

IPC White Paper

The Damage Prevention Challenge:

Opportunity to recover \$61 billion lost to systemic inefficiency and waste while protecting underground utilities from damage

Infrastructure Protection Coalition • www.ipcweb.org



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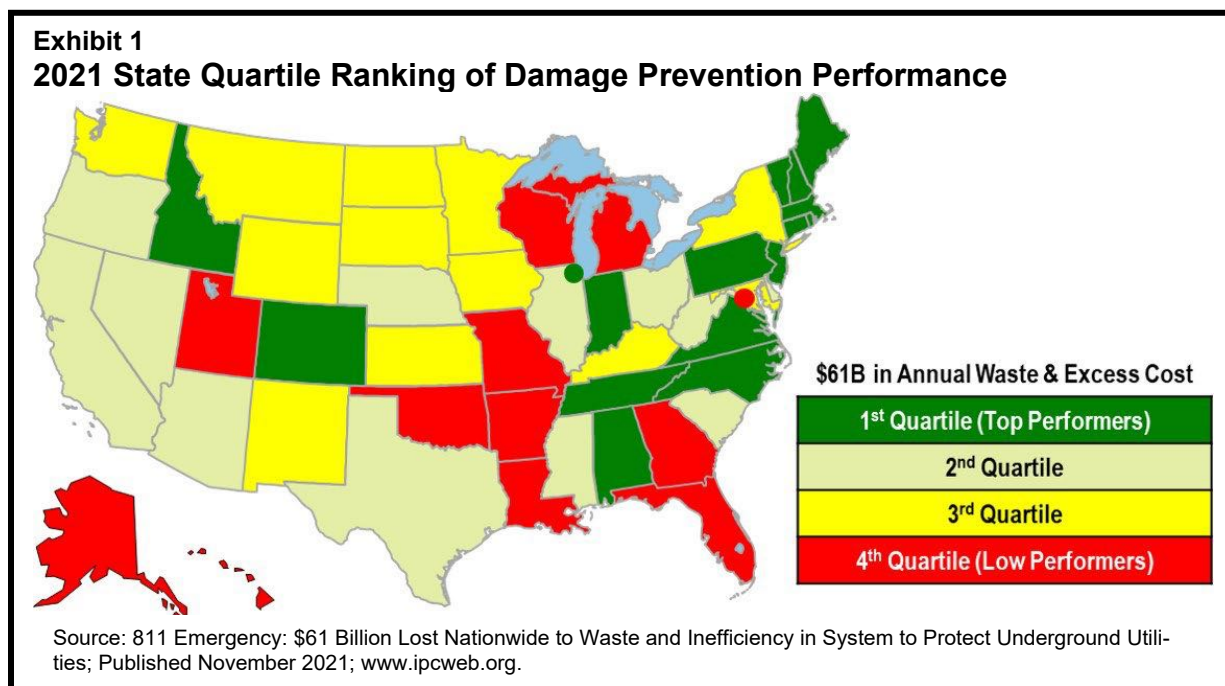
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SUMMARY

Damage Prevention Failure: \$61 Billion Lost to Waste and Inefficiency in System to Protect Underground Utilities

It is widely publicized that failures in the nation’s damage prevention system used to prevent damage to underground utility lines are historically responsible for over \$30 billion in annual societal and utility line damage costs¹. This already staggering estimate was compounded further by a 2021 study that estimated that these system failures are responsible for an additional \$61 billion in annual waste and excess costs², thus creating excessive but preventable hazards for public safety, as well as excessive cost to rate-payers, particularly in states where the implementation and accountability are most lax. (Exhibit 1)



The 2021 study was commissioned by the Infrastructure Protection Coalition (IPC), a group of associations representing broadband, electric, natural gas distribution, liquid/gas pipelines, transportation, sewer, and water industries who design, construct, maintain, or locate these underground systems, with both union and non-union workforces. These associations represent key damage prevention system stakeholders who want to see the system run safely and efficiently.

