Damage Prevention Report Card

2020

ALLIANCE FOR INNOVATION AND INFRASTRUCTURE

2020 Damage Prevention Report Card

Introduction

Advances in technology often lead to greater technological access for more people. As time goes on, technology improves, often making that improved technology cheaper and more widely available. This means a *better* version of the technology that only a select few had a decade ago is available to virtually everyone today.

The technology needed for more effective damage prevention exists today and is inexpensive, reliable, and ubiquitous – but many states are not incorporating the technology imbedded in the basic tools of modern life (e.g. cell phones and tablets) into their damage prevention laws.

The excavation equipment industry has risen with the tide of technological advancement in many ways, including utilizing GPS and mapping technology to improve equipment. Yet in damage prevention, a lack of systemic technology adoption and enforceable standards for the use of proven technology that could increase excavation safety is still not occurring. Virtually every adult carries a camera, photo library, GPS, email, messaging app, and more in their pocket in the form of a smart phone. But most states have not incorporated the use of these tools – commonly used by virtually every American – in their excavation damage prevention laws.

While each state has its own laws and regulations, with some incorporating technology faster than others, the goal should be the same across the country: implement pro-technology, pro-innovation damage prevention policies to decrease the potential for excavation damage, injury, and death.[1] In this report card, we examine each state's damage prevention laws to assess their use of technology and communication practices.

This update comes four years after our first state-level report card.[2] Unfortunately, only minimal progress has occurred despite general technological advancement and accessibility over the last four years. It is our aim through this report card, that state regulators, legislatures, and even industry decisionmakers adopt higher standards implementing proven technology.

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[1] McCown, B., & Skelton, S. (2015). The Role Of Improved Communication & Technology in Enhancing Damage Prevention Practices: Why Use 20th Century Technology to Combat 21st Century Safety Challenges? *The ICER Chronicle, Edition 4*, 53-61.

[2] Aii. *Damage Prevention Report Card*. (June, 2016). https://www.aii.org/wp-content/uploads/2016/07/Damage-Prevention.pdf.

Background

Included in a 2017 Pipeline and Hazardous Materials Safety Administration (PHMSA) report to Congress was a study demonstrating that the use of GPS and mapping technologies reduced excavation damage incidents by as much as 67 percent.[3] Known as Enhanced Positive Response (EPR), that technology can be understood as comprising three chief components: positive response, shareability, and quality control.[4] Taken together, these three components can help reduce human error and miscommunication about the presence and location of underground facilities at an excavation site, thereby reducing excavation damage incidents.

To date, four years after the PMHSA study, no state has implemented this technology into law. Although several states have shown improvement, taking small strides toward better technology-enabled communication, overall, there has been little advancement in the required use of technology. We have prepared this report card to provide a side-by-side comparison of the damage prevention efforts by state and to encourage more use of technology across the states.

According to PHMSA, 641 excavation damages across all pipeline categories resulted in 158 deaths or injuries and cost over $445 million dollars in damage over the past ten years (from 2010-2019).[5] Narrowing those incidents to only those falling under state jurisdiction rather than federal, excavation damages accounted for 341 gas distribution line incidents, leading to 19 fatalities, 102 injuries and more than $172 million in reported costs.[6]

These numbers do not account for the injuries, economic harm, and inconvenience caused by excavation incidents that damage cable, phone, broadband, water, sewer, and electric utility lines – which together account for the majority of the well over 20 million mile of underground utilities in the United States. By some estimates, damage to underground utilities harms the U.S. economy by as much as $50 billion to $100 billion annually.[7]

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[3] United States, Department of Transportation, Pipeline and Hazardous Material Safety Administration. (2017). *A Study on Improving Damage Prevention Technology* (pp. 22-23). Retrieved from https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/news/18351/reporttocongressonimprovingdamagepreventiontechnologyaug2017.pdf.

[4] Smith, T. (2017, May 17). Introduction of Enhanced Positive Response. Retrieved from https://www.epa.gov/natural-gas-star-program/introduction-enhanced-positive-response.

[5] Pipeline Incident 20 Year Trends. (2020). Retrieved from https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-incident-20-year-trends.

[6] *Id*.

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

Data shows that damage incident rates will decrease significantly if states update from older techniques for mapping and marking the locations of underground facilities and adopt better and newer technology to facilitate how this information is gathered and shared among facility owners, excavators, One-Call centers, and locators.

