DIRT

Damage Information Reporting Tool

Analysis & Recommendations

Volume 11

2014

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CGA™ Common Ground Alliance

811

Common Ground Alliance

Dear Damage Prevention Stakeholders,

The first CGA Annual DIRT Report was issued in 2005 analyzing data for calendar year 2004. At that time there were approximately 22,000 event records submitted, and nearly 50% of the damages were due to lack of notification to a one call center. In the ensuing decade, the volume of events submitted to DIRT continued to grow, and the percentage of damages attributed to lack of notification continued to decline. It gradually passed through the low 30% range in the late 2000s. From 2011 to 2012, a few years after the rollout of 811, we saw a significant decrease from 32% to 26% No Call. However, it has since remained at approximately 25%.

The number of events submitted for 2014 increased by nearly 50,000 over 2013, due to efforts of the Data Reporting and Evaluation Committee to promote data entry by existing and new submitters.
This year's analysis indicates that the total number of U.S. damages increased in 2014 over 2013, but at a slower rate than increases in construction spending and housing starts, which have historically exhibited a high correlation with underground damages. Moreover, the number of incoming locate requests to one call centers and outgoing transmissions to member facility operators increased. This resulted in the damages per ticket rate declining from 2.07 to 1.60 despite the increase in damages.

In response to feedback from the damage prevention community, the Committee examined the effect of state enforcement programs. It found, not surprisingly, that enforcement does have a positive effect on damage rates. Just as the Committee was putting the final touches on the DIRT report, the U.S. DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) issued its Final Rule establishing review criteria for state excavation damage prevention law enforcement programs. CGA has long recognized that enforcement, although not warm and fuzzy, can be an effective component of the overall damage prevention strategy when approached in a fair and balanced way. Indeed, the Best Practices manual devotes an entire chapter to the topic.

As noted above, damages attributed to lack of one call notification seem to have leveled off at around 25%. From my conversations with stakeholders across the U.S. and Canada, I am aware of several states that saw significant increases in one call notifications and decreases in damages after implementing enforcement programs. I believe the next leap forward will come as more states implement enforcement programs in a manner reflecting the five Best Practices on this issue.

This report also introduces new ways of examining the relationships between facilities affected, excavation equipment, and root causes.

As always, CGA and the Data Committee rely on good quality data from their stakeholders in order to give back a good quality annual report that can help move damage prevention in a positive direction. Thank you for your support.

Sincerely,

Robert Kipp
CGA President

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Introduction

The Damage Information Reporting Tool (DIRT) is the result of the efforts of the Common Ground Alliance (CGA), through its Data Reporting & Evaluation Committee (DR&EC or Committee), to gather meaningful data regarding the occurrence of facility events. An event is defined by the CGA DIRT User's Guide as "the occurrence of downtime, damages, and near misses." DIRT allows industry stakeholders to submit data anonymously to a comprehensive database that is used to analyze factors leading to events.

This annual DIRT report provides a summary and analysis of the submitted events occurring during the year 2014. For 2014, 273,599 events were submitted, approximately 49,000 more than submitted for 2013. It is the Committee's belief this increase is the result of several positive factors. First and foremost, construction activity in the United States increased significantly in 2014, leading to increased opportunities for underground events. Secondly, several key indicators suggest more stakeholders are reporting to DIRT.

As in prior years, the Committee reviewed the data collected for all of the DIRT elements. While not all of this information is included in this report, it is published and available online at http://www.damagereporting.org/annual.

Reported Events and Total Damages Estimate

The number of underground events submitted to DIRT in 2014 totals 273,599 (for Canada and the U.S.). There were exactly 48,983 more events than what was submitted in 2013.

The estimate for the total number of damages occurring in the U.S. is developed from a linear regression model using information from states that appear to have a substantial number of damages reported to DIRT. Substantial reporting was determined by reviewing state regulations and statutes, One Call Systems International (OCSI)[1] and U.S. DOT's Pipeline Hazardous Material Safety Administration (PHMSA)[2] state classifications, a survey of state pipeline safety representatives conducted by the Committee in 2014, and a review of the number of events reported to DIRT in each state. Based on this research, for 2014 the team identified 16 states believed to have substantial reporting resulting from their legislative requirements, an entity such as a PSC (Public Service Commission), PUC (Public Utility Commission), or one call center with a Virtual Private Dirt (VPD),[3] and/or a high level of stakeholder reporting from the state. These states submitted 192,247 of the 262,741 total events submitted to DIRT from all U.S. states (5,996 events were near misses where no facilities were damaged).[4] These states are Colorado, Connecticut, Georgia, Illinois, Indiana, Kansas, Michigan, Missouri, New Mexico, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, Virginia, and Washington.

The variables used in the model include building permits, construction spending put in place, infrastructure, land area, population, and population density.[5] This analysis suggests that the estimated total number of underground excavation damages is approximately 349,000 (see Exhibit 1). The 2014 estimate represents an increase from the estimated 335,000 damages of 2013. Though this is a 4.2% increase from 2013, it is important to compare this to the increase in construction spending (5.2%) and U.S. housing starts (6%) during this same time period. These two indicators have historically exhibited a high correlation with underground damages. Therefore, one could expect the estimated increase in damages in 2014 to be at least a full percentage point higher, thus indicating improvement in damage prevention efforts.

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[1] OCSI is a CGA committee comprised of one call center representatives and other industry professionals whose purpose is to enhance damage prevention efforts and infrastructure protection by serving as a subject matter expert for one call processes; providing statistical and other resources to support CGA programs; and, acting as a key link between national and local damage prevention efforts.

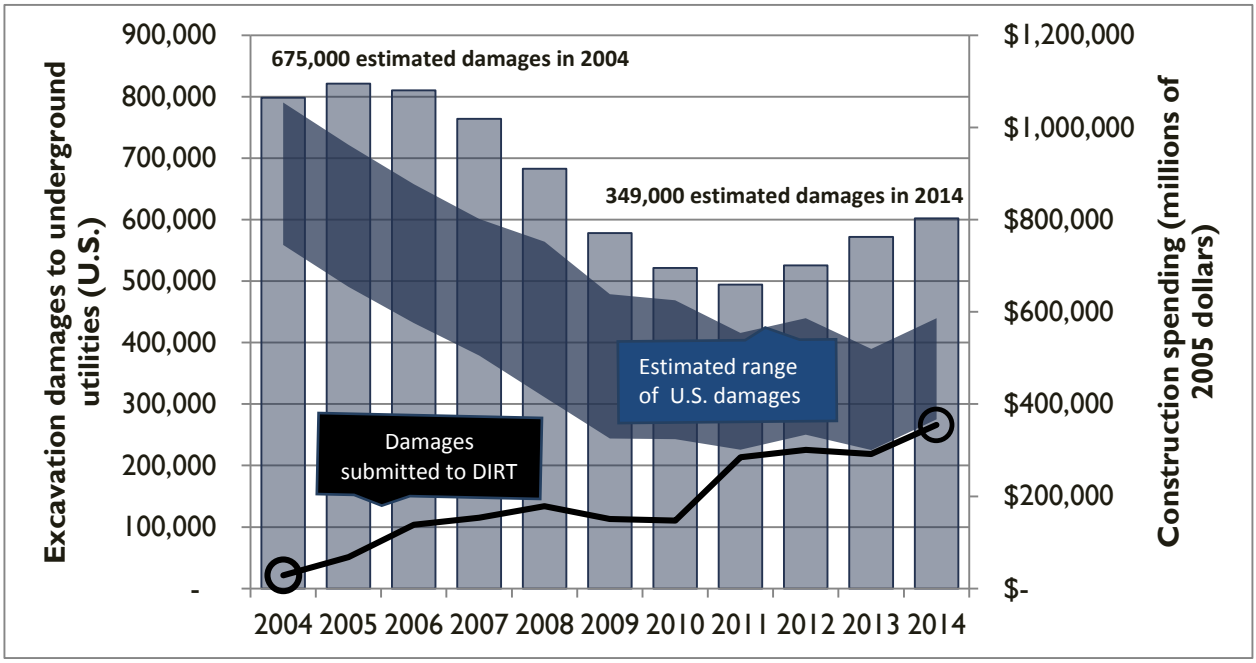
[2] PHMSA is a federal agency whose mission is to protect people and the environment from the risks of hazardous materials transportation by pipelines and other transportation modes.

[3] For more information about VPD, go to: http://www.cga-dirt.com/virtual/VirtualDIRTOverview.pdf

[4] Events identified as near misses were excluded from this report's analyses.

[5] Sources: U.S. Census Bureau, FMI Construction Forecast

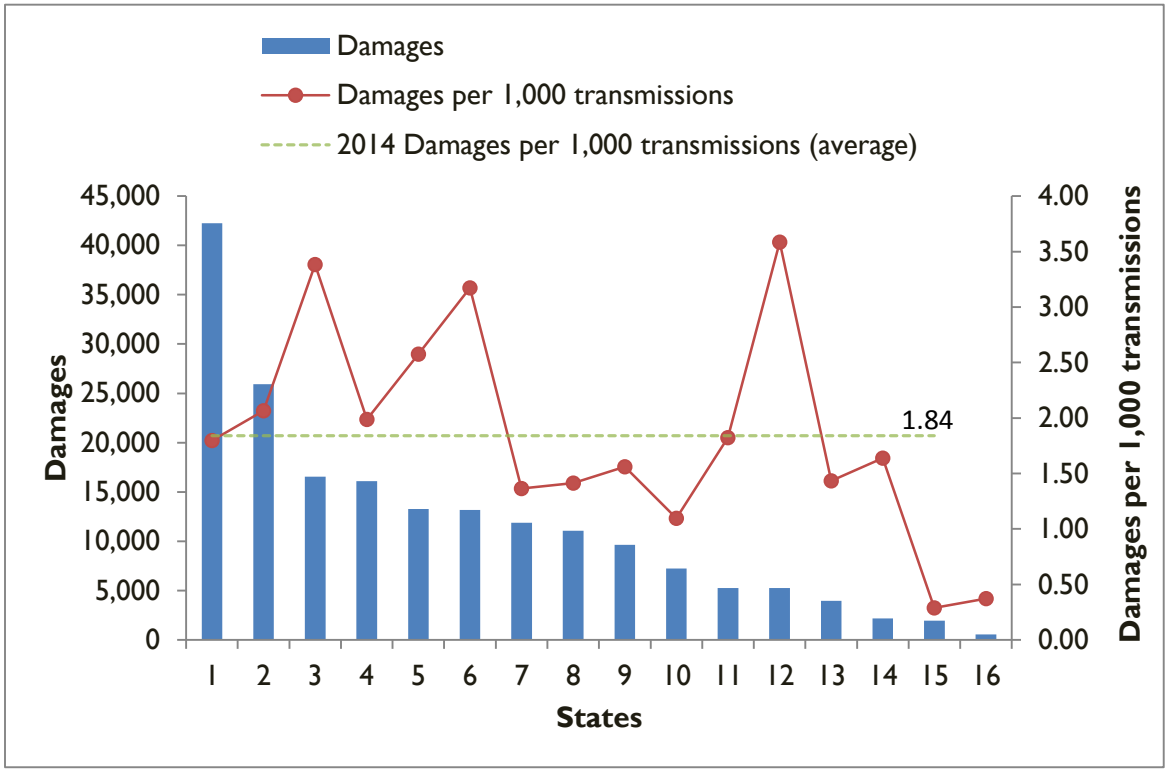
Exhibit 1: Estimated number of total underground utility damages resulting from excavation (U.S.)



As first introduced in the 2013 DIRT report, the damages per 1,000 transmissions[6] is a preferred measurement of underground excavation damage prevention efforts to damages per 1,000 incoming requests. Exhibit 2 represents this metric for the 16 substantial reporting states, indicating a rate of 1.84 per 1,000 one call transmissions.

[6] According to data provided by OSCI for 2014, on average each incoming locate request to a one call center generated 7.17 outgoing transmissions to member facility operators.

Exhibit 2: Damages per 1,000 transmissions from the 16 substantial reporting states



The following process explains how the 2014 estimated damage rate is conducted.