This comprehensive, independent review of the nation’s damage prevention system – including an in-depth examination of its effectiveness in every state, Washington, D.C., and the city of Chicago – shows that these costs and the increased risk to public safety could be substantially reduced if states adopted more effective damage prevention practices and procedures.

The study comes at a critical time for the nation’s infrastructure as the passage of the national infrastructure bill will result in tens of thousands of miles of traditional highway, bridge, road, broadband, and water & sewer infrastructure construction along with new underground electric and CO2 and hydrogen pipeline and storage facilities, all of which will be near existing underground utilities.

¹ www.commongroundalliance.com/dirt-dashboard

² www.ipcweb.org

The study identified and defined 13 recommendations proposed for selected implementation on a state-by-state basis that would eliminate \$40 billion in damage and waste over a 3- to 5-year timeline. The performance value of these recommendations outweighs the “putting-into-practice” cost by a factor exceeding 30x over the 3- to 5-year implementation timeline.

Regardless of where or how these costs originate, they migrate over a 3- to 5-year timeline toward the most professional excavators and locators and by default to their utility customers, who are primarily the highly regulated electric and gas utilities, and ultimately their rate-payers.

Change is a follower of action...the overall magnitude of risk to public safety as well as the steep cost of the system failures, dictate that action be taken now. This can be accomplished through legislative efforts at both the state and federal levels. In addition, government agencies responsible for oversight activities, such as the Pipeline and Hazardous Materials Safety Administration (PHMSA), should carefully consider the positive impact of these 13 recommendations with implementation and enforcement.

INTRODUCTION

Each year, hundreds of thousands of damages to underground utilities occur, generating billions of dollars in societal costs. The ever-increasing number of excavation projects nationwide, most often within already overcrowded underground environments, place never-ending pressures on all stakeholders, requiring them to work smarter and continually seek performance improvements that will reduce incurred risks and liability that come from damages to buried utility infrastructure.

Can a trillion dollars in excavation be completed without damaging existing infrastructure and exposing the public to severe safety concerns?

The IPC believes so, and commissioned its 2021 study with the purpose of dramatically improving the system through a combination of law, regulation, practice, and process changes emulating what the best-performing states are already accomplishing. This includes strong support for the:

- Elimination of all damages associated with legal excavation;
- Reduction of public exposure to severe safety concerns; and
- Return to utility ratepayers, through lower rates, a significant portion of the largely invisible \$61 billion in calculated waste, inefficiency, and excess cost within the system.

The Common Ground Alliance (CGA), the industry's most recognized source for "all things damage prevention" collects and publishes a wide array of damage prevention related statistics³, all of which point to two irrefutable points:

1. Current practices are not significantly reducing existing damage trends, and
2. There is no single answer, root cause, or stakeholder group solely responsible

The overall damage prevention process involves multiple stakeholders, each with responsibilities they must execute properly for the overall process to work.

- All Owner Operators (O/Os) must join as members of their local 811 center;
- Each O/O should have up-to-date maps of facility locations;
- Every O/O employs competent technicians to locate and mark facilities accurately and timely;
- One-Call centers are the communication hub for the process and must reliably take locate requests in detail and pass them on to O/Os to act on, and finally;
- Contractors must have a program in place to communicate with the other stakeholders and deal with existing facilities on the job site.

The 2021 IPC study provides an exhaustive, independent review of each state's systems to highlight specific areas where each state should focus on improvement. This can serve as a guide to regulators, legislators, and stakeholders as they explore the development and implementation of a damage prevention system that is safe and efficient.

The IPC study identified 13 recommendations that have a direct correlation to increasing public safety, risk mitigation, and substantial cost savings. This paper will explain each of these recommendations in detail.