Most states currently require some variation of the following steps in the locate process:

1) The excavator calls or logs into the state or local One-Call center at least forty-eight hours prior to beginning excavation;
2) The One-Call center notifies any operator with facilities impacted by the excavation;
3) The facility operator, often through a third-party contract locator, marks the work site with paint stakes, or flags to signify the location of any underground facilities within a required 48- to 72-hour period prior to scheduled excavation; and
4) The excavator breaks ground after the 48- to 72-hour waiting period has passed.

With the universality of smart phones, tablets, and Internet-connected devices, every participant in the damage prevention process already has the tools needed to better communicate and collaborate. Using mobile devices with existing technology and practices, excavators, One-Call personnel, operators, and locators can share information in real time.

While still following the same procedure outlined above from locate request to site markings, the incorporation of technology can facilitate the sharing of photos, maps, and ticket information that the excavator can cross reference during planning and excavation thereby reducing the potential for a damage incident.

We created this stoplight report card to help track which states, through their laws and regulations, require the use of improved technologies to enhance communications practices, make information shareable, and facilitate on-site quality control. The report card allows policymakers to see model regulations and practical examples to consider and adopt.

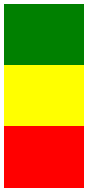
Reading The Report Card

The report card is based on an analysis of every state's damage prevention statutes, as well as the implementing regulations in those states that have them. We have also included in our analysis information on voluntary or encouraged practices by the various One-Call centers that are not mandated in law. The analysis is focused the three key components of EPR, rated individually:

- **Positive Response:** Does the state require the communication loop between the excavator and locator to be closed?
- **Shareability:** Does the state require a technology-based platform all relevant parties can access to share excavation site and locate information?
- **Quality Control:** Does the state require enhanced information to be shared between the facility owner, locator, excavator, and One-Call center so that all can view the ticket, photos, maps, or other data?

This report card employs Green, Yellow, and Red to indicate sufficient, insufficient, and absence of policy. We build on our 2016 report card by including a * for those programs that stand out as models that we believe other states, or the federal government, should explore and adopt.

The report card can be interpreted as follows:



= Meets minimal acceptable threshold and is enforceable

= Fails to meet threshold or an unenforced, voluntary form exists

= No policy and no voluntary form

* = Examples policymakers or regulators should explore and consider adopting as enforceable

With this rating, it is possible for a state to earn a Yellow* because the One-Call center or private actors have a voluntary system in place that, while not enforceable, incorporates the component of EPR being evaluated. The "*" highlights this program as something state officials or the federal government should consider making an enforceable minimal standard.

Positive Response

Does the state have a sufficient positive response system in place?

We have defined a positive response as a requirement that the locator or facility operator a) if having facilities at the excavation site, notify the excavator directly or through the One-Call center that the location of their facilities at the proposed excavation site have been marked, or b) if not having facilities at the excavation site, notify the excavator directly or through the One-Call center that they do not have any facilities under or around the proposed excavation site.

To meet our criteria for positive response, a phone call, email, in-person communication, or update to an online portal by the locator or operator is required. Marking the worksite alone (or not marking a worksite where no facilities are present) would not meet this requirement.

Positive response is important, because it closes the communications loop between the excavator and the locator. In its absence, an excavator could incorrectly assume that there were no facilities in the work area if no markings were visible after the waiting period ends. When in reality, it could simply mean that the site had not been located within the required time period. This could be the result of weather, mistake, shortage of locators, or other scheduling issues. Unclear communication significantly increases the likelihood of an incident.

As seen in the report card, 24 states have positive response requirements that meet our definition:

> **Alabama[8], Alaska, California, Colorado, Delaware, Florida, Georgia, Hawaii, Indiana, Iowa, Maryland, Michigan, Mississippi, Missouri, Nebraska, New Mexico, New York, North Carolina, North Dakota, Ohio[9], Pennsylvania, South Carolina, Tennessee, and Virginia.**

Since our report in 2016, only 6 states have joined this number.[10]

States are graded green because they have positive response practices that meet our definition and are required by law. States with a green* meet this standard and succinctly and clearly explain the requirement. (e.g. “Each operator, upon determining that no underground facility is present on the tract or parcel of land or upon completion of the

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8 A disclaimer on the Alabama 811 website states “As a reminder positive response is voluntary in Alabama.” However, the law has been updated, requiring positive response effective January 2021.