- Estimate of 2014 total U.S. damages = 349,000
- Total incoming notifications for 2014 for the 40 U.S. one call centers reporting to OCSI = 23,984,804
- Using the same methodology to calculate the estimated total U.S. damages and extrapolating from the 23,984,804 above, estimated total U.S. 2014 locate requests = 30,400,000
- From OCSI U.S. locations that reported both outgoing transmissions and incoming notifications, the ratio = 7.17

  Assuming that ratio remains valid for the non-reporting U.S. OCSI locations,

349,000 / [(30,400,000 * 7.17) / 1000] = 1.60 damages per 1,000 outgoing transmissions

In the 2013 DIRT report, this same calculation was performed resulting in an estimated damage rate of 2.07 damages per 1,000 outgoing transmissions. Several factors appear to have contributed to this reduction from 2013 to 2014. First, incoming locate requests increased approximately 8%. Secondly, the ratio of outgoing transmissions to incoming locate requests increased from 5.78 to 7.17. Thus,

although the numerator (damages) increased, the denominator (transmissions) also increased enough to result in an overall lower rate.

It is important to keep in mind that locate request criteria vary from state to state. Requirements for submitting locate requests, such as length or size of the excavation (e.g., a city block, a mile, or from county line to county line, etc.), life of the ticket (e.g., 14 business days, 30 calendar days, indefinite), and notification exemptions, will affect the number of locate requests in a particular state.

For these reasons, users of the metric need to keep in mind how the number is derived when attempting comparisons, whether they be state vs. state, operator vs. operator, or state vs. operator. Nonetheless, the metric remains valuable as a means for states and operators to measure their own "damages per 1,000 locate requests" data in a year-over-year basis to ensure that improvement is being made.

Underground Damage Prevention Analysis

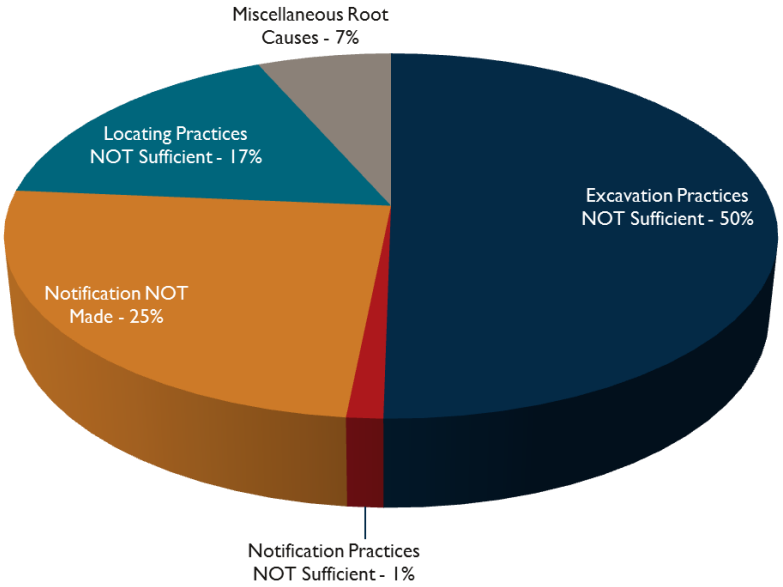
During any excavation project, there are three major opportunities to minimize the likelihood of damage to underground facilities.

1. Requesting that the underground facilities be located in the area to be excavated, typically by contacting 811
2. Correctly marking the underground facilities (i.e., fulfilling the locate request)
3. Employing proper excavation techniques given the site characteristics and conditions (e.g., maintaining clearance, maintaining marks, supporting exposed facilities, using hand tools when appropriate)

The DIRT damage root cause groups reflect these three major points of opportunity. The analysis of additional data elements provides insight into the more common attributes associated with each damage root cause group. This enables stakeholders to more effectively direct efforts and resources and reduce the likelihood of future excavation damages to underground facilities.

A damage root cause was reported for 76% of all events submitted to DIRT for 2014. This is an increase of approximately 3% from 2013. The traditional categorization of these damage root cause groups aligns with the three major points of opportunity described above and accounts for 92% of the reported damage root causes (see Exhibit 3). *Excavation Practices not Sufficient* was the most common damage root cause group reported in 2014 (50% of known events).

Exhibit 3: Distribution of known events by root cause group[7]



The root cause group distribution for 2014 is virtually identical to that of 2013, with *Locating Practices not Sufficient* increasing 1% and *Notification Not Made* decreasing 1% (approximately after rounding). In 2014, events attributed to the *Excavation Practices not Sufficient* damage root cause group increased 0.5% compared to 2013. These shifts do not necessarily indicate worsening excavation or locating practices. More likely, greater public awareness concerning the importance of submitting locate requests and improved facility marking techniques led to this natural outcome, since the pie slices must always add up to 100%. Ideally, *Notification Not Made* will eventually approach 0%, leaving only the remaining root cause groups to approach 100%.

1) <u>Was a locate request made prior to excavation?</u>

Submitting a locate request continues to prove to be the most effective means of preventing underground excavation damages. In recent years, the DIRT reports have noted that less than 1% of underground excavations preceded by a locate request resulted in damages. Last year we reaffirmed that statement, but arrived at a new method that we believe to be more valid, based on a more complete dataset. This method incorporates outgoing transmission from OCSI data. By using the estimate of total damages in the U.S. and available OCSI data on outgoing transmissions, we calculate that damages with a locate request divided by transmissions as follows:

[7] Events that included facility damages (Part H).

- 25.1% notification not made + 1.3% notification not sufficient = 26.4%
- 349,000 x 0.264 = 92,136 damages due to no valid locate request
- Damages due to other causes = 349,000 – 92,136 = 256,864
- Outgoing transmissions = incoming X (outgoing/incoming ratio)= 30,400,000 x 7.17= 217,968,000
- Damages with a locate request over total U.S. outgoing transmissions = 256,864 / 217,968,000 = 0.12%

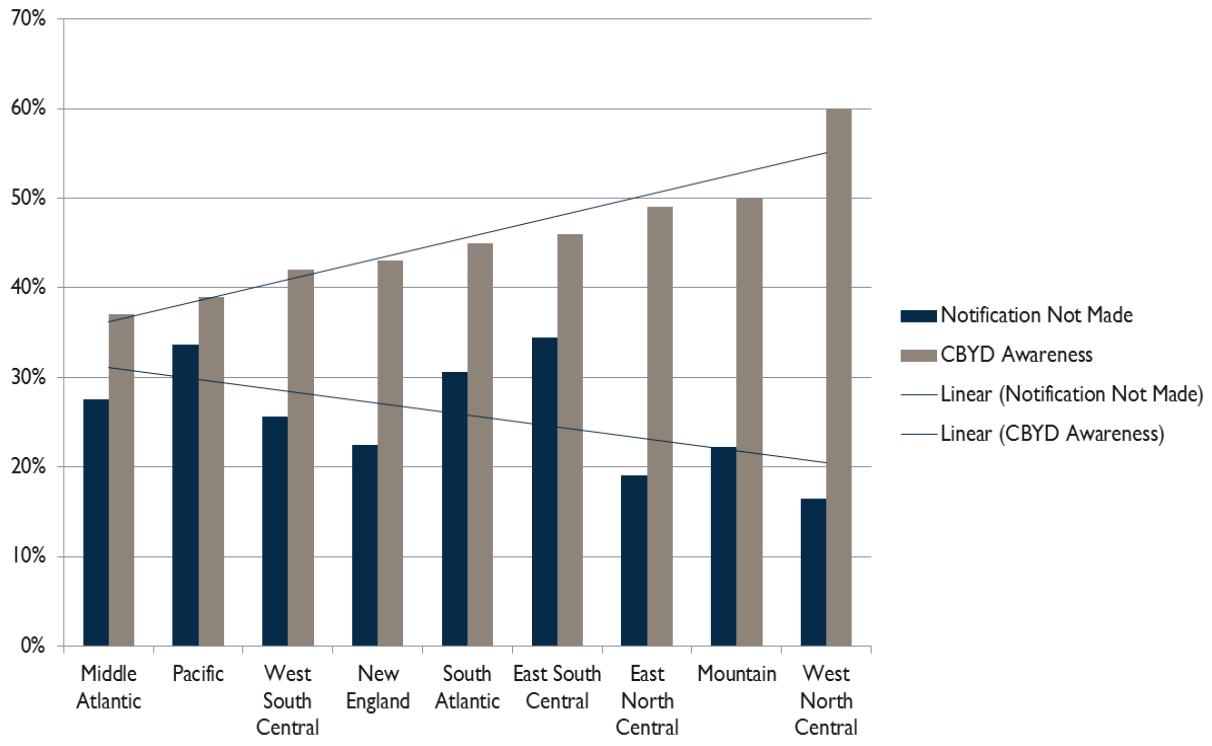
Using outgoing transmissions is the equivalent of saying that an excavator making one call to 811 is on average actually notifying approximately 7 underground facility operators, and there is a 0.12% chance of damaging any one of them—i.e., 0.12% chance of damaging the natural gas facility, 0.12% chance of damaging the communications facility, etc.

Incoming locate requests is an alternative way of looking at it. Dividing damages due to root causes other than lack of notification by number of incoming notifications: 256,864/ 30,400,000 = .0084 = 0.84%. This is the same result as multiplying the chance of damaging a single facility by the number of facilities at the work site (0.12 X 7 = 0.84). This is equivalent to saying that by making one call to 811, there is a 0.84% likelihood of damage occurring to one of the facility operators in the project area. In other words, by contacting 811, the excavator has less than a 1% likelihood of being involved in a damage event.

Please note that the "damages due to other causes" number consists mainly of excavation practices and, to a lesser extent, locating practices. Exhibit 3 shows that the *Excavation Practices Not Sufficient* group constitutes approximately 50% of damages. Improving excavation practices would also reduce the likelihood of being involved in a damage event. However, the *Excavation Practices Not Sufficient* root cause group includes seven root causes (See Exhibit 7 below). Therefore, contacting 811 remains the single most effective means of reducing damages.

A survey conducted by Common Ground Alliance in 2014 identified "Call Before You Dig" general awareness by the nine U.S. census divisions. Awareness ranged from a low of 37% in the Middle Atlantic division to a high of 60% in the West North Central division. Generally speaking, as awareness increases, the percentage of events attributed to *Notification NOT Made* decreases. This can be seen through an examination of the linear trend lines in Exhibit 4.

Exhibit 4: Comparison of "Call Before You Dig" (CBYD) general awareness and percentage of events attributed to the Notification NOT Made *damage root cause by U.S. census division (2014)*



The percentage of underground excavation damages attributed to *Notification NOT Made* varies by excavator group as illustrated in Exhibit 5. Sixty-one percent of damages involving the Occupant/Farmer excavator group were due to *Notification NOT Mad*e. However, Exhibit 5 reveals that the occupant/farmer group has improved in 2014 in its percentage of damages attributed to *Notification NOT Made*, from 65% and 66% in 2012 and 2013 to 61% in 2014. A further examination of damages attributed to *Notification NOT Made* reveals that, relative to the total number of events they are involved in, the Occupant/Farmer group most often was using hand tools (58%). In addition, hand tools were involved in approximately 12 % of all damages due to *Notification NOT Made*, with *occupants* making up approximately 38% and *farmers* less than 1%, respectively, of that 12%.

In contrast, the Contractor/Developer Group was most often using backhoe/trencher (53%), but still had a significant percentage of events using hand tools (31%) (see Exhibit 6). As discussed in the Annual DIRT report on calendar year 2012 data, there are various combinations of one call notification exemptions in state laws involving homeowners, farmers, hand tools and farm equipment.

