

Excavation Damage Prevention

This paper focuses in on one of the factors that plays a role in keeping pipelines safe – or conversely – that causes pipeline failures: excavation damage, and the various programs in place to try to prevent it.

Promote Safe Digging!

The familiar 811 logo and shovel letting everyone know to call before you dig, and the nationwide availability of a one-call utility location service available free for anyone preparing to excavate are all accomplishments of a coalition of underground utilities, state and federal regulators and commercial excavators working together to reduce the number of incidents in which underground utilities, including pipelines, were damaged or destroyed by excavators with insufficient or inaccurate location information. By calling 811 two days before digging, underground utilities will come out and mark the location of any facilities within your dig area at no charge to you.



**Know what's below.
Call before you dig.**

Excavation Damage By the Numbers

Through about 2010, excavation damage was the leading cause of all significant pipeline incidents, resulting in many deaths and injuries, as well as substantial property damage¹. While excavation damage is no longer the leading cause of significant pipeline incidents, it is still a major cause, and is still the second leading cause of serious incidents (those that cause death or injury requiring hospitalization). The four pie charts following will show you the progressive decline in excavation incidents as a percentage of the significant and serious incidents.

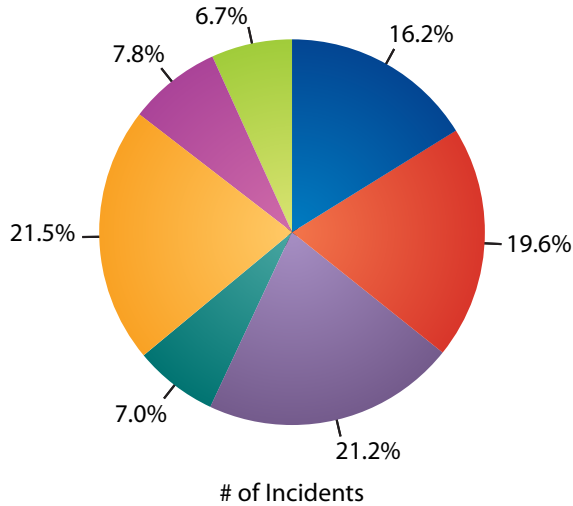
¹ Significant incidents are those where there is a death, an injury requiring hospitalization, property damage of \$50,000 or more, liquid releases where there is an unintentional fire or explosion, or a liquid release of > 5 barrels of highly volatile liquid, or > 50 barrels of other liquids.

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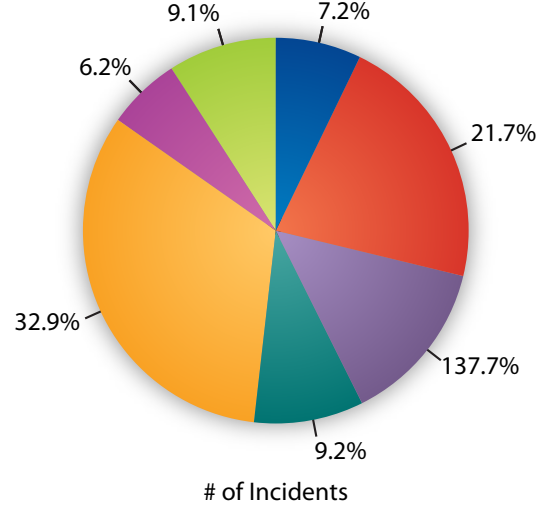
Significant incidents, last 20 years

PHMSA data as of 9/29/15; cause breakdown, 20-year average 1995-2014



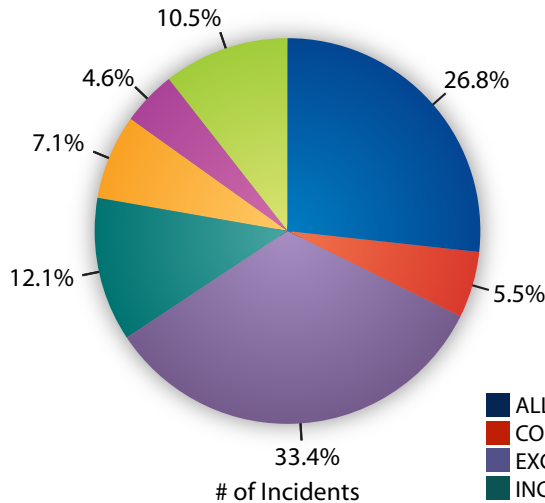
Significant incidents, last 5 years

PHMSA data as of 9/29/15; cause breakdown, 5-year average 2010-2014



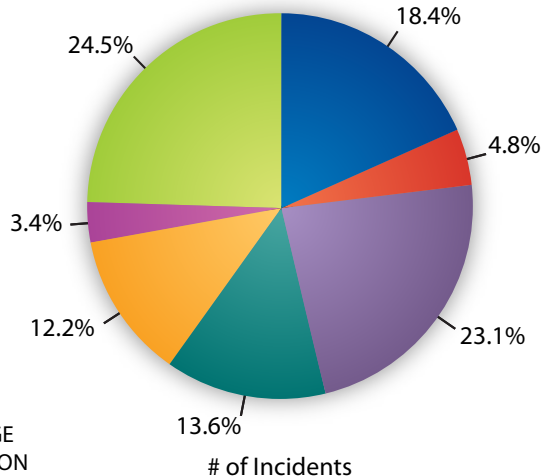
Serious Incidents, last 20 years

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Serious Incidents, last 5 years