9 Ohio requires that utility members to respond to its positive response system. However, a problematic note in the law also states that “if the utility does not mark… or contact the excavator… the utility is deemed to have given notice that it does not have any facilities at the excavation site.” (Ohio Revised Code: 3781.29(A)(1)) This seemingly negates the positive response requirement.

10 CGA reports that 41 states do and 10 states do not have positive response. This does not separate mandatory from voluntary policies, nor whether the simple presence or lack of spray paint on site qualifies as positive response.

marking of the location of any underground facilities on the tract or parcel of land shall provide a positive response with information to the 'One-Call Notification System.'")[11]

States are graded yellow primarily because although a positive response is available to some through a voluntary online ticket check program, it is not a requirement enforced by law. Other states are graded yellow on the basis of insufficient laws, which only require closing the communication loop in some instances. Four common deficiencies in positive response law are:

1) Spray paint or other markings are themselves deemed to be positive response. (e.g. "an operator…shall inform the excavator of the tolerance zone of the underground facility…by marking, flagging or other acceptable method.")[12]

2) Notice is required to the excavator only if no facilities are present. (e.g. "the operator shall: (i) mark the location or (ii) notify the excavator…that the operator does not have any underground facility in the area…")[13] While this is better than no communication, it does not address the more critical issue of an unmarked site when facilities are actually present. A positive response should require the locator or operator to respond after marking or not marking to clarify that they did finish marking or why they did not mark.

3) Notice is required to the excavator only when the locator is unable to complete his task, unable to find facilities, or otherwise leaves markings incomplete. (e.g. "If an underground facilities operator is unable to complete the location and marking within the time period…the facility operator shall…provide prompt notice of these facts to the excavator…")[14]

4) The excavator must take action to confirm all markings are completed. (e.g. "If, after proper notification through the State-Wide One-Call Notice System and upon arrival at the site of the proposed excavation, the excavator observes clear evidence of the presence of an unmarked or incompletely marked utility…the excavator shall not begin excavating.")[15, 16] This requires the communication loop to be closed, but does not meet our definition of an acceptable positive response, which requires the locator or operator to positively respond in a manner reaching the excavator. This policy requires an *inquiry*, not a *positive response*.

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[11] Alabama Code §37-15-6(d).

[12] Kansas Statute 66-1806(a).

[13] Utah Code 54-8a-5(1)(a)(i)-(ii).

[14] Arizona Revised Code §40-306.22(I).

[15] 220 Illinois Compiled Statutes 50/4)(from Ch. 111 2/3, par. 1604) §4(h).

[16] A.R.S §40-360.22(B) states "no person shall begin excavating before the location and marking are complete or the excavator is notified that marking is unnecessary" which implies the excavator must confirm the completion.

Shareability

Does the state require a common-access platform allowing all relevant parties to share information?

For purposes of this report card, we have defined shareability as a requirement that the One-Call center or other damage prevention authority form, host, or make available a common-access platform where excavators, One-Call center personnel, utility operators, and locators can view and update the status of a locate ticket.

To meet this definition of shareability, an electronic positive response[17] system, smart phone application, or ticket status check portal on the One-Call center website must be functional and its use required by law. Leaving physical documents on site for the excavator would not meet our definition of shareability. Further, online locate ticket entry without the ability to track or check the status of the ticket, is insufficient.

Even if the worksite is properly marked and an effective positive response system is in place, all of the parties – the excavator, the One-Call center, the operator, and the locator– should be able to track a locate request and view its progress at all times.

A common-access platform builds on positive response by allowing real-time updates and sharing of information that can help reduce the likelihood of damage. With positive response, miscommunication between locators and excavators can be reduced regarding the completion of the locate. With shareability, efficiency can be improved, and the communication process can be enhanced by allowing all parties to view and update information on the ticket virtually in real time.

While 24 states require a positive response meeting our definition, only 13 require a technology-based platform for all parties to post or view responses and other relevant information in real time:

California[18], Colorado, **Florida, Michigan, Mississippi[19], Missouri, Nebraska, New Mexico, New York, North Carolina, South Carolina, Tennessee, and Virginia.**

These 13 states are graded green because they require an electronic online information exchange system that allows all parties (the excavator, facility operator, locator, and One-

[17] *See* CGA Best Practice 3.27 (note this is different from Enhanced Positive Response, also abbreviated EPR).