Exhibit 5: Known damage root cause comparison for professional excavators vs. homeowner/farmer excavators 2012–2014

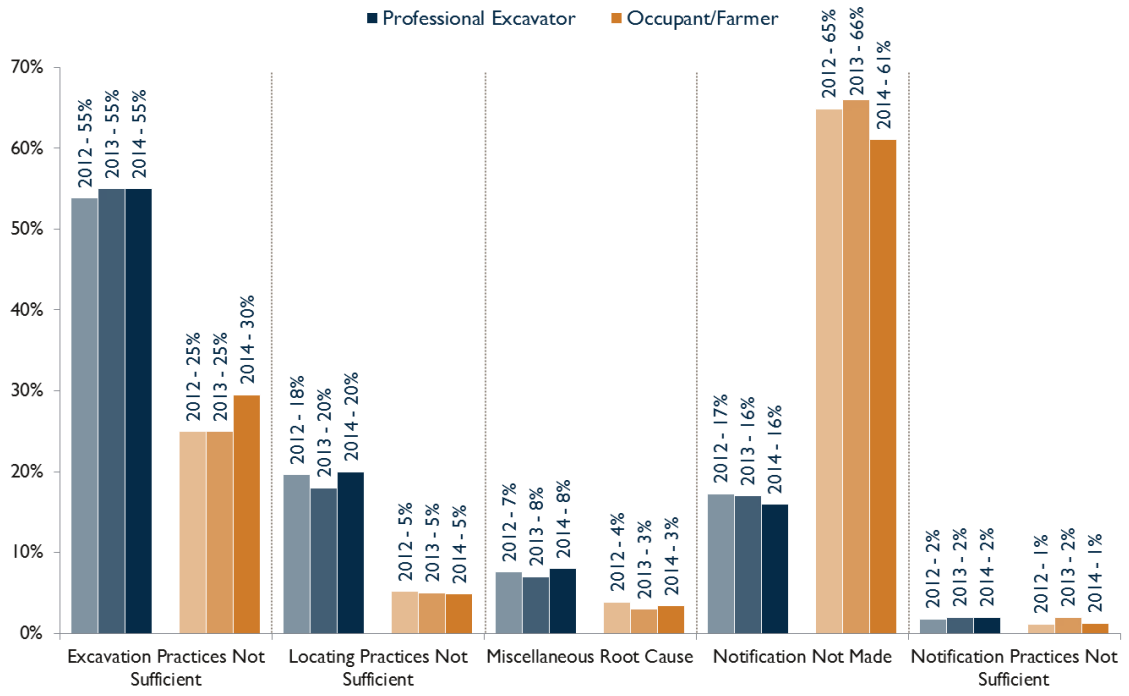
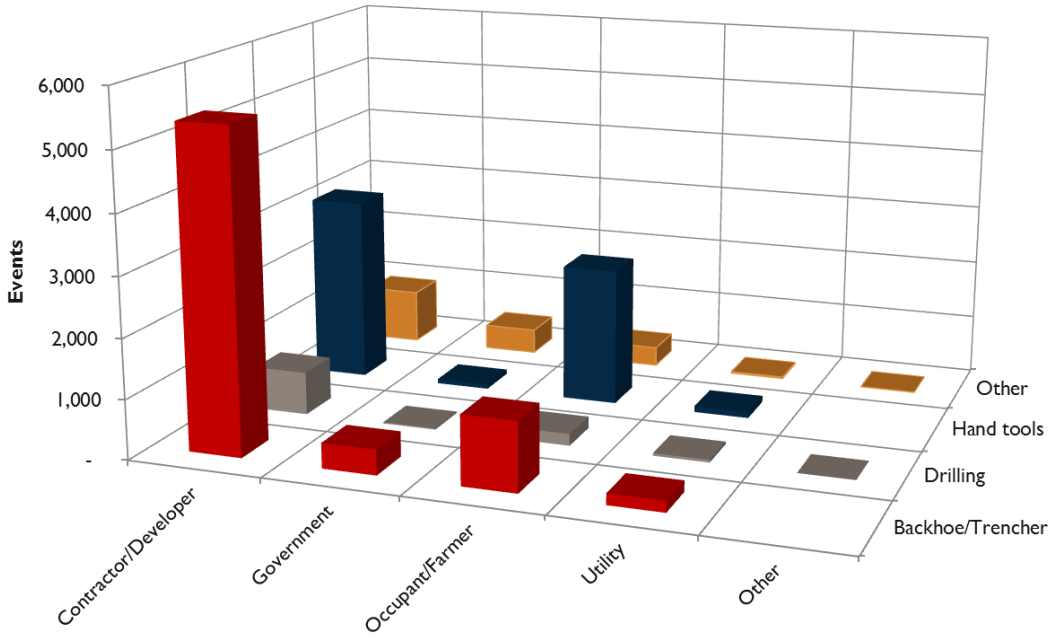


Exhibit 6: Segmentation of "Notification NOT Made" root cause by excavator and excavation equipment type for known events



2) Was the facility properly marked?

The damage root cause group *Locating Practices Not Sufficient* is made up of several root causes. These include *Facility could not be found or located*; *Facility marking or location not sufficient*; *Facility was not located or marked*; and *Incorrect facility records/maps*. *Facility marking or Location not sufficient* were the most commonly reported root causes (69%), followed by *Facility not located or marked* (19%). Of the events that included facility damages, and for which a locate request was made and the damage root cause group was reported as *Locating Practices Not Sufficient*, the majority (68%) had visible but incorrect markings, and 29% had markings not visible (possibly not made at all). The remaining 3% had visible marks that were correct.

3) Was the site properly excavated?

Excavation Practices not Sufficient was the leading root cause group for 2014, comprising 50.1% of known root causes selected. The majority of events under this root cause group (83.8%) were categorized as *Other excavation practices not sufficient* and therefore lack a meaningful specific indication of the true root cause (see Exhibit 7). However, this is a 1.8% improvement from 2013, which would indicate those reporting events are more effectively categorizing the event's root cause.

Exhibit 7: Distribution of root causes for group "Excavation Practices Not Sufficient" (known events)

	Number of events	Percentage of damages		
Excavation practices not sufficient	**104,266**	**2014**	**2013**	**2012**
Other excavation practices not sufficient	87,420	83.8%	85.6%	83.9%
Clearance not maintained	8,561	8.2%	5.2%	6.6%
Hand tools not used	4,728	4.5%	5.8%	5.5%
Marks not maintained	2,254	2.2%	2.1%	2.2%
Test hole not used to verify	804	0.8%	0.8%	1.1%
Exposed facility not supported	394	0.4%	0.4%	0.6%
Backfilling improper	105	0.1%	0.1%	0.1%

The next two most-reported damage root causes for the *Excavation Practices not Sufficient* group were *Hand tools not used where required* and *Clearance not maintained*. When these root causes are compared over the past several years, it is significant to note the 3% increase in *Clearance not maintained*. This may be related to the decreased use of *Other excavation practices not sufficient*.

When the damages in the *Excavation Practices not Sufficient* group are segmented by the excavation information provided in Part D, the most common characteristics of damages to underground facilities are revealed (see Exhibits 8 and 9). The pattern for the past three DIRT data sets—that most underground excavation damages involved contractors and developers using backhoes/trenchers while performing sewer/water construction—persists for the 2014 DIRT data set.

Exhibit 8: Segmentation of "Excavation Practices Not Sufficient" by excavator and excavation equipment type for known events (Part D)

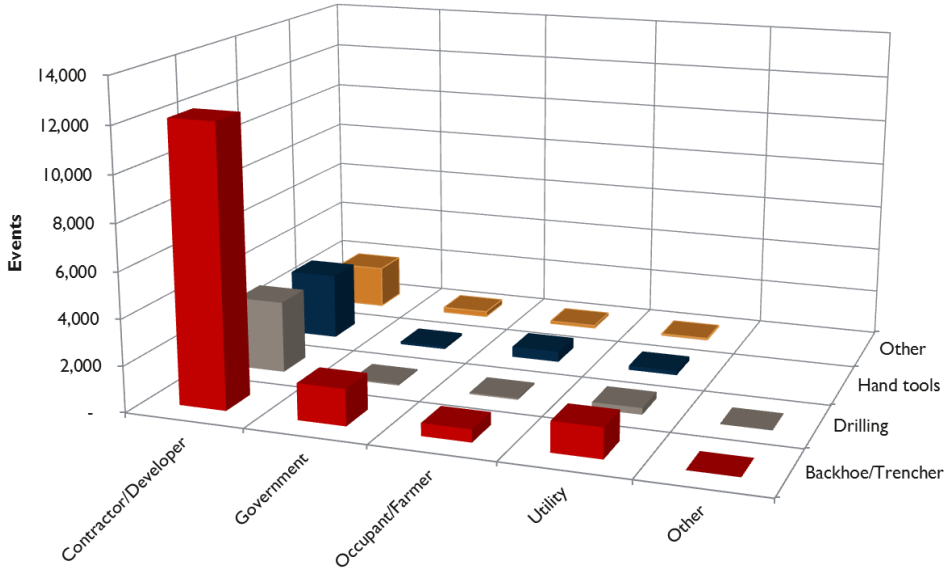
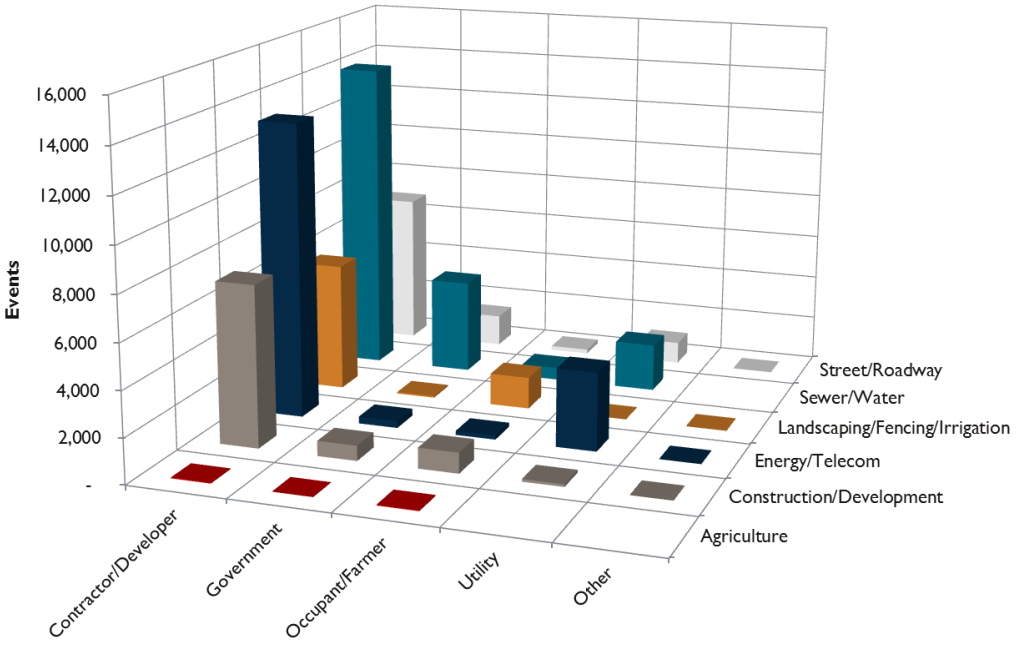


Exhibit 9: Segmentation of "Excavation Practices Not Sufficient" by excavator type and work performed for known events (Part D)

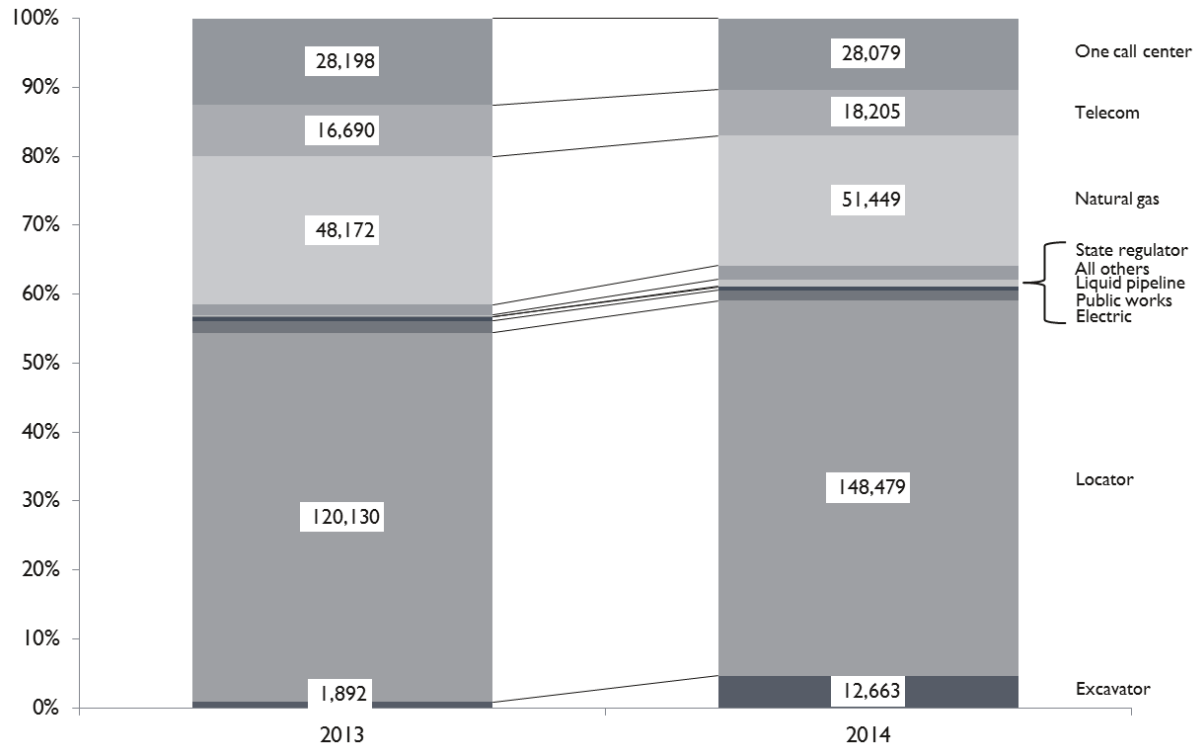


Select Data Element Results

Part A: Who is submitting this information?

