Damage Prevention Report Card

ALLIANCE FOR INNOVATION
AND INFRASTRUCTURE

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Introduction

Technology plays a pivotal role in making everything we do easier, safer, and more efficient. While each of us notices how much technology can improve the convenience of our daily life, few pay attention to how it makes us safer as well. Technological advances in medicine have helped people to live longer and healthier lives. Technological advances in transportation networks have improved the safety of moving passengers, goods and services by air, rail, or pipeline. Technological advances have even helped keep our country safer by allowing us to protect critical information and identify potential future threats to our security.

One place technology has not been fully utilized is in the excavation industry. There are a number of potential reasons for this – each state makes their own rules and some states move faster than others, some state legislators and regulators may not even know that better technologies exist, and others may not realize the size and scope of the problem. Whatever the reason, the safety culture needs to improve.

Background

According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), there were 734 gas distribution line incidents over the past ten years (from 2005-2014).[1] These incidents accounted for 36 fatalities, 132 injuries and more than $252 million in property damage.[2] These numbers do not account for the economic harm and inconvenience caused by excavation incidents that damage cable, phone, broadband, water, sewer, and electric utility lines.

Incident rates will improve significantly as states begin to phase out arcane techniques for mapping and marking the locations of underground facilities and how this information is communicated to excavators. Most current systems require some variation of the following steps:

1) The excavator calls or contacts the state or local One Call center at least forty-eight hours prior to the date of excavation;

2) The One Call Center notifies any operator with facilities at or near the excavation site of the project;

3) The facility operator marks the work site with paint, stakes, or flags to signify the location of the facility (within 18-24 inches) within 48-72 hours; and

4) The excavator can break ground after 48-72 hours have passed.

Fortunately, significant improvements in GPS technologies, digital mapping technologies, and mobile device applications in recent years provide an opportunity to improve the process by allowing more precise identification of underground utilities and better communication amongst parties. Some states have already started to explore how technology and improved communications practices can be used to improve their excavation damage protection programs.

We created this stoplight report card to help track which states, through their laws and regulations, use up-to-date technologies

to enhance communications practices to ensure all of the necessary information is shareable, and available for on-site quality control.

Report Card

The report card is based on an in-depth analysis of every state's damage prevention statutes, as well as the implementing regulations in those states that have them. The analysis is focused on three key points:

- Does the state have a legitimate positive response system in place?
- Is technology used to allow excavators to engage in proper quality control proce dures prior to breaking ground?
- Does the state require a technology-based platform all parties can access to share information ensuring the excavation is completed safely?

Positive Response

We defined a positive response requirement as any provision that requires the locator or facility operator to notify the excavator directly or through the One Call center a) that they went to the work site and marked the locations of all of their facilities as required by state law, or b) notify the excavator directly or through the One Call center that they do not have any facilities under or around the proposed worksite.
Marking the worksite alone (or not marking a worksite where no facilities are present) would not meet this requirement. Positive response is important, because in its absence, an excavator could incorrectly assume that there were no facilities in the work area if no markings were visible after the requisite time period elapsed. This significantly improves the likelihood of an incident.

As seen in Table I, eighteen states have positive response requirements that meet our definition:

Alaska, California, Florida, Georgia, Hawaii, Indiana, Iowa, Maryland, Michigan, Missouri, New Mexico, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia.

Positive response is important, because in its absence, an excavator could incorrectly assume that there were no facilities in the work area if no markings were visible after the requisite time period elapsed.

There are two additional states that while not having fully functional positive response systems, are a step ahead of those that require only marking. In Arizona, if the operator is not able to complete the locating and marking process on time, they must "provid[e] prompt notice of these facts to the excavator and [assign] one or more representatives to be present on the excavation site at all pertinent times as requested by the excavator to provide facility location services until the facilities have been located and marked or the excavator is notified that marking is unnecessary pursuant to any mutually agreeable method." [3]

Similarly, North Dakota requires that "[i]f the operator cannot complete marking of the excavation area before the excavation commencement time stated in the excavation notice, the operator shall promptly contact the excavator."[4] The state also requires the One Call center to establish a procedure for "assuring

[1,2] See Pipeline and Hazardous Material Safety Administration, Department of Transportation, "Data and Statistics," http://phmsa.dot.gov/pipeline/library/datastatistics/pipelineincidenttrends
[3] Arizona Revised Statutes §40-306.22(I)

positive response from the affected operator in all emergency excavation notices." [5]

While the Arizona and North Dakota positive response systems don't ensure the best possible communication, they do make it more likely that an unmarked site will be known to the excavator compared to the other 30 states that have no positive response system at all.

Quality Control

To measure whether or not up-to-date technology is used for proper quality control efforts, we looked at whether or not the state law required any process or equipment that allow the excavator to ensure all markings are present and accurate at the worksite before breaking ground. Even with a positive response system in place, inclement weather, construction, lawn mowing or other disruptions could wash away or otherwise remove markings that were properly made when required.

There are several ways technology can be used to do this. Operators could be required to provide the excavator with a digital map showing where all the markings were made. These images would allow the excavator to compare the markings at the worksite on the day of excavation to the markings that were made when the request was entered. If the digital map matched up with the current worksite, the excavator would know the site was properly marked. If the images did not reflect the current worksite, the excavator could follow up with the operator.

As visible in the report card, no state has updated its laws or regulations to fully take advantage of technology to allow for better quality control at the work site. In fact, only two states have any provisions that would improve quality control, but one is focused on the excavator, and the other places a vague requirement on the One Call center without any criteria on how they should implement the mandate.

Colorado requires the excavator to "maintain adequate and accurate documentation including but not limited to photographs, video, or sketches, at the excavation site on the location and identification of any underground facility throughout the excavation period."[6] While this documentation may help future excavators who work on or around the same worksite, they do nothing to prevent damage during the initial projects.

