67 percent[9] in pilot projects validated by the Pipeline and Hazardous Materials Safety Administration under the U.S. Department of Transportation.

In addition to the 67 percent reduction in damage – which directly translates to reduced damage costs – EPR users explain how the best practice improves the broader damage prevention system. Of the excavators surveyed, 92 percent indicated that it improved job efficiency.[10]

Trade groups like the Common Ground Alliance and the Infrastructure Protection Coalition along with various state and federal authorities point to technological best practices like electronic white-lining and enhanced positive response to help prevent damage and improve efficiency. However, as these parties also agree, the use of these technologies is not yet widespread or systemic, leading to continued damages and leaving money on the table.

As the nation increases its electrification and infrastructure build-out, it is desirable to incorporate proven technologies and best practices into the damage prevention process, protecting the nations underground infrastructure. It should not go unstated that when buried infrastructure is protected, greater economic potential is possible with citizens and businesses having uninterrupted access to power and internet services able to engage in and with businesses and generated new value. The technology and practices are on standby to unlock this reality, but are not yet being used systemically.

[8] Pipeline and Hazardous Materials Safety Administration. (2007). *Virginia Pilot Project for Incorporating GPS Technology to Enhance One-Call Damage Prevention Phase I – Electronic White Lining*. https://primis.phmsa.dot.gov/comm/publications/Virginia_Pilot_Project_Report_Phase_I.pdf.
[9] Pipeline and Hazardous Materials Safety Administration. (2017). *Report to Congress on Improving Damage Prevention Technology*. U.S. Department of Transportation. https://www.phmsa.dot.gov/news/report-congress-improving-damage-prevention-technology.
[10] Brown, S., Fordham, T., Crawford, D., & Peterson, R. (2014). *Enhanced Positive Response Pilot*. Washington Gas, UtiliQuest. https://commongroundalliance.com/sites/default/files/EnhancedPositiveResponsePilot_June2014.pdf.

Conclusion

The dynamic U.S. economy is constantly growing to serve ever greater populations. This growth drives the creation of more buried infrastructure as well as more construction activity, which each correlate to the possibility of increased damage to the nation's critical infrastructure. Costing the U.S. economy as much as $161 billion every year in damage and inefficiency, reform to the current system and processes will be needed to safeguard the nation's infrastructure and to protect our economy. Fortunately, existing technology and practices are available to be implemented to reduce these damages and streamline costs associated with damage prevention to save money and promote efficiency.

Author

Benjamin Dierker, JD, MPA
Executive Director, Alliance for Innovation and Infrastructure

For more information or inquiries on this report, please contact the Aii Media Coordinator at info@aii.org

Recommended Citation for this report

Dierker, B. (April, 2023). *Unseen Threats to the U.S. Economy: The importance of damage prevention for saving billions in preventable harms.* Alliance for Innovation and Infrastructure.

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.

Board of Directors