Locator, natural gas, telecommunications, and one call center are the reporting stakeholder for 94% of known events submitted for 2014, a slight decrease from 2013. This is offset by an increase in events submitted by excavators from 1,892 in 2013 to 12,663 in 2014.[8] When the events reported by the excavators are combined with the above-noted four reporting stakeholders, the sum becomes 99% of known events submitted. Locators submitted the most events for the third year in a row with 148,479 (54.3% of total events submitted).

Exhibit 10: Distribution of known events by reporting stakeholder



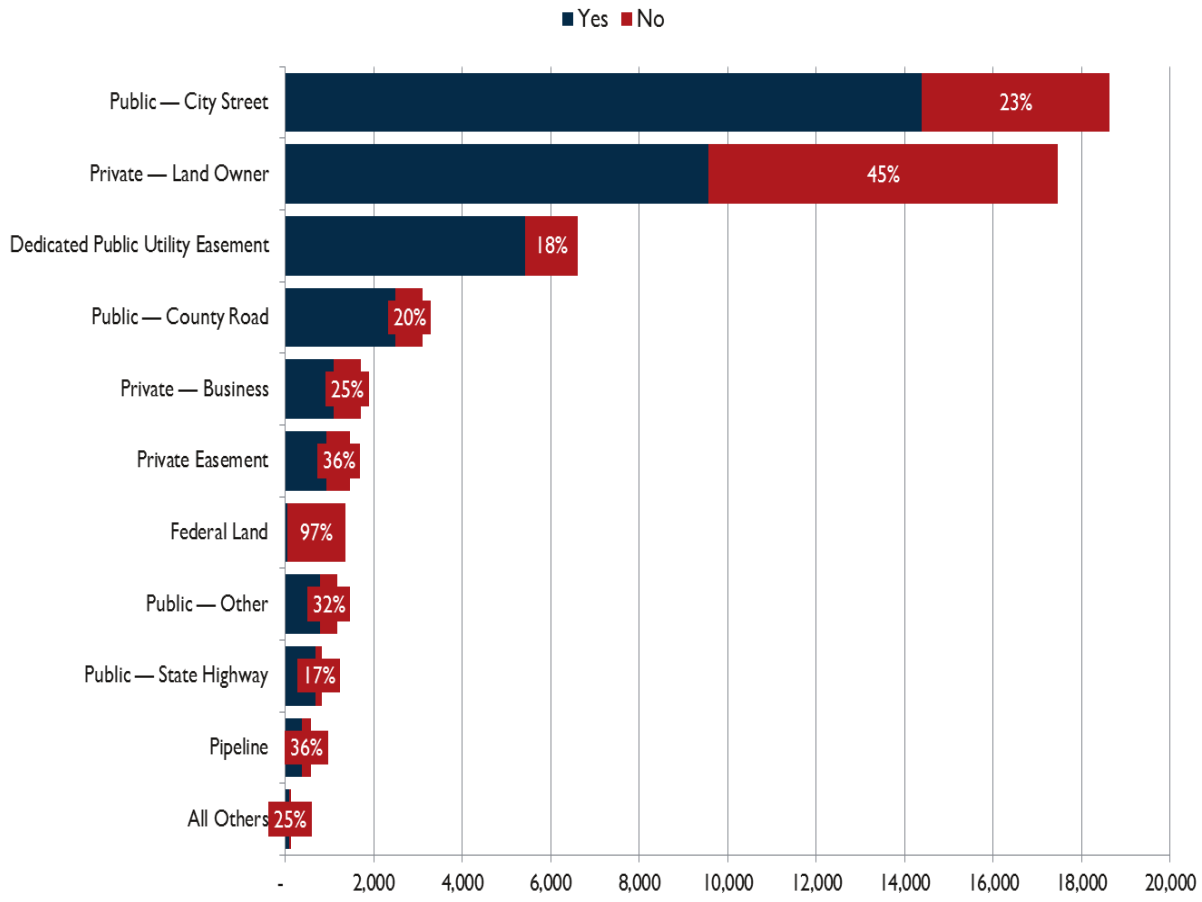
Part B: Date and location of the event

This data element includes the date of the event and the type of right-of-way (ROW). Approximately 35% of the known events occurred in public city street ROW, which is a decrease from 2013 (see Exhibit 11). In 2014, there was an increase in events that occurred on private landowner ROW, but only 55% of these events were preceded by a locate request, which is 18% lower than all events reported

[8] Some events submitted by one call centers actually are based on damage reports they receive from excavators.

(see Part E below). It is interesting to note that of the 1,375 events occurring on federal land, 97% were not preceded by a locate request.

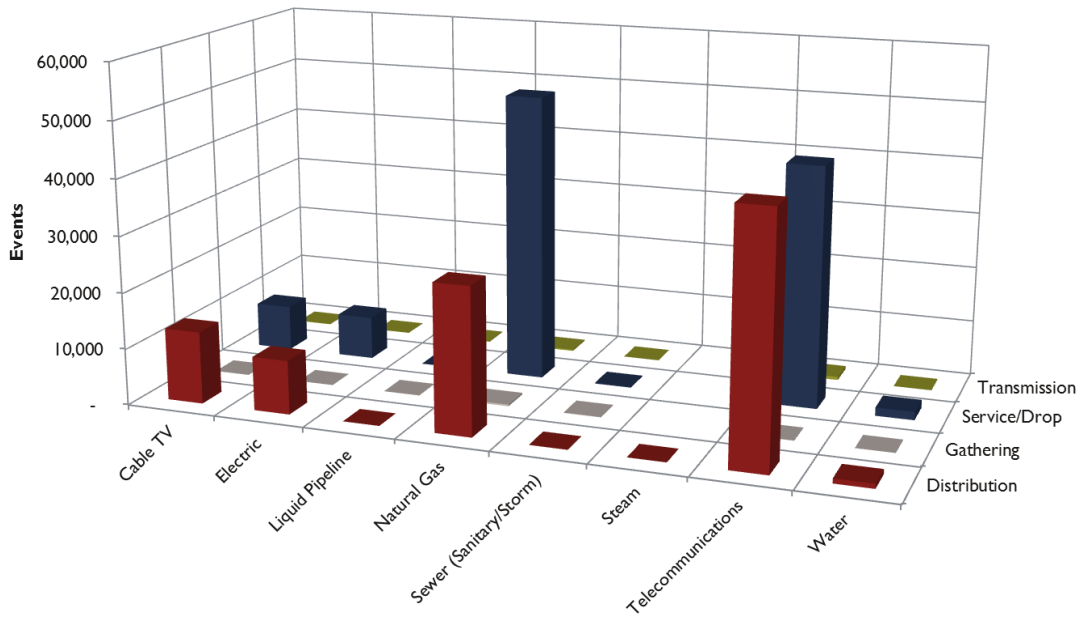
Exhibit 11: ROW in which the event occurred and the percentage of these events without a locate request (excludes Data Not Collected)



Part C: Affected facility information

This data element includes the type of facility operation affected (e.g., Cable TV, Natural Gas, Water); the type of facility affected (e.g., Distribution, Transmission); whether it was a joint trench; and if the owner of the facility is a one call member. Natural Gas and Telecommunications utilities bore the most damages, representing almost 80% of the known events (38% Natural Gas and 39% Telecommunications). Similar to 2011, 2012, and 2013, nearly 99% of the facilities affected in 2014 (known data) were reported as Service/Drop or Distribution (see Exhibit 12).

Exhibit 12: Events segmented by facility operation and type of facility affected (excludes Unknown/Other responses)



These attributes create an interesting opportunity to undertake a more granular examination of these damages and better understand the dynamics surrounding these events. Exhibit 13 visualizes an in-depth examination of damages to natural gas distribution facilities. These damages are approximately 11% of the total known facility damages reported in 2014. When the type of excavation equipment and root cause is added to the analysis, the intricacies of these damages can be seen. For instance, 19% of the known damages to natural gas distribution facilities are attributed to hand tools, of which 54% have a root cause of *Notification NOT Made*. This deviates from 25% of events attributed to *Notification NOT Made* in the entire U.S. and Canada as seen in Exhibit 3.

When this same type of analysis is then applied to natural gas damages of service/drop facilities (22% of known damages), the percentage of events associated with hand tools and *Notification NOT Made* increases to 24% and 55%, respectively (see Exhibit 14). Of the known excavator types for these natural gas events, occupant/farmers constitute 41% for distribution facilities and 45% for service/drops. This is significant because only 10% of total known damages submitted to DIRT come from this excavator group.

Exhibit 13: Examination of natural gas, distribution damages by excavation equipment and damage root cause[9]

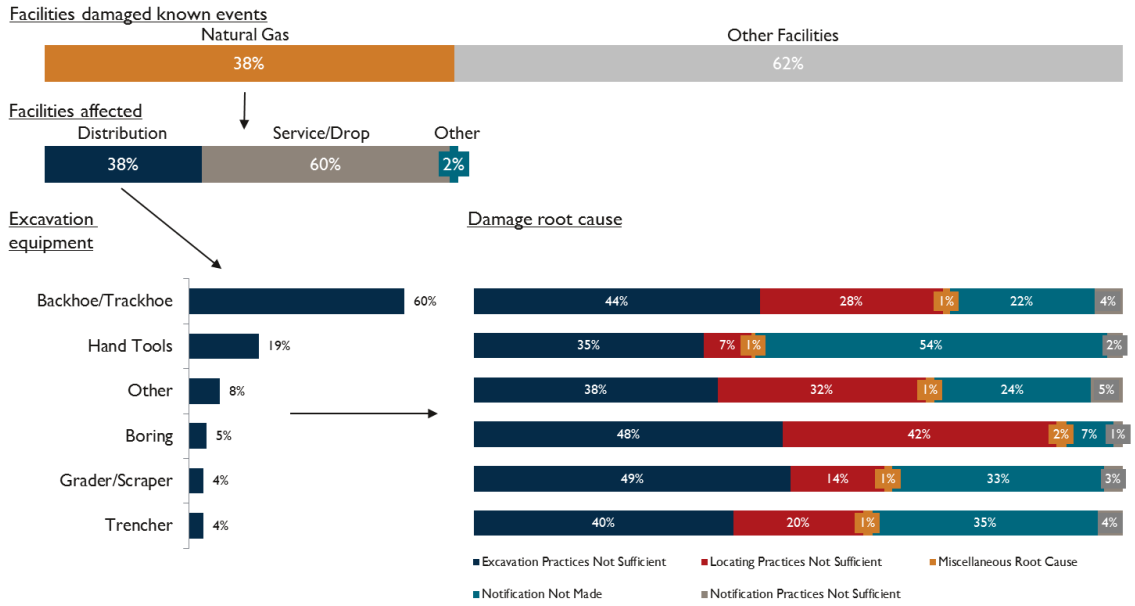
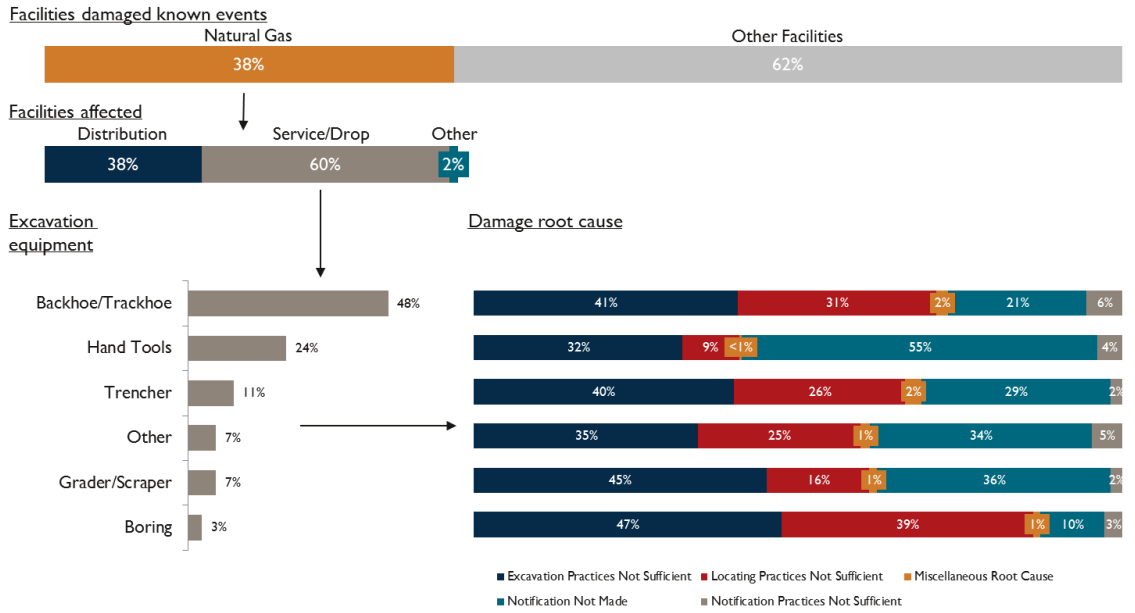


