DIRT

Damage Information Reporting Tool

Analysis of Near Miss Events

Supplement to DIRT Report for 2018

To download or to access additional analysis, visit CommonGroundAlliance.com/DIRT.

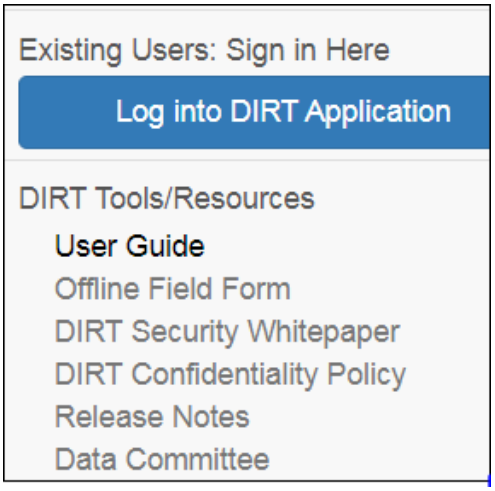
This report may be referenced as the DIRT Analysis of Near Miss Events for 2015-2018.

Released, April 2020

Contents

Near Miss and Damage Events Defined

One of the resources available on the Damage Information Reporting Tool (DIRT) website (www.cga-dirt.com) is a *User Guide*, which provides guidance on interpreting the questions and selecting the proper entries. It is accessible even for people not registered in DIRT.



The *DIRT User Guide* glossary defines "near miss" and "damage" as follows:

Near Miss: An event where a damage did **not** occur, but a clear potential for damage was identified.[1] Some examples include, but are not limited to, the following:

1. An excavator discovers a buried facility that was not marked or not marked accurately.
2. An excavator is found digging without having notified the one call center.
3. An operator fails to respond to a locate request.
4. A one call center incorrectly entered data regarding the work site.

Damage: Any impact or exposure that results in the need to repair an underground facility due to a weakening or the partial or complete destruction of the facility, including, but not limited to, the protective coating, lateral support, cathodic protection, or the housing for the line, device, or facility.

Note that a damage does not require a release of product. For example, excavating machinery contact with a pipeline that causes a dent, coating scratch, or tracer wire damage requiring repair is considered a damage for DIRT purposes. This is consistent with how natural gas and liquid petroleum transmission pipeline operators distinguish damages.

In annual DIRT reports, the word "events" is used to encompass both damage and near miss reports, and "damages" is used when referring to damage reports only. Recent DIRT reports and online dashboards have been based only on damage reports. Near misses were filtered out because of the low percentage of near miss reports relative to total events[2] and the realization that near miss reports likely

[1] CGA's *Best Practices Manual* also contains a glossary. The "near miss" definition found there does not include the examples shown in the *DIRT User Guide*. The "damage" definition is identical in the *DIRT User Guide* and the *Best Practices Manual* glossary.

[2] Typically, 3% or less.

have characteristics that distinguish them from damage reports. This report examines those unique characteristics using the last four years' worth of data (2015 to 2018).[3]

Key Takeaways

- Excavators and road builders submit higher quality data for near miss DIRT reports compared to the damage reports they submit. Many of the excavators and road builders who are submitting near miss DIRT reports appear to be using DIRT to document locating issues and associated downtime, as intended by the original *Study of One-Call Systems and Damage Prevention Best Practices.*[4]
- Near miss reports submitted by natural gas and liquid pipeline stakeholders involve "transmission" as the facility affected and "no notification made to one call center/811" as the root cause in higher percentages than their damage reports.
- Near miss reports from locators are not significantly different from their damage reports in terms of root causes, facility operation, and facility type affected.

Recommendations

- **Promote greater usage and quality of near miss reporting in DIRT, especially by excavators and road builders.** The ability to report near misses and/or downtime allows excavators and road builders to document breakdowns in the damage prevention process that affect their businesses. The Common Ground Alliance's motto is "Damage prevention is a shared responsibility." The responsibility of the excavator is to provide valid and timely notification of intent to dig, and facility operators (or locating vendors) will respond in a timely manner, barring unusual circumstances (e.g., natural disasters). In addition to damage reporting, near miss reporting provides a more complete picture of the functioning of the damage prevention process. Preventive measures that reduce near misses will also serve to reduce damages. If excavators and road builders see the damage prevention process working for them as intended, they will be more likely to uphold their ends of the shared responsibilities.