[18] While Electronic Positive Response is currently voluntary, the law has already been updated, requiring it effective January 2021.

[19] Law goes into effect January 2021.

Call center) to track the progress of the locate request and record a positive response. This is a significant step in the right direction as far as positive response systems go.

Some states receive green because they require positive response to be submitted in accordance with the One-Call center practice, with those centers requiring electronic systems. States receive green* for requiring electronic shareability by law. (e.g. "[E]very operator shall supply an electronic positive response through the regional notification center before the legal excavation start date and time.")[20]

With the universality of smart phones, tablets, and Internet-connected devices, every participant in the damage prevention process already has the tools needed to better communicate and collaborate.

States graded yellow on the report card have a voluntary system but do not currently require that positive responses and other data be shareable and accessible, or they do not require all operators or locators to provide digital positive responses. This leaves excavators to have to wait for phone calls, faxes, emails, or even to rely on site markings. Almost every state now has at least a voluntary practice for ticket check and electronic platforms, and in most states, a smartphone application also exists.

States graded red do not require or offer a way for excavators to check the status of their ticket electronically. While every state now offers a digital alternative to calling 811, allowing excavators to submit a locate request directly through a web-based portal, states graded red still do not offer a platform for the excavator to check the status of the locate tickets.[21]

[20] California Government Code § 4216.3(c)(1)(A).

[21] The laws for Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont were analyzed individually. These states use the same regional One-Call center, DigSafe. Grading based on analysis of www.DigSafe.com and phone interviews.

Quality Control

Does the state have a sufficient requirement for sharing enhanced information about the facilities at the excavation site with the excavator?

We have defined quality control as a requirement that the utility operator, One-Call center, and locator make the information that they have about the excavation site and the underground facilities located there, and information used or collected during the locate process, available directly to the excavator through an electronic platform that we described previously with respect to shareability.

To sufficiently meet our quality control requirement, the excavator must have access to the locate request information, facility maps, digital photos taken by the locator, or virtual manifests. [22] Additional enhanced information beyond this is encouraged. Paper documents or printed photos left on site would not meet this requirement unless they are also uploaded and accessible through the electronic platform.

Even with a positive response system in place, inclement weather, construction, lawn mowing, or other disruptions could wash away, shift, or otherwise remove markings that were properly made when required. Allowing excavators to access information affords the excavator a chance to double check, clarify, and dig with confidence.[23] Additionally, facility maps or other information that may be available from the facility owner, One-Call center, or locator may be useful during excavation in avoiding damage.

There are several ways technology can be used to accomplish this. Electronic positive response portals can at least allow, or at best require, an attachment of the required additional information. Thus "marked" may be accompanied by an additional column for hyperlinks or attachments including photos of the marked site, digital maps, or other enhanced information.

As shown in the report card, only **Colorado** has updated its laws or regulations to require digital transmission of information for better quality control at the work site. In fact, only six states have any practice or provisions that would improve quality control through the sharing of additional information, with some focused on the excavator and others focused on sharing digital information with the One-Call center.

In addition to markings, Colorado requires that facility operators "shall provide for each of its underground facilities: (A) Documentation listing the owner's or operator's name, the size and type of each marked underground facility. AND (B) Documentation of the

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22 These were provided in the PHMSA study. *See* note 3.

23 *See* note 4.

location of the underground facilities in the form of a digital sketch, a hand-drawn sketch, or a photograph that includes a readily identifiable landmark, where practicable."[24]

In Washington, D.C. and Maryland, a voluntary EPR system is used by some companies.[25] This facilitates transmission of enhanced information. While not required by law, the yellow* rating indicates this voluntary practice which should be explored and adopted as a minimum enforceable standard.

Additional states graded yellow have legal provisions encouraging but not requiring data sharing. Utah offers facility owners the option to include image attachments and notes on positive responses.[26] While not required, and though falling short of robust EPR data sharing, it is an encouraging step.

These are steps in the right direction. As legislators and regulators look at their sister states to revise and improve on their rules, it is critical to maintain flexibility for operators and others to experiment and improve rather than follow highly technical prescriptive rules.

Conclusion

A number of states are taking steps in the right direction, whether through language in their statutes that can serve as building blocks to integrating more technologies into the locate process in the future, or through integrating platforms that are not required by law.