Exhibit 14: Examination of natural gas, service/drop damages by excavation equipment and damage root cause

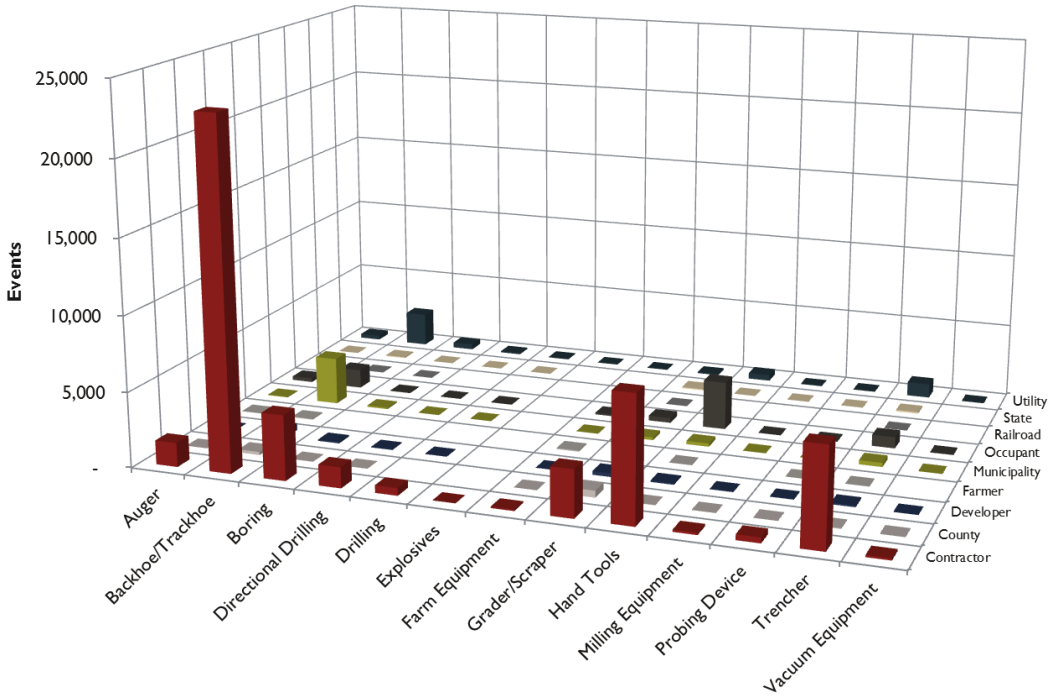


[9] Additional graphical analysis of telecommunication events is included with the full set of backup data at http://www.damagereporting.org/annual

Part D: Excavation information

This data element includes the type of excavator, type of work performed, and type of excavation work involved in the event. This is one of the most critical components of the DIRT data set because it identifies the "who" and the "how" related to excavation damages. The Underground Damage Prevention Analysis section of this report addresses this data element in additional detail and suggests that the greatest number of damages involve contractors and developers using backhoes/trackhoes while performing sewer and water excavation when *Excavation Practices not Sufficient* was the root cause, although in 2014 an increasing number of damages occurred during energy and telecommunications excavation work. Backhoes/trackhoes in use by Contractors were also involved in the majority of damages (35% of known events) regardless of root cause (see Exhibit 15).

Exhibit 15: Distribution of events by type of excavator and type of excavation equipment (excludes Data Not Collected, Other, and Unknown responses)



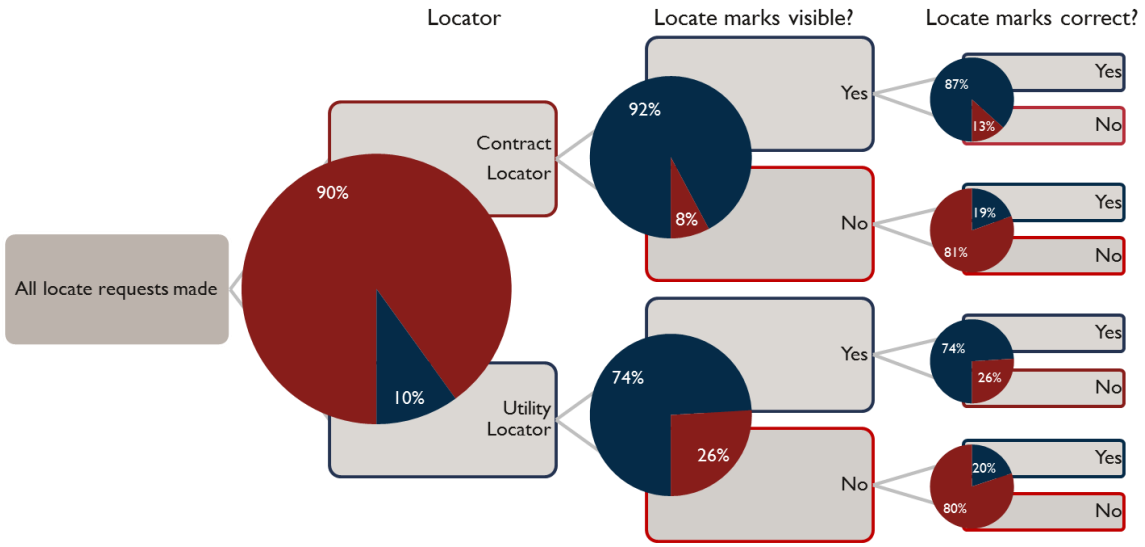
Part E: Notification

Requesting the location of underground utilities prior to excavation is a proven method for preventing damage. In 2014, 73.1% of the events submitted included notification made to a one call center, which remains consistent with the 73.6% in 2013. This is consistent with the inverse of those damages attributed to the root cause of *Notification NOT Made*, 74.9%.

Part F: Locating and marking

Contract locators continue to fulfill the majority of locate requests, representing 90% of submitted events in 2014 (see Exhibit 16). The locating and marking performance of *contract locators* in 2014 is essentially unchanged compared to 2013, with the percentage of marks that are 1) visible and 2) correct being 92% and 87%, respectively. The locating and marking performance of *utility locators* in 2014, however, has seen a considerable performance change from 2013. Of the 10% of submitted events marked by *utility locators* in 2014, there has been a decrease compared to 2013 in the marks' visibility (74% versus 78%) and accuracy (74% versus 80%).

Exhibit 16: Site marking characteristics by locator (known events)



Part G: Excavator downtime

This data element reports whether excavator downtime was incurred as well as its duration and cost. A large majority of reported events do not include this data (approximately 89%). Of the 31,035 events that included responses to excavator downtime incurred (i.e., response of yes or no), only 31% report that downtime was incurred, a 3% decrease from 2013.

When excavator downtime was experienced, for the majority of events it was 1 to 2 hours in duration (see Exhibit 17). This downtime duration range occurred to the greatest extent in the $1–$500 cost range, but was followed closely by events with no cost associated with the downtime. This $0 cost range also had the most events with over 2 hours of downtime. This differs from past years, where events in the $1,001 to $2,500 range had the longest lengths of downtime. Exhibit 18 illustrates that the lengthiest downtimes were associated with liquid pipeline facilities, electric facilities, and natural gas facilities. Sewer and telecommunications facility downtime grew in 2014 compared to 2013, with a greater percentage of events having downtime in excess of 2 hours.

Exhibit 17: Distribution of events experiencing excavator downtime by cost and duration

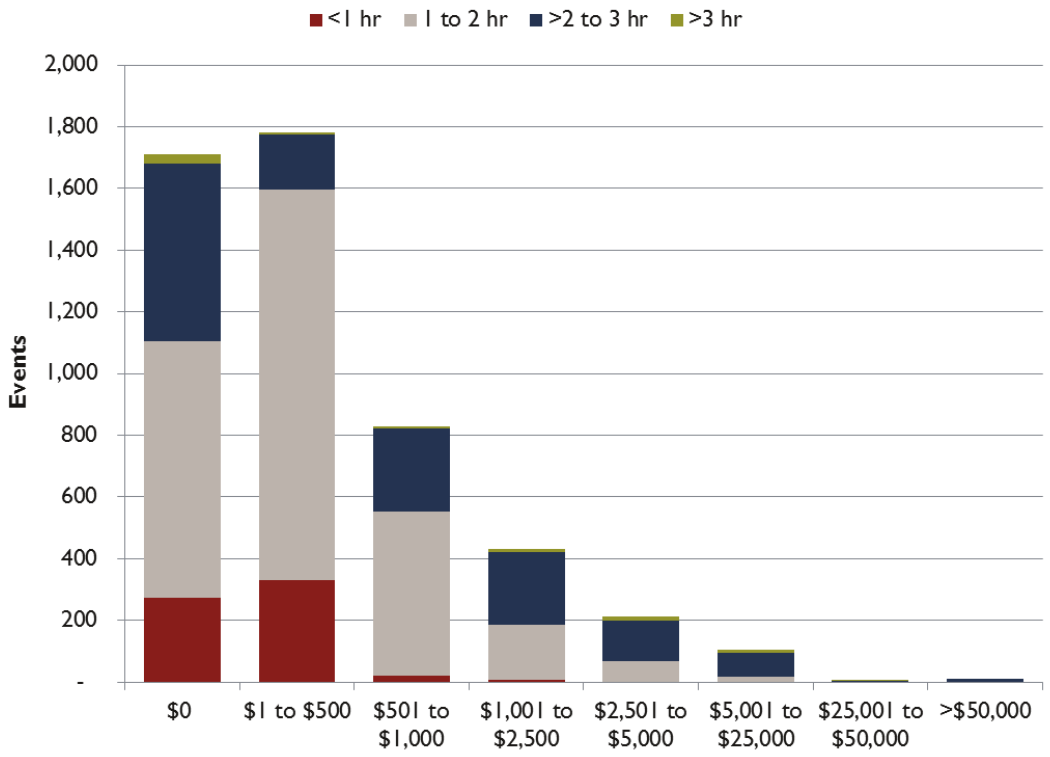
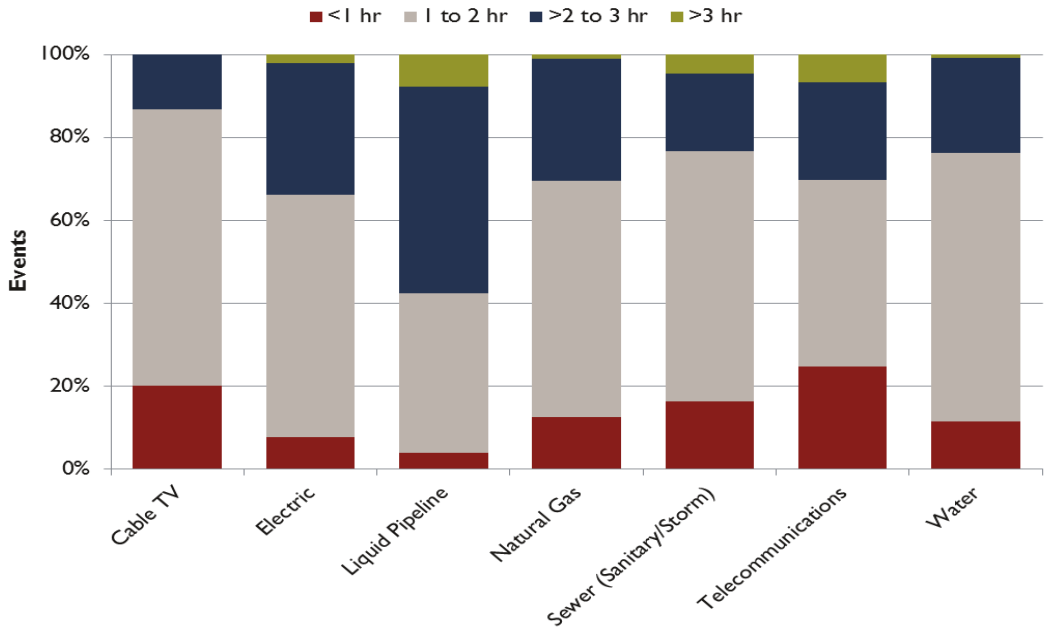