³ www.commongroundalliance.com/dirt-dashboard

NATIONAL RECOMMENDATIONS SUMMARY

In-depth, state-specific, research and stakeholder feedback were analyzed ultimately identifying 13 elements used to assess the performance of damage prevention systems within each state. It was only through this assessment that a single conclusion became clear:

- The highest-performing state systems had processes in place that met, or exceeded, the requirements of at least 10 of the 13 elements, and states that met the requirements of fewer than 10 of those same elements fell into low-performance quartiles.

Simply said, only by implementing all or most of the 13 elements can high performance be achieved, and without high-performance, significant public safety improvement, risk mitigation, and cost savings cannot be gained.

Each one of the elements was defined using specific parameters and now serves as the 13 recommendations published from the study. They are:

1. No Exemptions: Require all asset owners and operators, including municipalities and departments of transportation, to join and participate in their state's 811 system.
2. Mandatory Damage Reporting: Refine the dig law to require reporting of all damages to **all** underground utility types to support effective data collection, process improvement, damage adjudication, and enforcement.
3. Balanced Enforcement: Cause enforcement authority to weigh the involvement of all primary participants in a damage, and in a fair and balanced fashion, hold the asset owner, excavator, and locator appropriately responsible in the damage adjudication process.
4. Third-Party Enforcement Board: Develop or enhance third-party investigation and enforcement board with a balanced number of representatives from each stakeholder group, imbued with both responsibility and authority to manage the entire damage adjudication process.
5. Standardized Minimum Notification Time: Standardize the ticket notification time to a minimum of two full business days after the day/date of a notification request.
6. Ineffective Penalty Structure: Bring balance to the penalty structure or amount so that asset owners, excavators, and locators each face similar risks and responsibility.
7. Effective Metrics: Identify, develop, collect, and track metrics that effectively support trending and continuous improvement of the state damage prevention performance. (Mandatory reporting is necessary to accomplish this effort.)
 - a. Develop and track metrics that support behavioral change in addition to metrics designed to track violations of the law.
8. Annual Reporting to CGA and DIRT: Require state entity(s) responsible for the oversight of the damage prevention system and collection and adjudication of compliance or damage reports, ticket volumes, etc., to submit data to the Common Ground Alliance (CGA) to support the preparation of the annual DIRT Report.
9. Positive Response Requirement: A web-based electronic positive response requirement by all asset owners/locators through the 811 call center system.

10. Excavation Site Accurate Description:
 - a. Premark / White-line Requirement: Require pre-mark or white-lining of any proposed excavation area that includes traditional reference to intersecting streets/roadways paired with one or more of the following options:
 - i. Global Positioning System (GPS) coordinates
 - ii. Electronic white-line, or
 - iii. Physical white-lining.
 - b. Geographic Information System (GIS) System Adoption by Asset Owners: By 2030, cause all asset owners to adopt a GIS system for asset mapping and require notification through the 811 call center using Global Positioning System (GPS) coordinates.
11. Continuous Improvement: Develop a culture of continuous improvement within the damage prevention system and more broadly through stakeholder education and public outreach programs.
12. Standardized Ticket Size, Distance, Duration, and Life: Standardize the ticket size, distance, duration, and life to the described characteristics:
 - a. 3 working day notification time (addressed in Standardize Minimum Notification Time recommendation above)
 - b. 30 calendar day ticket duration
 - c. Ticket type:
 - i. Standard
 - ii. Complex
 - iii. Design
 - d. Ticket size limit:
 - i. Standard urban = 1,000 LF
 - ii. Standard rural = 2,500 LF
 - iii. Complex = joint meet, 5 working day clear
 - iv. Design = joint meet, 10 working day clear
13. Educational Resources: Develop and publish electronically an excavator's manual that is updated and republished every 5 years or when an update to the law takes place, whichever is more frequent.

RECOMMENDATIONS DETAILS

To better understand the importance of each of the 13 recommendations, an Impact/Cost/Result analysis was conducted for each one. Damage prevention success and longevity are directly related to the decisions stakeholders make. In times of transformation, the stakes of making the right decision are dramatically higher. In short, if you want a bright and shiny future for damage prevention, it's essential to understand the effects of the choices available. An Impact, Cost, and Result analysis is how to understand the effect of decisions.