Without enforced policies, however, many states are missing out on the benefits or left to suffer the high costs, injuries, and potential fatalities common in the excavation industry. A better way forward is a technology-based damage prevention process, utilizing the common devices already in use in every other industry and in use in some states today.

Unfortunately, and despite the accessibility and common use of technology elsewhere, current excavation damage laws, regulations, and practices are not nearly as far along as they could be. Most states have not updated their laws to require the use of available technology, such as electronic positive response, ticket status check systems, and quality control portals that allow the attachment of enhanced information. Although most states now have a smartphone application or locate ticket check system available, they are largely voluntary programs not required by law. Thus, many states do not earn a higher

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[24] Colorado Revised Statutes 2018 § 9-1.5-103(4)(a)(I)(A)-(B).

[25] CGA Best Practice 3.31. "EPR is in use as a daily process by Washington Gas, UtiliQuest and Miss Utility (OCC) call center for all locate requests in Washington DC and MD". Retrieved from https://bestpractices.commongroundalliance.com/-3-One-Call-Center/331-Enhanced-Positive-Response.

[26] Electronic Positive Response (EPR) " Blue Stakes of Utah 811. (2020). Retrieved from https://www.bluestakes.org/epr/.

rating in our report card, which they would earn if certain practices leading to excavation site safety were mandated and enforced.

Further, despite the results of the PHMSA study regarding the efficacy of Enhanced Positive Response (EPR), no state is requiring that this practice be implemented. Only one state, Colorado, requires sharing of additional information at all, and others using EPR do so on a voluntary basis.

This report card is not intended to be used as a tool for criticizing state programs. Its purpose instead is to shine a light on states that are moving in the right direction and to draw attention to areas where states could improve their laws, regulations, and practices.

About Aii

The Alliance for Innovation and Infrastructure (Aii) *is an independent, national, educational organization dedicated to identifying our nation's infrastructure needs, creating awareness of those needs, and finding solutions to critical public policy challenges. Aii strives to promote proven, innovative technology and higher safety standards in a non-partisan manner to achieve excellence nationwide.*

Aii consists 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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State	Positive Response	Technology	
		Shareability	Quality Control
Alabama	● *	●	●
Alaska	●	●	●
Arizona	●	●	●
Arkansas	●	●	●
California	●	● *	●
Colorado	●	●	● *
Connecticut	●	●	●
Delaware	●	●	●
Florida	●	●	●
Georgia	● *	●	●
Hawaii	● *	●	●
Idaho	●	●	●
Illinois	●	●	●
Indiana	●	●	●
Iowa	● *	●	●
Kansas	●	●	●
Kentucky	●	●	●

State	Positive Response	Technology	
		Shareability	Quality Control
Louisiana	🟡	🟡	🔴
Maine	🟡	🟡	🔴
Maryland	🟢 *	🟡	🟡 *
Massachusetts	🟡	🔴	🔴
Michigan	🟢 *	🟢	🔴
Minnesota	🟡	🟡	🔴
Mississppi	🟢	🟢 *	🔴
Missouri	🟢	🟢	🔴
Montana	🟡	🟡	🔴
Nebraska	🟢	🟢 *	🔴
Nevada	🟡	🟡	🔴
New Hampshire	🟡	🔴	🔴
New Jersey	🟡	🟡	🔴
New Mexico	🟢	🟢	🔴
New York	🟢	🟢	🔴
North Carolina	🟢	🟢	🔴
North Dakota	🟢	🟡	🔴

State	Positive Response	Technology	
		Shareability	Quality Control
Ohio	🟢	🟡	🔴
Oklahoma	🟡	🟡	🔴
Oregon	🟡	🟡	🔴
Pennsylvania	🟢	🟡	🔴
Rhode Island	🔴	🔴	🔴
South Carolina	🟢	🟢	🔴
South Dakota	🟡	🟡	🔴
Tennessee	🟢	🟢	🔴
Texas	🟡	🟡	🔴
Utah	🟡	🟡	🟡
Vermont	🔴	🔴	🔴
Virginia	🟢	🟢	🔴
Washington	🟡	🟡	🔴
Washington, D.C.	🟡	🟡	🟡 *
West Virginia	🟡	🟡	🔴
Wisconsin	🟡	🟡	🔴
Wyoming	🟡	🟡	🔴

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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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