The Iowa statute mandates that the One Call center "implement the latest and most cost-effective technological improvements for the center in order to provide operators and excavators with the most accurate data available and in a timely manner to allow operators and excavators to perform their responsibilities with the minimum amount of interruptions."[7] To date, the One Call board has not taken any action to implement new technologies for this purpose.

Shareability

Even if the worksite is properly marked, a fully functioning positive response system is in place, and quality control measures are required, all of this information needs to be available to all parties – the excavator, the operator, the locator, and the One Call center – at all times. For the purpose of this report card, share-ability measures whether or not all parties, through a technology-based platform, can access any, or all, of this information.

Thirteen states – **Florida, Georgia, Iowa, Maryland, Mississippi, Missouri, New Mexico, New York, North Carolina, Ohio, South Carolina, and Virginia** – currently have some version of an electronic online information exchange system in place that allows all parties, excavator, operator, locator, and One Call center to track the progress

[4] North Dakota Century Code §49-23-04(3)(e)
[5] North Dakota Century Code §49-23-04(2)(d)
[6] Colorado Revised Statutes §9-1.5-103(4)(c)(I)
[7] Iowa Code Title XI, Subtitle 5, Chapter 480 §480.3(2)

of a positive response system. This is a large step in the right direction as far as positive response systems go. These states were assigned a yellow light on the report card, because while they make positive response status shareable, they do not make work site images, maps, or other information available and shareable.

Similarly, Maine asks the operator to provide the One Call center with all facility locations in electronic or digital format.[8] However, this is a request rather than a requirement. There is also no provision of the law that would ensure this digital or electronic map would make it to the excavator even if it were received by the One Call center.

No state has updated its laws or regulations to fully take advantage of technology to allow for better quality control at the work site.

Steps in the Right Direction

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 safety technologies in the future, or through integrating platforms that are not required by law. Mississippi requires facility operators to provide One Call centers with a "digital map, paper map or geospatial information showing the location of" underground facilities.[9] Future laws could eliminate the use of paper maps and ensure that the digital maps and geospatial information are shared directly with the excavator.

Rhode Island states in the findings section of its Damage Prevention law "To develop a process for fostering and promoting the use of an effective damage prevention program, by all appropriate stakeholders, technologies need to be improved that enhance communications, underground pipeline locating capability, and gathering and analyzing information about the accuracy and effectiveness of underground facility locating programs."[10] Future updates to their laws could take more concrete steps to implementing these technologies.

On the technology side, states like Maine, California, Florida, Pennsylvania and Virginia now allow excavators to submit tickets to the One-Call center online in the place of a phone call. This is a small improvement, but could mark an important shift in how excavators, locators, facility operators and One Call centers choose to share information moving forward.

Further ahead of the trend, Minnesota developed a One-Call application for mobile devices, which allows users to submit an excavation ticket, make a positive response notification and search for active tickets – it even provides a handy color code guide.[11]

Conclusion

Current excavation damage laws, regulations, and practices are not nearly as far along as they could be in implementing positive response requirements. Additionally, most states have not embraced the use of available technology, such as the use of digital maps using GPS technology, nor the sharing of dig site data with all relevant parties. Although some states are moving in the

[8] See Maine PUC Rules, Part 8, Chapter 895 §(6)(a)
[9] Mississippi Annotated Code §77-13-17(7)(b)
[10] Rhode Island General Laws §39-1.2-1.1(2)
[11] http://www.gopherstateonecall.org/download-the-new-gsoc-app

right direction and the trend in recent years seems to be moving toward favoring advanced safety and communications technologies, there is still a long way to go.

The intent of this report card is not 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 all states could improve their laws, regulations, and practices.

About Aii

The Alliance for Innovation and Infrastructure (Aii) *consists of two non-profit organizations, The National Infrastructure Safety Foundation (NISF) a 501(c)(4), and the Public Institute for Facility Safety (PIFS) a 501(c)(3). The Foundation and the Institute focus on non-partisan policy issues and are governed by separate volunteer boards working in conjunction with the Alliance's own volunteer Advisory Council.*

Report Card: Table I

State	Positive Response	Technology	
		Accuracy/Quality Control	Shareability
Alabama	R	R	R
Alaska	G	R	R
Arizona	Y	R	R
Arkansas	R	R	R
California	G	R	R
Colorado	R	Y	R
Connecticut	R	R	R
Delaware	R	R	R
Florida	G	R	Y
Georgia	G	R	Y
Hawaii	G	R	R
Idaho	R	R	R
Illinois	R	R	R
Indiana	G	R	R
Iowa	G	R	Y
Kansas	R	R	R
Kentucky	R	R	R
Louisiana	R	R	R
Maine	R	Y	Y
Maryland	G	R	Y
Masachusetts	R	R	R
Michigan	G	R	R
Minnesota	R	R	R
Mississippi	R	R	Y
Missouri	G	R	Y
Montana	R	R	R

Nebraska	R	R	R
Nevada	R	R	R
New Hampshire	R	R	R
New Jersey	R	R	R
New Mexico	G	R	Y
New York	G	R	Y
North Carolina	G	R	Y
North Dakota	Y	R	R
Ohio	G	R	Y
Oklahoma	R	R	R
Oregon	R	R	R
Pennsylvania	G	R	R
Rhode Island	R	R	R
South Carolina	G	R	Y
South Dakota	R	R	R
Tennessee	G	R	R
Texas	R	R	R
Utah	R	R	R
Vermont	R	R	R
Virginia	G	R	Y
Washington	R	R	R
West Virginia	R	R	R
Wisconsin	R	R	R
Wyoming	R	R	R