Impact analysis is a method used to assess the impact — expected and unexpected — an event has on a project or business. Simply put, it's a process of analyzing causes and consequences.

1. **No Exemptions: Require all asset owners and operators, including municipalities and departments of transportation, to join and participate in their state's 811 system.**

Recommended Legislation Example

1. State of Delaware Title 26 - Public Utilities, Chapter 8 - Underground Utility Damage Prevention and Safety, Subchapter I - Underground Utility Damage Prevention and Safety Act, § 802, 803, 804, 807 & 808.
 - a. Delaware defines "Operator" as...any person who furnishes or transports materials or services by means of a utility line. It shall be duty of each operator...to participate in the approved notification center. § 808 exempts only any excavation or demolition done by the owner of a private residence when such excavation or demolition is made entirely on the land on which the private residence is situated and provided there is no encroachment on any operator's rights-of-way or easement.

Impact

1. Reduce the frequency and severity of damages to asset owners that are not members of the state 811 system (i.e., DOTs, municipalities, etc.).
2. Reduce contractor "Recoverable Lost Time" associated with waiting for locate, observing unlocated assets, and avoiding damage to unlocated assets.

System Costs

1. Mapping.
2. 811 system membership.
3. Utility locating cost.
4. General compliance with the law for previously exempt utilities.
5. Development and implementation of an updated or new law.

Result

- Public protection increased, public damage impact reduced, utility damage costs reduced, and the reduction of contractor "Recoverable Lost Time" in combination, significantly outweigh the system costs – implementation considered cost neutral.

2. **Mandatory Damage Reporting: Refine the dig law to require reporting of all damages to all underground utility types to support effective data collection, process improvement, damage adjudication, and enforcement.**

Recommended Legislation Example

1. New Hampshire Code of Administrative Rules, Chapter PUC 800 - Underground Utility Damage Prevention Program, parts 802, 804 & 805
 - a. New Hampshire law states...each operator shall file monthly, with the commission, on or before the 15th day of the following month, probable violations of Puce 800, damages to underground facilities, or both. Excavators are required to notify 811 of any damage as well as...report the damage within 72 hours, excluding weekends and holidays, to the commission.

Impact

1. Consistently report damages in a streamlined process to achieve a reduction in damages to utility assets.
2. Streamline and make the damage reporting process electronic to reduce wasted time and increase consistency in reporting by locators and contractors.

System Cost

1. Additional investigation staff.
2. System to receive, track, and monitor damages.
3. Development and implementation of an updated or new law.

Result

- Makes possible the implementation of a continuous improvement culture built on root cause analysis supported through the use of fines and penalties. It will also achieve a reduction in damage frequency and severity and "Recoverable Lost Time" for locators and contractors – implementation considered cost neutral.

3. **Balanced Enforcement: Cause enforcement authority to weigh involvement of all primary participants in a damage, and in a fair and balanced fashion, hold the asset owner, excavator, and locator appropriately responsible in the damage adjudication process.**

Recommended Legislation Example

1. Pennsylvania Law - Underground Utility Line Protection Law - 806, No. 50, Section 5, §12.i and 12.ii, SB242
 - a. Where...the facility owner...has misidentified, mislocated or failed to identify its facilities pursuant to this act, then in computing the amount of reimbursement to which the facility owner is entitled, the cost of repairing or replacing its facilities shall be diminished in the same proportion that the facility owner's or designer's misidentification, mis-location or failure to identify the facilities contributed to the damage.

Impact

1. Change future behavior of responsible parties to reduce the frequency and severity of damages.
2. Potential to reduce "Recoverable Lost Time" for locators and contractors through consistent owner compliance with 811 system locate and mapping accuracy requirements.

System Cost

1. Additional investigation and enforcement staff.
2. Additional process touches associated with investigation and enforcement activities.
3. Development and implementation of an updated or new law.