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- ALL OTHER CAUSES
- CORROSION
- EXCAVATION DAMAGE
- INCORRECT OPERATION
- MATERIAL/WELD EQUIP FAILURE
- NATURAL FORCE DAMAGE
- OTHER OUTSIDE FORCE DAMAGE

While the PHMSA data, and the data collected by the Common Ground Alliance in its annual DIRT report (Damage Information Reporting Tool, a voluntary reporting system) both indicate a decrease in total excavation damage incidents, the discrepancy between the numbers of pipeline incidents reported by each organization is huge. What the Trust testified to the Subcommittee on Energy and Power, of the Committee on Energy and Commerce of the United States House of Representatives on June 16, 2011 is still true today:

“Although PHMSA likes to call itself a data-driven agency, there is a serious lack of data to determine the extent, causes, or perpetrators of excavation damage to pipelines. For example, because of the limited reporting requirements, the PHMSA incident database only includes about 70 total pipeline incidents nationwide in 2008 caused by excavation damage. Yet the Common Ground Alliance’s 2008 DIRT database reports well over 60,000 excavation events that affected the operation of natural gas systems alone.”

Undoubtedly some of the discrepancy results from a difference in definitions between a PHMSA “incident” and a CGA “event.” The large discrepancy makes clear that a common data set and common reporting requirements should be part and parcel of PHMSA’s efforts to strengthen state damage prevention programs, and that the threat from excavation damage is larger than the PHMSA data implies.

One-Call Centers

The primary tool for avoiding damages to underground facilities is timely communication between those digging (excavators) and the owners of the facilities. It is important to Call Before You Dig and Dig Safely. A One-Call center facilitates this communication process by enabling an excavator to place just one call, prior to digging, to request that all underground facilities in the area of a planned excavation be located and marked.

By simply dialing 811, you can reach the one-call center where, at no cost to you, companies that may operate underground utilities in the area you plan to dig will be notified. Those companies can then dispatch locate crews to determine and mark the exact location of their utilities so that you can avoid hitting them when you begin your excavation. Most state laws requires anyone doing excavation to call to have the location of the utilities marked at least 48 working hours before any excavation is done.

Hitting underground utilities when you are digging can cause injuries, even deaths, environmental damage and loss of critical infrastructure and services. Strikes that don’t cause immediate problems can lead to failures years later. If you don’t make the call, you could be liable for damage costs and repairs, as well as subject to potential penalties. Don’t take the chance – Call Before you Dig.

Best Practices Regarding Damage Prevention

In 2000, a national organization called the Common Ground Alliance (CGA) was launched in an effort to reduce damages to all underground facilities in North America through shared responsibility among all stakeholders. In promoting a spirit of shared responsibility, the CGA welcomes all stakeholders who would like to be a part of the identification and promotion of best practices that lead to a reduction in damage. Any “best practices,” endorsed by the CGA come with consensus support from experts representing the following stakeholder groups: Excavators, Locators, Road Builders, Electric, Telecommunications, Oil, Gas Distribution, Gas Transmission, Railroad, One Call, Public Works, Equipment Manufacturing, State Regulators, Insurance, Emergency Services and Engineering/Design.

CGA has taken the lead nationally in developing best practices to reduce damage to underground utilities, including pipelines. The latest version (Version 12.0) of their Best Practices manual includes 151 best practices in the following categories:

1. Planning & Design Best Practices
2. One Call Center Best Practices
3. Location & Marking Best Practices
4. Excavation Best Practices
5. Mapping Best Practices
6. Compliance Best Practices
7. Public Education & Awareness Best Practices
8. Reporting & Evaluation Best Practices
9. Miscellaneous Practices

To obtain a free copy of the CGA Best Practices manual visit the CGA website at: <http://www.commongroundalliance.com/>

In the 2006 pipeline safety law, Congress joined the effort to increase enforcement of one-call system violations, to define what an adequate damage prevention program would include for a given state, and authorized PHMSA to pursue civil actions and penalties against excavators and operators who fail to use an adequate state system.



Congress listed the nine elements of an adequate program (see box following), describing a system dependent upon a shared responsibility to call and respond to a one call location system, and to have a mechanism in place to enforce against those who fail to use it or respond, resulting in damage to a facility. (Now codified at 49 USC 60134.)