Exhibit 18: Distribution of events experiencing excavator downtime by facility damaged and duration

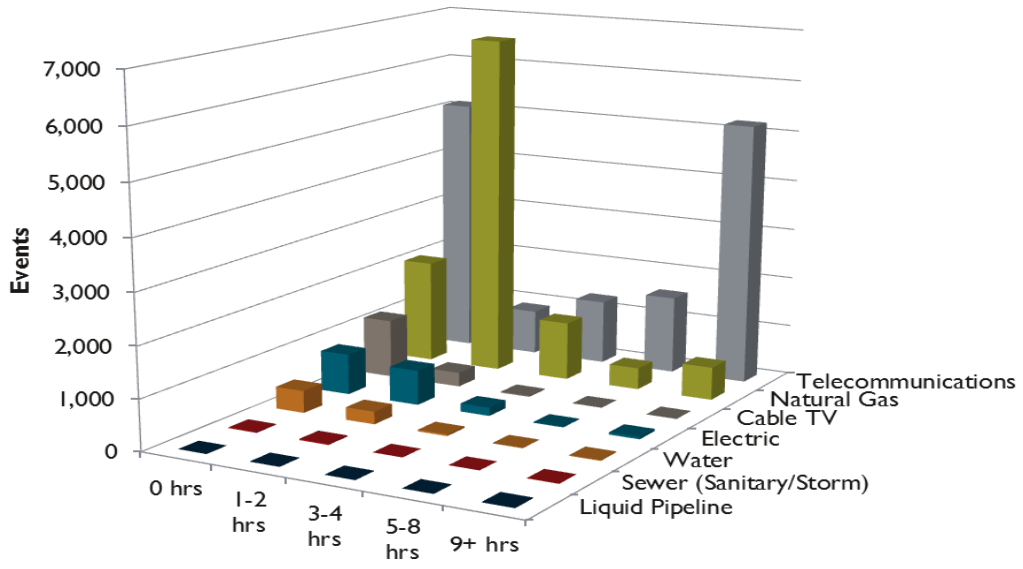


Part H: Description of damage

This data element indicates if damage was incurred and provides details regarding a service interruption, if applicable. The results of this analysis can be summarized as follows.

- 97% of events submitted in 2014 experienced facility damages, and 3% would be considered a "near miss."
- 78% of the above-noted facility damages have known data regarding service interruption (an increase of 2% from 2013).
- Of the known facility damages that included data about service interruptions, the majority (81%) did experience service interruption.
    - 92% experienced service interruptions lasting less than 24 hours. The largest proportion experienced 0 hours of interruption, or 33% of the total interruptions reported.[10]
    - Of the known service interruptions, 31% came from natural gas and 48% came from telecommunications (see Exhibit 19).
    - 90% affected zero (8%) to one customer (81%).
    - 87% incurred costs of $2,500 or less.

Exhibit 19: Distribution of known events by service interruption duration and the facility affected

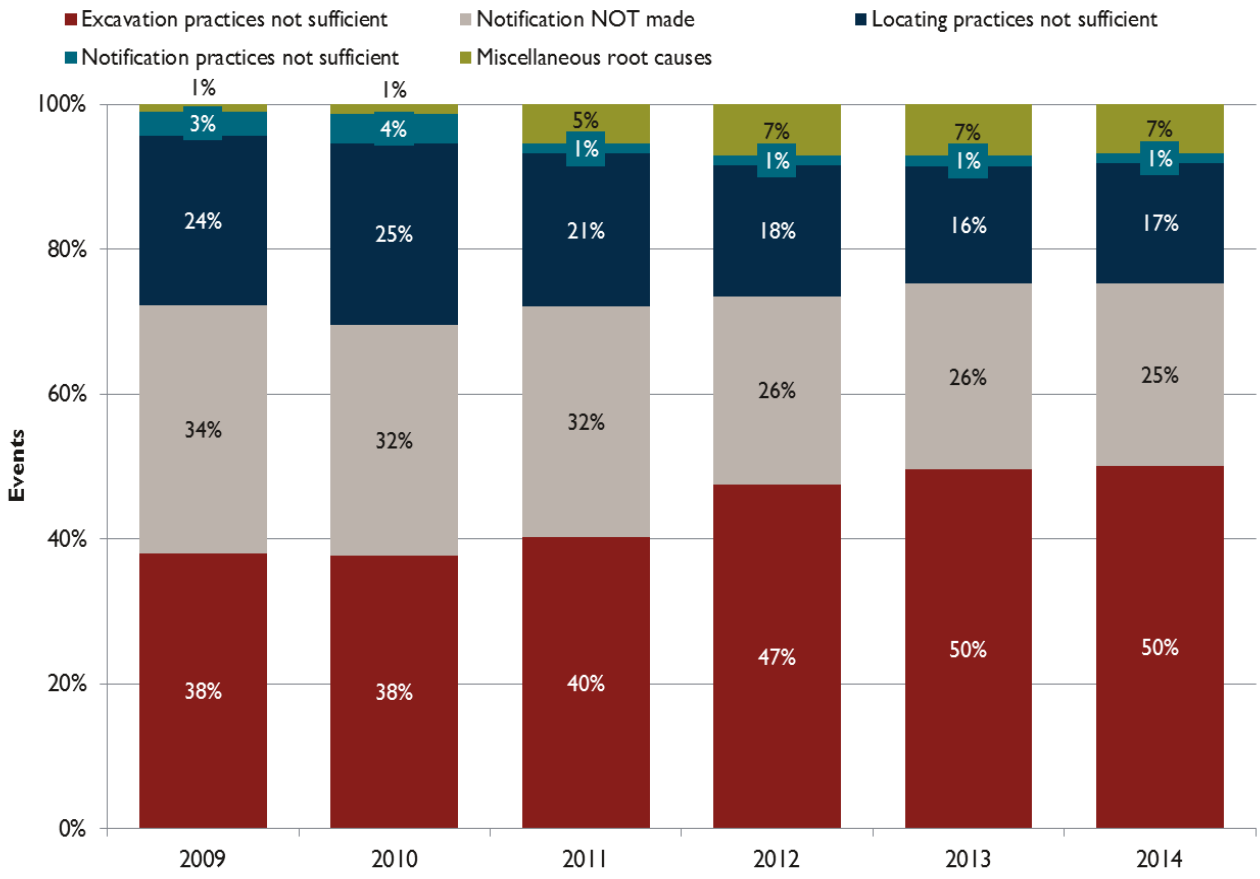


[10]An interruption is described as a deviation from normal operating capabilities. It is possible to have an interruption with zero customers affected because some facility operations, for example CATV or Telecommunications, can reroute service in certain situations - to avoid interrupting customers.

Part I: Root cause

A damage root cause was reported for 76% of all events submitted to DIRT in 2014, approximately the same as in 2013. The distribution of known events among the root cause groups has remained relatively unchanged over the last three years.

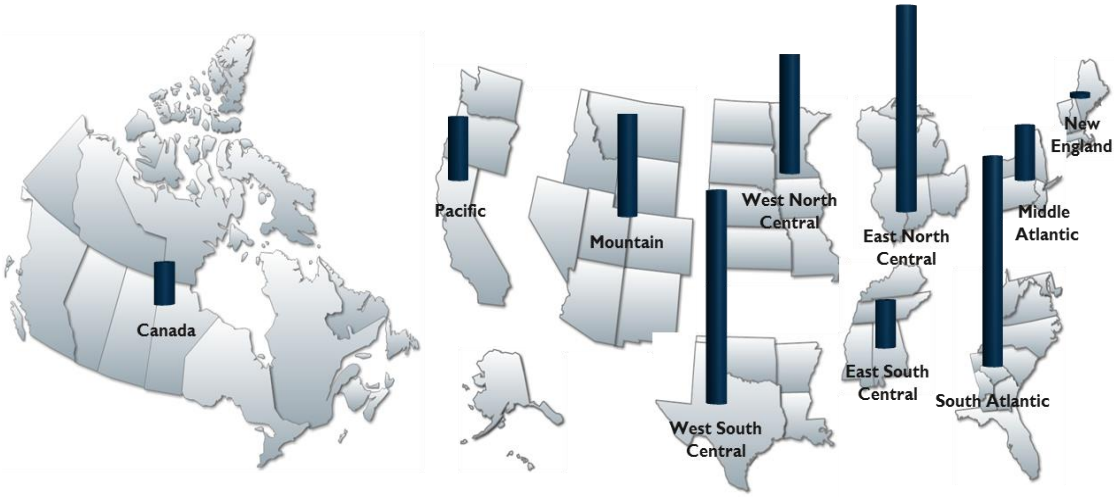
Exhibit 20: Distribution of known events by root cause group (2009–2014)



Regional Data Comparisons

Events submitted to DIRT include the state or province of occurrence. The ability to develop more localized damage prevention recommendations that result from the analysis of event data and information for smaller regions has great benefit.

Exhibit 21: Distribution of events by division[11]

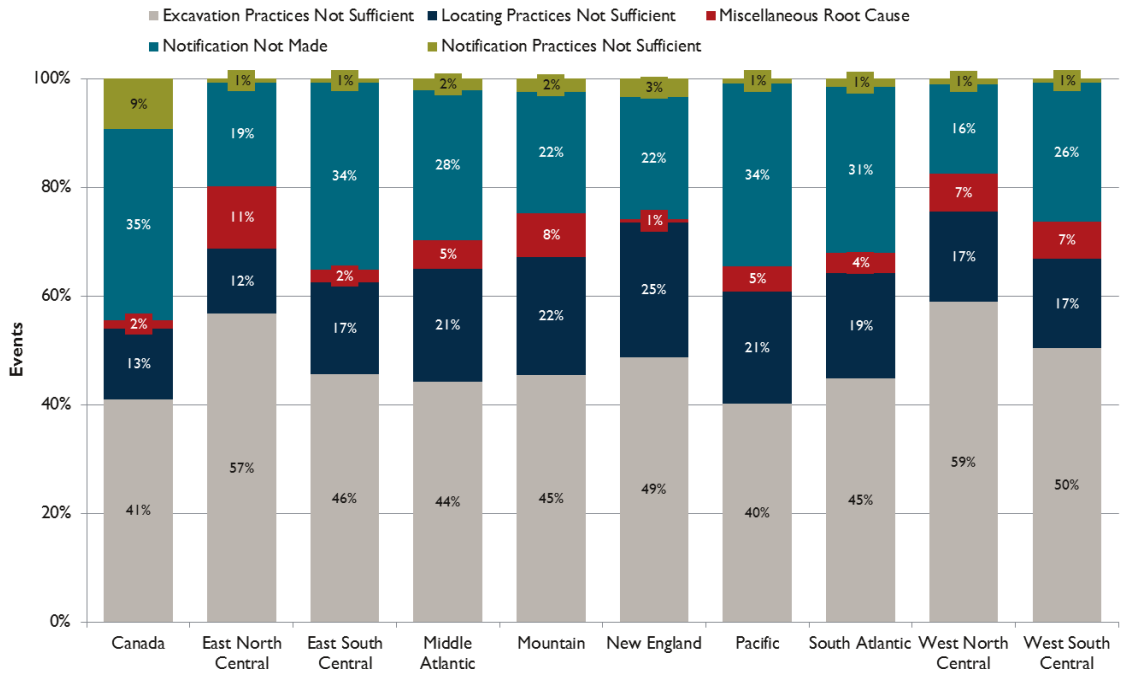


	2014		2013	2012
Census Division & Canada	Number of Events	% of Total Events	% of Total Events	% of Total Events
Canada	10,857	4.0%	3.5%	3.5%
East North Central	52,974	19.4%	21.3%	22.1%
East South Central	12,194	4.5%	4.8%	5.6%
Middle Atlantic	14,125	5.2%	5.8%	6.4%
Mountain	26,299	9.6%	7.1%	5.5%
New England	1,231	0.4%	0.5%	0.7%
Pacific	16,255	5.9%	6.3%	5.0%
South Atlantic	54,013	19.7%	20.0%	22.2%
West North Central	30,615	11.2%	11.0%	10.3%
West South Central	55,035	20.1%	19.9%	22.3%

[11] Canada and U.S. census divisions

Exhibit 22 illustrates the distribution of damage root causes by division. Meaningful differences are apparent and may suggest the need to develop underground excavation damage prevention best practices specific to some geographies.