Result

- Changes the future behavior of responsible parties to achieve a reduction in damage frequency and severity. The use of fines and penalties collected from the responsible parties supports the additional staff cost – implementation considered cost neutral.

4. **Third-Party Enforcement Board: Develop or enhance third-party investigation and enforcement board, with a balanced number of representatives from each stakeholder group, imbued with both responsibility and authority to manage the entire damage adjudication process.**

Recommended Legislation Example

1. State of Idaho Title 55 - Property in General, Chapter 22 - Underground Facilities Damage Prevention, Parts 2201 & 2203.
 - a. The principal purpose of the Idaho Damage Prevention Board...is to reduce damages to underground facilities and to promote safe excavation practices through

education directed toward excavators, underground facility owners and the public at large. The board also shall review complaints of alleged violations. It shall be the responsibility and duty of the administrator to administer the requirements of the law, and the administrator shall exercise such powers and duties as are reasonably necessary to enforce the provisions of the law.

Impact

1. Change future behavior of responsible parties to reduce the frequency and severity of damages.
2. Reduce locator and contractor "Recoverable Lost Time" due to damage prevention system compliance and streamlined process.

System Cost

1. Additional investigation and enforcement staff.
2. Additional process touches associated with investigation and enforcement activities.
3. Development and implementation of an updated or new law.

Result

- Changes the future behavior of responsible parties to achieve a reduction in damage frequency and severity. The use of fines and penalties collected from the responsible parties supports the additional staff cost. Higher compliance with damage prevention law streamlines the process reducing "Recoverable Lost Time" for locators and contractors – implementation considered cost neutral.

5. Standardized Minimum Notification Time: Standardize the ticket notification time to a minimum of two full business days after the day/date of a notification request.

Recommended Legislation Example

1. New Jersey Administrative Code §14:2 - 3.1 Notice of Intent to Excavate – Timing
 - a. an excavator...shall notify the One-Call center of the intent to engage in any excavation or demolition not less than three business days before beginning the excavation or demolition, and not more than 10 business days prior to beginning the excavation or demolition. If the excavation or demolition is not commenced within 10 business days...The notice shall no longer be valid.
2. California Code 4216.2.(b)
 - a. an excavator planning to conduct an excavation shall notify the appropriate regional notification center of the excavator's intent to excavate at least two working days...before beginning that excavation. The date of the notification shall not count as part of the two working-day notice.

Impact

1. More reasonable amount of time to plan for and execute locates.
2. Balances contractor desire for a relatively quick process with locator time to respond.

System Cost

1. Development and implementation of an updated or new law.

Result

- Reduction of locator "Recoverable Lost Time" due to planning and resource leveling. Some reduction of contractor "Recoverable Lost Time" due to higher compliance in location completion during notification period. Results significantly exceed the cost of implementation.

6. Ineffective Penalty Structure: Bring balance to the penalty structure or amount so that asset owners, excavators, and locators each face similar risks and responsibility.

Recommended Legislation Example

1. Municipal Code of Chicago, Chapter 10-21 §110 - Chicago Underground Facilities Damage Prevention Ordinance (see also Municipal Code of Chicago, Chapter 10-21 §130, 210 & 230)
 - a. (1) A person who violates Section 10-21-040 shall be subject to a penalty of \$100.
(2) A person who violates Section 10-21-050 shall be subject to a penalty of not less than \$1,000 nor more than \$5,000...three or more such violations within any 12-month period shall be required to satisfy training requirements...(3) A person who owns or operates an underground facility or an underground location service who violates Section 10-21-060 shall be subject to a penalty of \$1,000...three or more such violations within any 12-month period shall be required to satisfy training requirements...(4) A person who violates Section 10-21-070 shall be subject to a penalty of not less than \$1,000 nor more than \$5,000...(5) A person who violates Section 10-21-080 shall be subject to a penalty of \$1,000 for each separate offense, and may be further sanctioned according to the following schedule: (A) For the first incident...issue a formal warning to the responsible person. (B) For the second incident...order the responsible person to satisfy training requirements. (C) For the third incident...may fine the responsible person up to \$1,500. (D) For the fourth incident...may fine the responsible person up to \$3,000. (E) For the fifth and each subsequent incident... may fine the responsible person up to \$3,500 for the fifth incident...to increase the fine in increments of \$500 per additional incident, up to a maximum of \$10,000...(Ref. 10-21-040 Membership in DIGGER. 10-21-050 Excavation and demolition requirements. 10-21-060 Facility marking requirements. 10-21-070 Third-party violations. 10-21-080 Damage to underground facilities)