- **The Data Reporting & Evaluation Committee should work with the One Call Systems International Committee (OCSI) to obtain data on late locates from one call centers with positive response systems.** Evidence indicates that near miss DIRT reports from excavators that involve late locates are a tiny fraction of what actually occurs. Several one call centers operate automated positive response (APR) systems in which facility operators and locators input information on the status of locate requests (e.g., marks complete, no conflict, delayed), and excavators then check the status of their locate request before commencing work. Data pulled from APR systems indicates that high percentages of locate requests are not fulfilled on time. If one call centers are willing to share data, it could be used in conjunction with DIRT data to produce a more complete picture of the downtime hours and cost associated with near misses due to late locates.

[3] 2015 was the first year that a method of identifying and weighting matching reports of the same event was applied to the DIRT data. The *2015 Annual DIRT Report* explains this method.

[4] Chapter 1 of CGA's *Best Practices* manual provides background on the Common Ground study and how it evolved into the creation of Common Ground Alliance and the *Best Practices*.

Background

Origins of Near Miss Reporting in DIRT

Participants in the original Common Ground study recognized the importance of collecting data on "problems that have not yet, but may, lead to facility damages." Below are some excerpts from **Reporting & Evaluation Task Team Best Practices** (Chapter 9) of the study:

- To prevent damage, it may be necessary to track problems before a hit has actually occurred. This data, strictly related to prevention, may be evident when near misses or downtime have occurred.
- Excavators may be able to identify problems that will prevent future damage. A prudent excavator who continually encounters problems with the one call system will find it beneficial to report those problems before damage occurs.
- Incentives are needed to encourage stakeholders to submit the data. For example, stakeholders that submit information should know that their data will be used to promote better damage prevention.
- It would be beneficial for the evaluation to include recurring problems that have not yet, but may, lead to facility damages. This evaluation can be used to target public awareness/education resources, locate unmarked/abandoned facilities, identify stakeholders who are not performing well, or identify other problems with the one call system process that can be improved before damage occurs.

The Common Ground study eventually led to the creation the *CGA Best Practices* as we know them today. The first two practices in the study's Chapter 9 **(Reporting and Evaluation)**, the foundation for DIRT, specifically refer to "events that *could have*, or did, lead to a damaged underground facility" (emphasis added) and "…data includes damage information, downtime, and near misses."

9.1 All Stakeholders Report Information

Practice Statement:

Facility owners/operators, locators, excavators, or stakeholders with an interest in underground damage prevention report qualified information on events[45] that could have, or did, lead to a damaged underground facility.

9.2 Standardized Information Is Reported

Practice Statement:

The requested data is standardized and consists of essential information that can be analyzed to determine what events could, or did, lead to a damaged facility. This means that collected data includes damage information, downtime, and near misses. All stakeholders submit the same damage, near miss and downtime data via simple answers and check boxes. (Refer to Appendix C for example form)[58]

Use of Icons

The CGA uses icons to assist readers in identifying the practices that pertain to their specific industry/stakeholder group. Throughout the document, the icons appear next to each practice and correspond to the following groups: Project Owners, Facility Owners, Excavators, One Call Centers, Designers, and Locators. The icon legend is provided below and also is available at the start of each chapter.

One Call Center | Facility Owner | Excavator | Locator | Project Owner | Designer

The Common Ground study and the *Best Practices Manual* make several references to downtime. The *DIRT User Guide* glossary defines downtime as shown below, and provides additional examples in the guidance material for that part of the DIRT form:

> **Downtime**: Time that an excavator must delay an excavation project due to failure of one or more stakeholders to comply with applicable damage prevention regulations or best practices. There may or may not be a damage associated with the downtime.