Exhibit 22: Distribution of known events by root cause by division



An examination of the circumstances and common characteristics of events by division reveals some variations for the type of excavator, excavation equipment, and work performed. These are illustrated in Exhibits 23, 24, and 25 (Part D).

Exhibit 23: Distribution of known events by division and excavator type

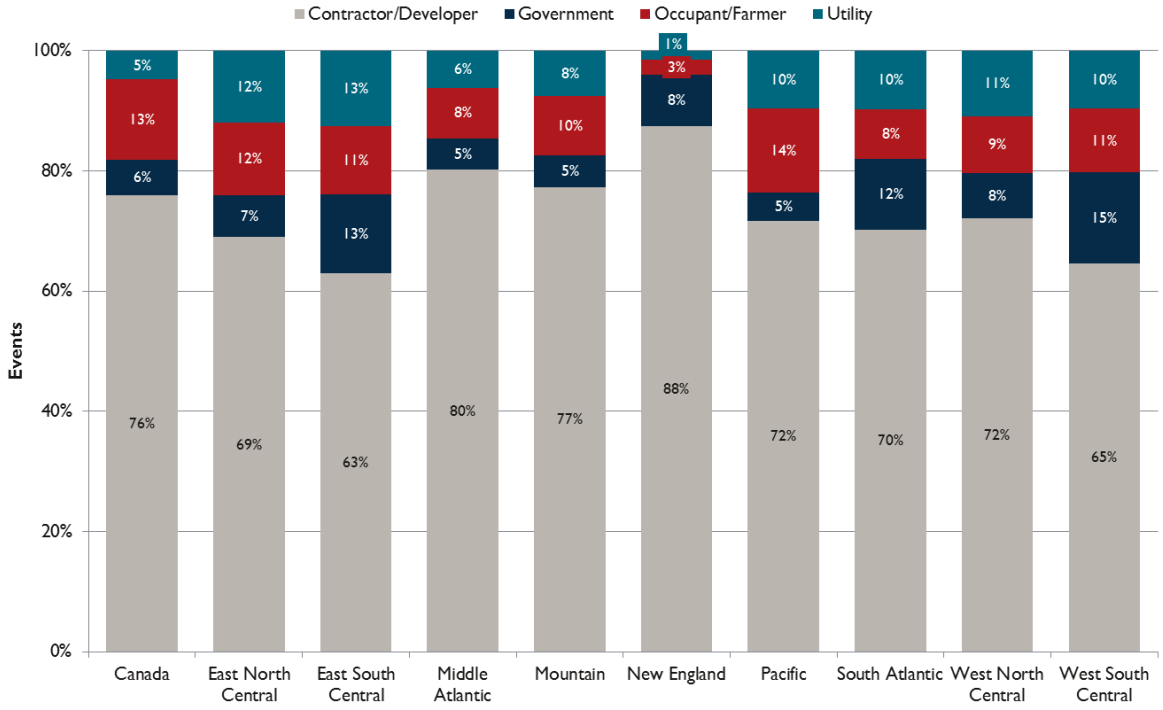


Exhibit 24: Distribution of known events by division and excavation equipment type

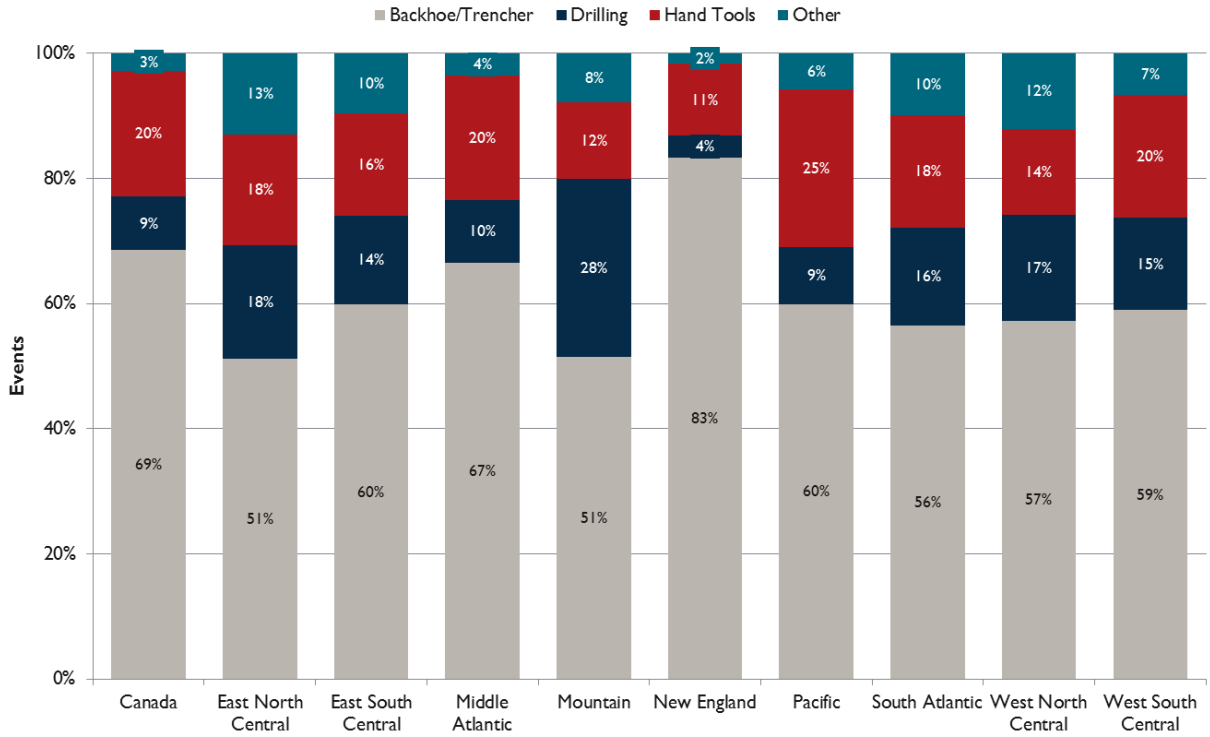
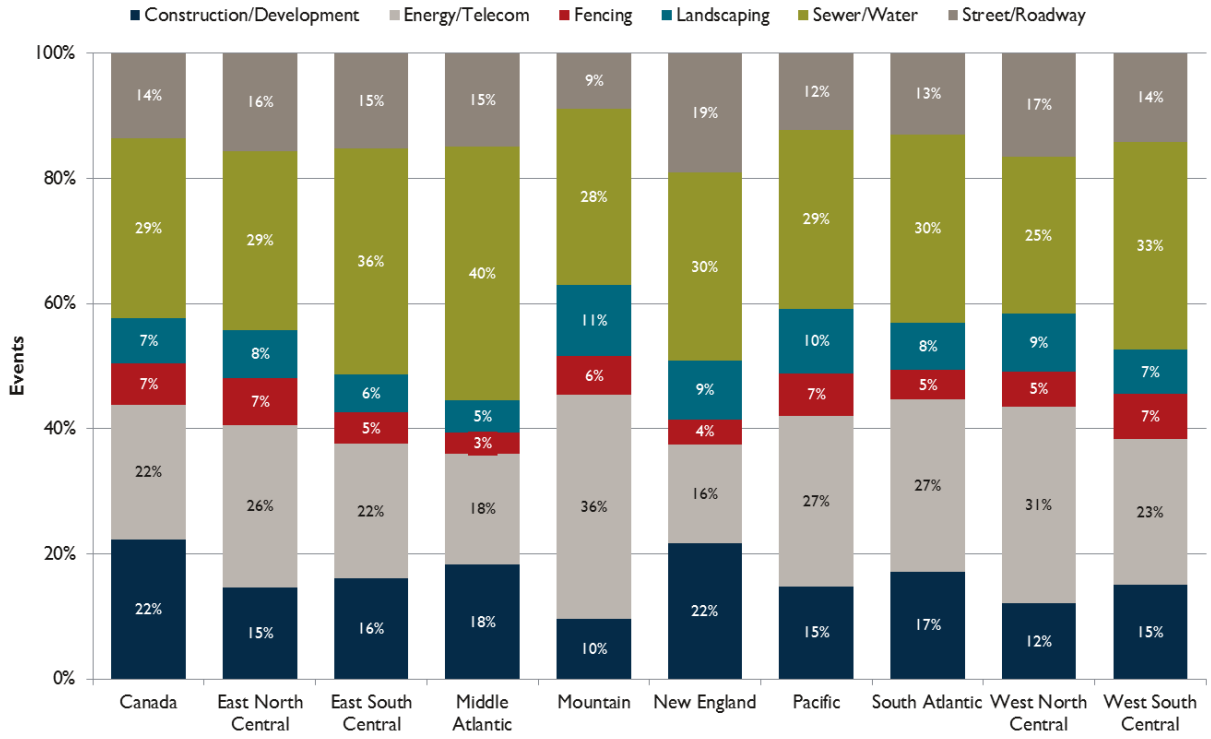


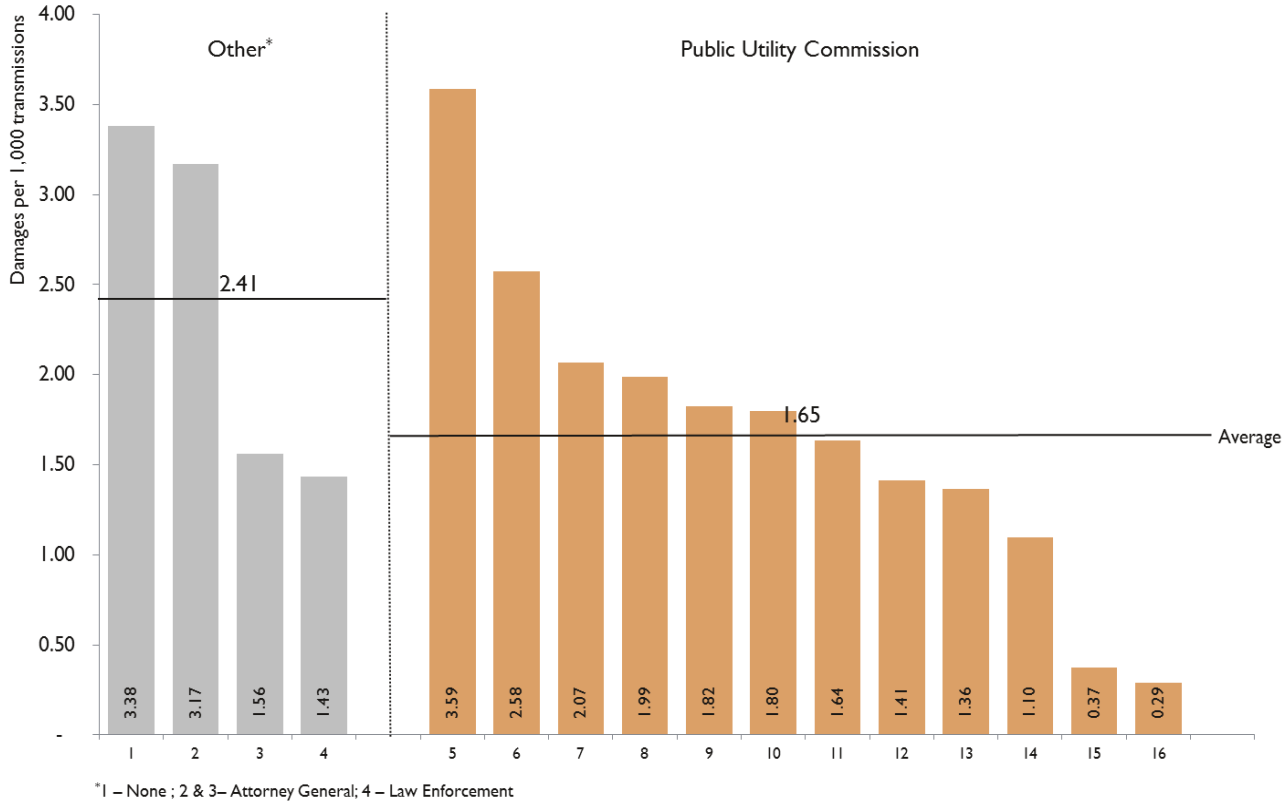
Exhibit 25: Distribution of known events by division and work performed