Impact

1. Change future behavior of responsible parties to reduce the frequency and severity of damages.

System Cost

1. Additional investigation and enforcement staff.
2. Additional process touches associated with investigation and enforcement activities.
3. Development and implementation of an updated or new law.

Result:

- Changes the future behavior of responsible parties to achieve a reduction in damage frequency and severity. The use of fines and penalties collected from the responsible parties supports the additional staff cost – implementation considered cost neutral.

7. Effective Metrics: Identify, develop, collect, and track metrics that effectively support trending and continuous improvement of the state damage prevention performance. (Mandatory reporting is necessary to accomplish this effort).

- a. **Develop and track metrics that support behavioral change in addition to metrics designed to track violations of the law.**

Recommended Example

1. The most widely recognized metric is the total number of damages per 1000 tickets. This should be further refined to the total number of damages per 1000 transmissions, or outgoing tickets. It should be noted that there are several factors in the locate notification process that vary from state to state that make this metric unpredictable. National standardization of the notification process would potentially transform the industry through the direct result of stable data (see Standardize Minimum Notification Time

recommendation). States that choose not to standardize would require substantial additional analysis in order to develop normalized metrics to support state-to-state and year-to-year analysis. Additional metrics include, but are not limited to:

- a. # of damages per construction spend or more specifically utility construction spend (normalization).
- b. # of damages per customer served (normalization).
- c. # of damages per state population (normalization).
- d. the trending of damages against GDP growth.
- e. the trending of damages against urban density or state average density.

Impact

1. Metrics make it possible to support state-to-state and year-to-year analysis
2. Facilitates the building of a culture of continuous improvement

System Cost

1. Minimal to zero; may require a slight increase of CGA funding to analyze the data.

Result:

- Makes possible the implementation of a continuous improvement culture built on root cause analysis and will achieve a reduction in damage frequency and severity. Results significantly exceed the cost of implementation.

8. Annual Reporting to CGA and DIRT: Require state entity(s) responsible for the oversight of damage prevention system and collection and adjudication of compliance or damage reports, ticket volumes, etc., to submit data to the Common Ground Alliance (CGA) to support the preparation of the annual DIRT Report.

Who is the CGA

1. The Common Ground Alliance (CGA) is an established and nationally recognized industry standard for continuous improvement and industry best practices specific to damage prevention. CGA focuses solely on damage prevention and the development of the latest best management practices developed and published through the collection and analysis of DIRT data collected from the stakeholders.

Impact

1. Metrics make it possible to support state-to-state and year-to-year analysis.
2. Facilitates the building of a culture of continuous improvement.

System Cost

1. Minimal to zero; may require a slight increase of CGA funding to analyze the data.

Result

- Makes possible the implementation of a continuous improvement culture built on root cause analysis and will achieve a reduction in damage frequency and severity. Results significantly exceed the cost of implementation.

9. Positive Response Requirement: A web-based electronic positive response requirement by all asset owners/locators through the 811 call center system.