The *Best Practices Manual* glossary defines it slightly differently:

> **Downtime:** Lost time reported by a stakeholder on the Damage Information Reporting Tool (DIRT) field form for an excavation project due to failure of one or more stakeholders to comply with applicable damage prevention regulations.

Note that downtime can be reported in association with a damage or a near miss. Also, a near miss can be reported with or without downtime.

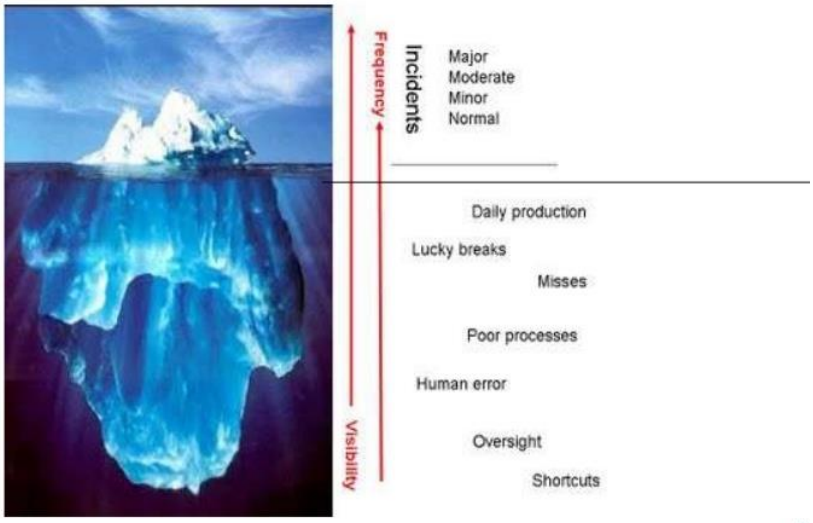
The topic of near misses has generated some interesting discussions at CGA Data Reporting & Evaluation Committee meetings. Different stakeholders bring different mindsets and experiences. The term can have different meanings in different industries, such as transportation (e.g., aviation, rail, ship), nuclear power, healthcare, workplace safety, etc. In the damage prevention industry, there can be a range of risks and likelihood of a near miss becoming an actual damage, from a natural gas or liquid petroleum transmission pipeline patrol discovering excavation work with no 811 notice at the edge of a 50-foot right-of-way versus digging within a few feet of the pipeline.

When an excavator delays their work due to a past-due locate, distance between the excavating activity and buried facility is not a factor in determining if it qualifies as a near miss. This scenario is considered a near miss (possibly with downtime) according to the DIRT Guidelines. The rationale is that the excavator might have proceeded with the work, without locate marks, in order to avoid downtime or scheduling conflicts, leading to an actual damage. But because the excavator was aware and responsible enough to delay their work, a damage that otherwise might have occurred is avoided.

The following are things to keep in mind when considering near miss reporting in the context of DIRT reporting and damage prevention:

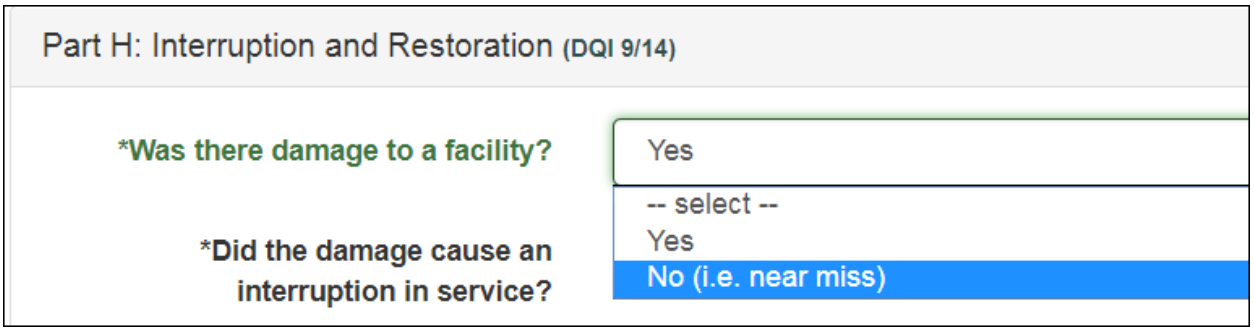
1. The original Common Ground study called for excavators to report downtime to demonstrate the effect that breakdowns in the damage prevention process have on them, as well as "identify stakeholders who are not performing well, or identify other problems with the one call system process that can be improved before damage occurs." Near miss reporting is the means by which these events can be entered into DIRT for further analysis, true to the intent of the Common Ground study.