Enforcement Authority Analysis

In the 2012 DIRT report, the committee examined the effects of notification exemptions on state damage rates. In this year's DIRT report, we examine the effect of enforcement authority on damage rates. Exhibit 26 examines the damage rate per 1,000 transmissions for the 16 previously identified substantial reporting states. Twelve of the substantial reporting states have active enforcement programs overseen by their public utility commissions. These 12 states have a combined rate of 1.65 damages per 1,000 transmissions. As a comparison, the damage rate for the other four substantial reporting states is 2.41. There are many factors that affect a state's damage rate aside from enforcement, such as the level of damage prevention education and marketing. Some of the states with PUC/PSC enforcement do have higher damage rates that those without. However, the state PUC/PSC enforcement programs have differing levels of maturity. The states labeled 15 and 16 in *Exhibit 26 (Damages per 1,000 transmissions by enforcement authority for substantial reporting states)* have mature programs. The states labeled 5 and 6 began their enforcement programs in 2013, and the DR&EC is aware that their damage rates did drop fairly significantly (>20%) in the short time since enforcement was implemented. Considering all these factors, it is apparent that active enforcement has a positive effect on damage rates.

Exhibit 26: Damages per 1,000 transmissions by enforcement authority for substantial reporting states



Data Quality Index Indications

The Data Quality Index (DQI) measures the completeness of event data submitted to DIRT. Data that is complete (i.e., information is provided for all fields) receives a score of 100%. As illustrated by Exhibit 27 [*Share of 2014 data element using Data Not Collected (DNC), Other, or Unknown]*, 15 of the examined data fields have equal or better reporting than in 2013. This can further be seen in Exhibit 28, which is a comparison of weighted DQI by reporting stakeholder. In 2014, the average weighted DQI across all events was a full percentage point greater than in 2013 (65% versus 64%). Although this increase is incremental, when applied throughout all 273,599 reported events, a significant increase in the amount of useful information is gained on the events reported. Perhaps the most impactful element on 2014's average DQI was the more than 2% increase in weighted DQI for the largest reporting stakeholder, Locators, with 148,479 submitted events.

Exhibit 27: Share of 2014 data element using DNC, Other, or Unknown

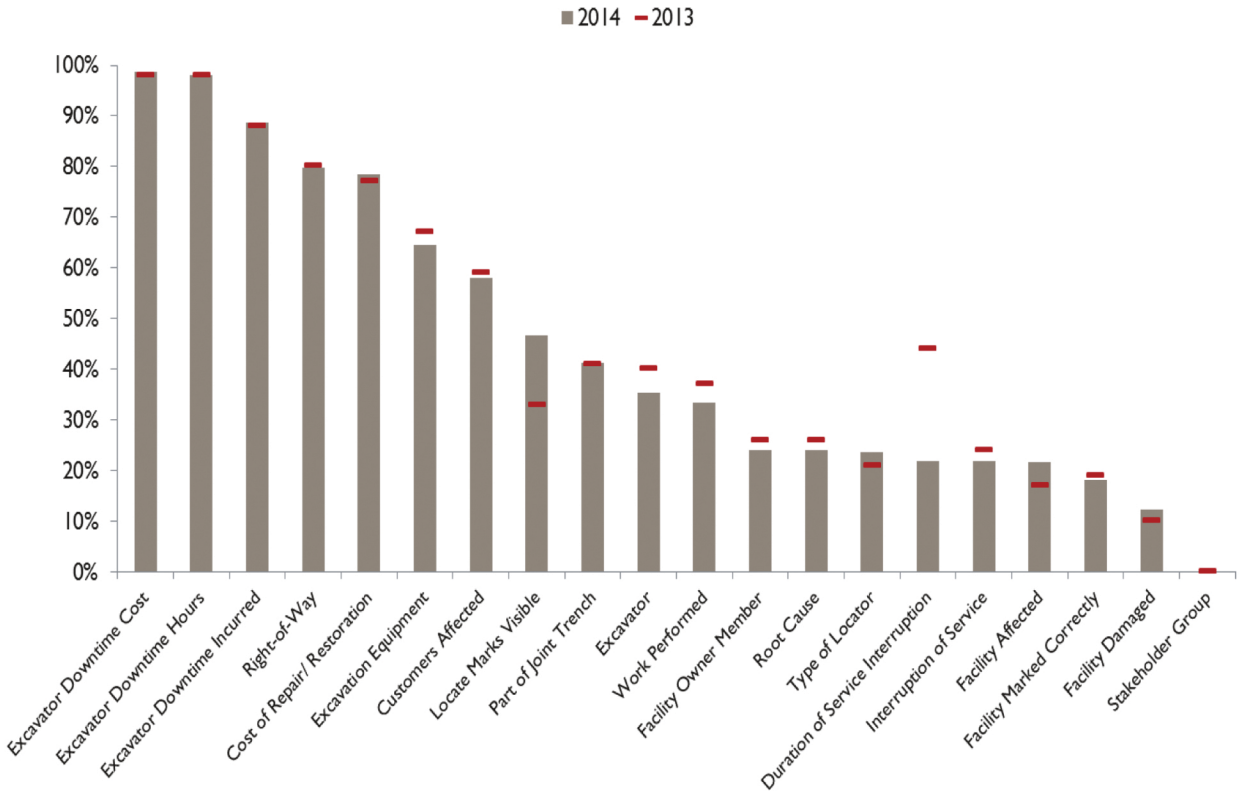
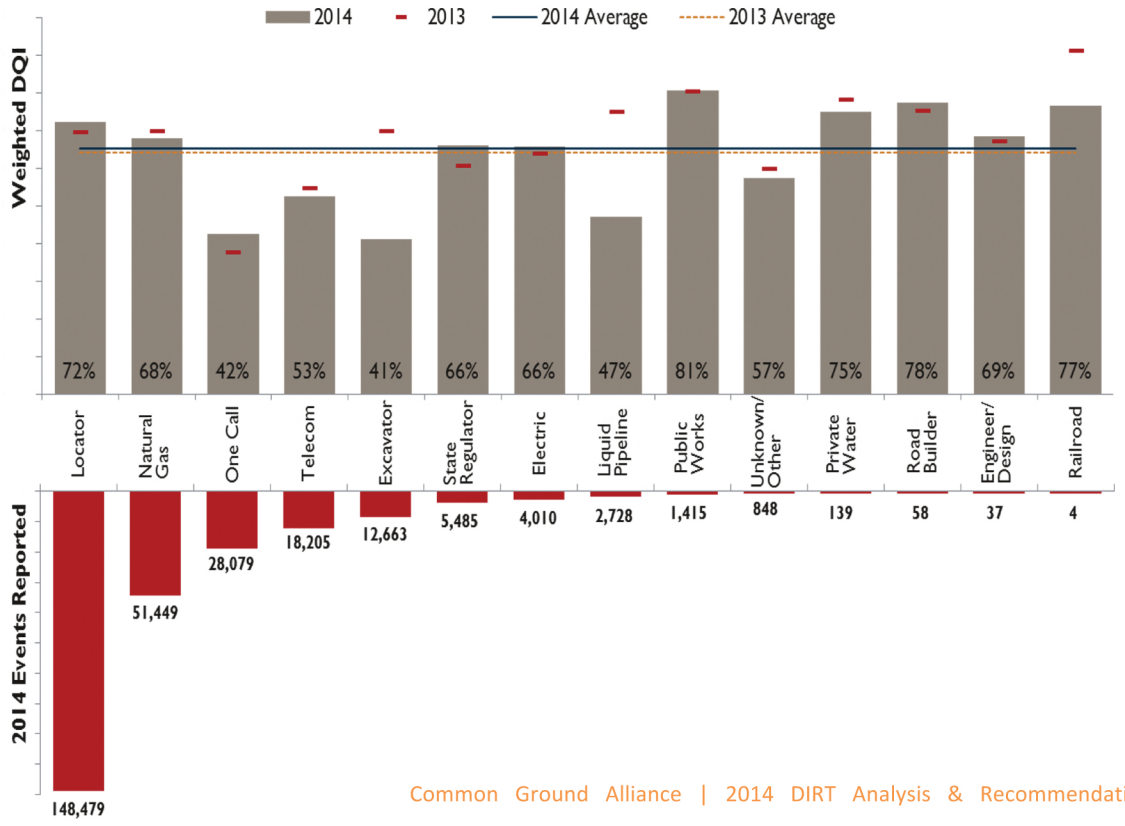


Exhibit 28: DQI by reporting stakeholder



Appendices

Appendix 1: Groupings used in this report

Excavator Group

Group	Type of Excavator
Contractor/Developer	Contractor, Developer
Occupant/Farmer	Occupant, Farmer
Utility	Utility
Government	State, County, Municipal
Other	Railroad

Excavation Equipment Group

Group	Type of Excavation Equipment
Backhoe/Trencher	Backhoe, Track hoe, Trencher
Hand tools	Hand tools, Probe
Drilling	Auger, Bore, Directional drill, Drill
Other	Grader, Scraper, Road milling equipment, Explosives, Vacuum equipment, Farm implement

Work Performed Group

Group	Type of Work Performed
Sewer/Water	Sewer, Water
Energy/Telecom	Natural Gas, Electric, Steam, Liquid Pipe, Telecommunication, Cable TV
Construction/ Development	Construction, Site Development, Grading, Drainage, Driveway, Demolition, Engineering, Railroad, Waterway
Street/Roadway	Roadwork, Curb/Sidewalk, Storm Drainage, Milling, Pole, Traffic Signals, Traffic Signs, Streetlight, Public Transit
Landscaping	Landscaping
Fencing	Fencing
Agriculture	Agriculture

Root Cause Group

Group	Root Cause
Excavation practices not sufficient	Failure to maintain clearance, Failure to support exposed facilities, Failure to use hand tools where required, Failure to test hole (pot-hole), Improper backfill practices, Failure to maintain marks, Excavation practices not sufficient (other)
Notification NOT made	No notification made to one call center
Locating practices not sufficient	Incorrect facility records/maps, Facility marking or location not sufficient, Facility was not located or marked, Facility could not be found or located
Notification practices not sufficient	Notification of one call center made but not sufficient, Wrong information provided to one call center
Miscellaneous root cause	Abandoned, One call center error, Deteriorated facility, Previous damage

2014 CGA DIRT
Analysis & Recommendations

Prepared by:
Jay Bowman and Paul Giovannoni, FMI Corporation
CGA's Data Reporting & Evaluation Committee

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Marathon Pipe Line
Spectra Energy
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Underground Safety Alliance
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American Petroleum Institute
American Public Gas Association
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Association of American Railroads
Association of Oil Pipe Lines
Avista
Blood Hound, Inc
Buckeye Partners, LP
CenterPoint Energy
Citizens Gas & Coke Utility
Colorado 811
Columbia Pipeline Group
Consumers Energy
Deere & Company
Dig Safely New York
DTE Energy
Elm Locating & Utility Services
Enable Midstream Partners, LP
Enbridge Energy Company
EnLink Midstream
Ericsson, Inc.
Explorer Pipeline Company
Georgia 811
Golden Pass Pipeline
INGAA
Infrastructure Resources/Rhino
Koch Pipeline Company LP
KorTerra
Lockton Companies, LLC
Magellan Midstream Partners
NAPSR
National Utility Locating Contractors
New York 811
NiSource
Ohio Utilities Protection Services
One Call Concepts
ONEOK Partners
Pacific Gas & Electric
Pennsylvania 811
Plains All American Pipeline
Public Service Electric & Gas
Radiodetection
Southern California Gas
Southwest Gas Corporation
Southern Star Central Gas Pipeline, Inc.
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