Recommended Legislation Example

1. Tennessee Code Title 65, Chapter 31, Part 108.3.b
 - a. ...each operator participating in a one-call service that has been notified...shall notify the one-call service that the operator has marked the approximate location of all of its underground utilities as required...or that the operator has no underground utilities in the proposed area of excavation. This notice shall fulfill the operator's obligation. When each operator notified...has notified the one-call service that its underground utilities in the proposed area of excavation have been marked or that the operator has no underground utilities in the proposed area of excavation, the person responsible for the excavation or demolition may immediately

proceed with the excavation or demolition, notwithstanding the minimum three-working-day notice requirement...

Impact

1. Reduce frequency and severity of damages to asset owners that may not have responded before excavation can legally begin.
2. Reduce contractor "Recoverable Lost Time" associated with waiting for locate, observing unlocated assets, and avoiding damage to unlocated assets.

System Costs

1. System to electronically receive, track, and monitor status of locate process.
2. Development and implementation of an updated or new law.

Result

- Public protection increased, public damage impact reduced, utility damage costs reduced, and the reduction of contractor "Recoverable Lost Time" in combination, significantly outweighs the system costs – implementation considered cost neutral.

10. Excavation Site Accurate Description:

- a. **Premark / White-line Requirement:** Require pre-mark or white-lining of any proposed excavation area that includes traditional reference to intersecting streets/roadways paired with one or more of the following options:
 - i. **Global Positioning System (GPS) coordinates**
 - ii. **Electronic white-line, or**
 - iii. **Physical white-lining.**

Recommended Legislation Example

1. Texas Economic Regulation, Title 16, Chapter 18, Rules 18.3 and 18.7 §18.7(a)
 - a. ...prior to giving notice...an excavator shall mark, if applicable according to the specific excavation area using white paint flags, or stakes. §18.3(c), When an excavation site cannot be clearly identified and described on a line locate ticket, the excavator shall use white-lining to mark the excavation area prior to giving notice to the notification center and before the locator arrives on the excavation site.
 - b. **Geographic Information System (GIS) System Adoption by Asset Owners: By 2030, cause all asset owners to adopt a GIS system for asset mapping and require notification through the 811 call center using Global Positioning System (GPS) coordinates.**

Impact

1. Reduce locator "Recoverable Lost Time" associated with confusion from marking instructions.
2. Reduce frequency and severity of damages to asset owners associated with mis-marked utilities.

System Costs

1. Contractor performing pre-mark / white-lining.
2. Development and implementation of an updated or new law.

Result

- Public protection increased, public damage impact reduced, utility damage costs reduced, and the reduction of locator "Recoverable Lost Time" in combination significantly outweighs the system costs – implementation considered cost neutral.

11. **Continuous Improvement: Develop a culture of continuous improvement within the damage prevention system and more broadly through stakeholder education and public outreach programs.**

Recommended Example

1. Damage Prevention Council of Texas (<https://dpcoftexas.org/about/>).
 - a. **Mission:** To facilitate underground utility & pipeline damage prevention, promote best practices, and contribute toward public safety and environmental protection through stakeholder education and communication.
 - b. **Vision:** To develop a volunteer group of damage prevention stakeholders that will aid in the statewide effort to minimize damages by:
 - i. Identifying opportunities to heighten excavator and public awareness to “Call Before You Dig” and
 - ii. the consistent use of safe excavation practices

Impact

1. Facilitates the building of a culture of continuous improvement.

System Cost

1. Minimal to zero.

Result

- Will achieve a reduction in damage frequency and severity. Reduction of contractor and locator "Recoverable Lost Time". Results significantly exceed the cost of implementation.

12. **Standardized Ticket Size, Distance, Duration, and Life: Standardize the ticket size, distance, duration, and life to the described characteristics.**