The Nine Elements to Better Damage Prevention

DAMAGE PREVENTION PROGRAM ELEMENTS – An effective damage prevention program includes the following elements:

- 1) Participation by operators, excavators, and other stakeholders in the development and implementation of methods for establishing and maintaining effective communications between stakeholders from receipt of an excavation notification until successful completion of the excavation, as appropriate.
- 2) A process for fostering and ensuring the support and partnership of stakeholders, including excavators, operators, locators, designers, and local government in all phases of the program.
- 3) A process for reviewing the adequacy of a pipeline operator's internal performance measures regarding persons performing locating services and quality assurance programs.
- 4) Participation by operators, excavators, and other stakeholders in the development and implementation of effective employee training programs to ensure that operators, the one call center, the enforcing agency, and the excavators have partnered to design and implement training for the employees of operators, excavators, and locators.
- 5) A process for fostering and ensuring active participation by all stakeholders in public education for damage prevention activities.
- 6) A process for resolving disputes that defines the State authority's role as a partner and facilitator to resolve issues.
- 7) Enforcement of State damage prevention laws and regulations for all aspects of the damage prevention process, including public education, and the use of civil penalties for violations assessable by the appropriate State authority.
- 8) A process for fostering and promoting the use, by all appropriate stakeholders, of improving technologies that may enhance communications, underground pipeline locating capability, and gathering and analyzing information about the accuracy and effectiveness of locating programs.
- 9) A process for review and analysis of the effectiveness of each program element, including a means for implementing improvements identified by such program reviews.

In the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011, Congress again addressed damage prevention by asking PHMSA to conduct a study on the impact of excavation damage on pipeline safety and a survey of state exemptions. PHMSA submitted a report to Congress in 2014², and issued a final rule in July 2015 that established criteria for assessing the adequacy of state damage prevention programs, and allows PHMSA to exercise federal authority over damage prevention violations in states with inadequate damage prevention law enforcement programs.



PHMSA requires that states have a one-call damage prevention system to be eligible for grants from PHMSA to reimburse the costs of its pipeline safety programs. States can receive up to 80% of their costs in grants from PHMSA, but only if they've adopted a one-call system. PHMSA reviews not only the enforcement part of state systems, but the adequacy of the underlying systems as well. Improved enforcement efforts, and PHMSA intervention to provide enforcement when a state won't, may help reduce the number of excavation incidents even further.



Major Issues in Excavation Damage Prevention

As PHMSA encourages states to amend their damage prevention programs, several major issues come up in nearly every discussion:

Exemptions

Most commonly, cities and municipal utilities, state departments of Transportation, and agriculture seek exemptions, or to retain existing exemptions from having to participate in the one call system. They don't want to have to get a one-call ticket every time they put in a new street sign, maintain ditches or plow their fields. We also see attempts to maintain exemptions on the other end – that is – production and gathering pipelines seeking exemptions from having to participate in responding to one call locate

² See [this link](#) for PHMSA's 2014 report to Congress on damage prevention.

requests or mapping requirements. Whether an exemption is written as an exception to a definition of what an underground facility is, what excavation is, or whether it's written as an exemption to who has to participate, every exemption provides another opportunity for a completely preventable serious pipeline incident to occur. As the Common Ground DIRT report states: "The data indicates that a call to the one call center or 811 is the simplest and most effective way to reduce or eliminate excavation related underground utility damages.... The data suggests that when a call is made prior to excavation, damage occurs less than 1% of the time. This is a powerful message."

Positive Response

Not all states require the excavator to be contacted by a utility or the one-call center when all of the utilities are done locating and marking. This leads to 2 problems: 1) The excavator is never positive that they've all been marked, even if the 48 hours has passed; and 2) accidents can occur to unmarked utilities *even if the excavator did everything right*. These issues would be easily resolved by a requirement that the utility either respond directly to the contractor once location is complete, or that the one-call center do so.

Enforcement authority

Most state attorneys general have more than enough cases to deal with without adding to their burden by requiring them to enforce violations of state damage prevention laws. Most states don't want to put the enforcement authority in the hands of the utility regulating commission because that is fraught with political issues when the enforcement involves utilities and contractors not otherwise regulated by the PUC or PSC. Some states have tried to resolve this by creating an independent commission to hear complaints, made up of members from all of the various stakeholder groups. This group can hear complaints and make recommendations to an attorney general or a county prosecuting attorney.

Equal Treatment of Utilities and Excavators

Another common complaint heard when damage prevention laws are reviewed comes mainly from the excavators who are concerned that they are unfairly blamed for all the problems. They rightfully point out that a high percentage of the incidents that cause damage to underground utilities are caused by the utilities being marked incorrectly after one-call has been used. The excavators want to ensure that if they are going to be held accountable for their failures to use the one call system properly, the utilities are also held equally accountable for failures to mark utilities correctly.

More Information:

Excavation damage prevention is important to all underground utilities, not just pipelines. So there are a wide variety of sources for more information. Here are a few:

- 1) PHMSA completed a comprehensive review of all states' one-call systems. The results, which can be viewed using an interactive map on the PHMSA website, can be found here: <http://primis.phmsa.dot.gov/comm/DamagePreventionSummary.htm>.

- 2) PHMSA has an extensive website about state damage prevention programs, grant opportunities and the history of their damage prevention efforts: <http://primis.phmsa.dot.gov/comm/DamagePrevention.htm>.
- 3) The Common Ground Alliance where the best management practices can be found, the annual DIRT report, information on how one call systems work, and access to logos, artwork, etc. to use in support of One Call systems: <http://commongroundalliance.com>.