Recommended Example

1. Designed to bring a higher level of consistency to the notification and ticket elements balancing reasonable notification time for locators with ticket size and life with contractor and locator needs both planning and resource leveling to increase the likelihood of both successful damage prevention and profit generation. In addition, the standardization will streamline locator, excavator, and stakeholder education and training.
 - a. A national standard supports and vastly improves efficiency throughout the utility locate and damage prevention process. Standardizing four basic elements of a notification request opens the possibility to complete robust analysis, build continuous improvement into the system, and simplify training and education programs. The four elements of notification and ticket standardization include:
 - i. 3 working day notification time (addressed in Standardize Minimum Notification Time recommendation above).
 - ii. 30 calendar day ticket duration.
 - iii. Ticket type:
 1. Standard (limited to one (1) refresh before a new notification is required)
 2. Complex (limited to one (1) refresh before a new notification is required)
 3. Design
 - iv. Ticket size limit:
 1. Standard urban = 1,000 LF
 2. Standard rural = 2,500 LF
 3. Complex = joint meet, 5 working day clear
 4. Design = joint meet, 10 working day clear

Impact

1. More reasonable time to plan for and execute locates.
2. Balances contractor desire for a relatively quick process with locator time to respond.

3. Facilitates the building of a culture of continuous improvement through standardized metrics.

System Cost

1. Development and implementation of an updated or new law.

Result

- Reduction of locator "Recoverable Lost Time" due to planning and resource leveling. Reduction of contractor "Recoverable Lost Time" due to confusion elimination and standardization. More consistent compliance with the law. Results significantly exceed the cost of implementation.

13. Educational Resources: Develop and publish electronically an excavator's manual that is updated and republished every 5 years or when an update to the applicable law takes place, whichever is more frequent.

Recommended Example

1. Excavator Manual is to contain a minimum of the following: See Table of Contents <https://www.illinois1call.com/excavatorhandbook/>
 - a. This document is intended for informational and reference purposes only. The handbook provides basic information on safe excavation practices and the protection of underground utility facilities in each state. Minimum contents include the following:
 - 1) Overview
 - 2) When and Who to Call
 - 3) Reasons to Contact Facility Owners Directly
 - 4) Ways to Notify 811 Facility
 - 5) Types of Requests
 - 6) Excavator Responsibilities
 - 6a) Pre-marks/White lining
 - 7) Facility Owner Responsibilities
 - 7a) Positive Response
 - 8) Damage Reporting Requirements
 - 9) Enforcement Program
 - 10) Website and Electronic System Use
 - 11) State "Dig Law"

Impact

1. A readily available resource for education to participants and private citizens.
2. Reduce frequency and severity of damages to asset owners by excavators who have not complied with damage prevention law.

System Cost

1. Minimal to zero.

Result

- Public protection increased, public damage impact reduced, utility damage costs reduced, and more consistent compliance with the law. Results significantly exceed the cost of implementation.

CONCLUSION

You don't have to look very hard to find a number of regulatory entities, industry associations, independent groups, media publications, and other damage prevention stakeholders that have conducted numerous polls, surveys, and studies on damage prevention. What you will find is a consistent message in all of them: **regulatory and legislative change is needed to influence performance.**

The data referenced in this paper estimate that the national total damage cost is approximately \$30 billion in annual and out-of-pocket cost⁴ to the system plus an additional \$61 billion⁵ in waste, inefficiency, and largely invisible excess cost embedded in the system. There is no doubt that the bulk of the \$90 billion in annual cost is borne by utility owners, contractors, and insurance companies. What is widely unrecognized is that these costs migrate into the pricing utilities pay for contract services and ultimately passed on to rate-payers through rate cases.

Recovery of these costs is accomplished through the implementation of the 13 recommendations proposed in this paper. There is an opportunity to eliminate \$40 billion of the combined \$90 billion in damage and waste costs over a 3- to 5-year timeline if action is taken. This is an opportunity that cannot be overlooked.

Adoption of these recommendations by PHMSA as part of the 2023 pipeline safety reauthorization will add significant influence to the efforts needed at the state and local levels. It represents an unprecedented opportunity for much needed proactive damage prevention system improvements. PHMSA can take one of the first steps in the recovery of billions of dollars of waste and lead the way to an overall safer and more efficient damage prevention system.

⁴ www.commongroundalliance.com/dirt-dashboard

⁵ www.ipcweb.org