2. Tracking near misses enables identification of breakdowns in the damage prevention process that have a *clear potential* to lead to damages. Corrective actions to reduce near misses will also serve to reduce actual damages because they target the same behaviors that contribute to damages. For example, consider an excavator digging without 811 notification and found by a natural gas transmission pipeline patrol. There were probably other times the excavator did so undetected. If that behavior continues, the probability of actual damages occurring increases. The same could be said for inaccurate or late locating. Similarly, this is why tracking near misses is common practice in many industries where human health and safety are factors. Enter "near miss iceberg" in an internet search engine and you will find many variations of images such as the following, with incidents/accidents above the water line and near misses below it.

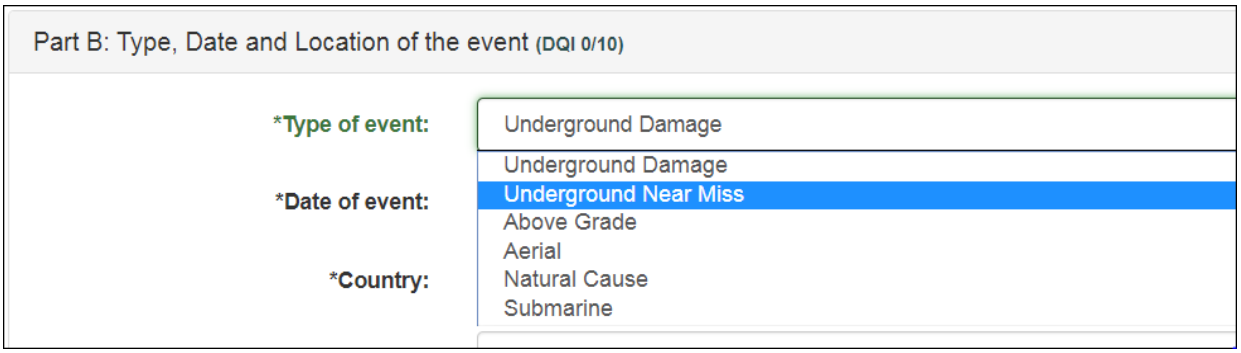


Near Miss Reports in the Damage Information Reporting Tool (DIRT)

Since its inception, DIRT users have been able to enter "near miss" reports in DIRT in addition to damages. Up to the end of calendar year 2017, this was done by selecting "No (i.e., near miss)" to answer the question "Was there damage to a facility?" in Part H of the online DIRT form.



Beginning in 2018, in conjunction with other revisions to the DIRT questions, near miss reporting was moved to Part B under the "type of event" question.



Analysis of 2015–2018 Near Miss Data

Dataset Used in Analysis

The following analysis is based on 23,981[5] near miss reports entered in DIRT from 2015 to 2018.

Event Source	Near Miss Reports
Electric	262
Engineering	15
Excavator	5,240
Insurance	1
Liquid Pipe	1,044
Locator	12,381
Natural Gas	2,640
One Call Center	92
Private Water	37
Public Water	282
Railroad	6
Regulator	941
Road Builder	34
Telecommunication	385
Unknown	622
Grand Total	**23,981**

Table 1—Near Miss Reports by Event Source[6]

Next, we will dig deeper into some of the underlying data for the top four sources: excavators, natural gas, liquid pipelines and locators. This will allow us to see if there are significant differences in the nature of the near miss reports as compared to damage reports, and reveal what issues are of concern to the various stakeholders that lead them to take the extra effort to report near misses.

Because road builders' interests and concerns are very similar to those of excavators, their 34 reports will be added to and treated as excavators.

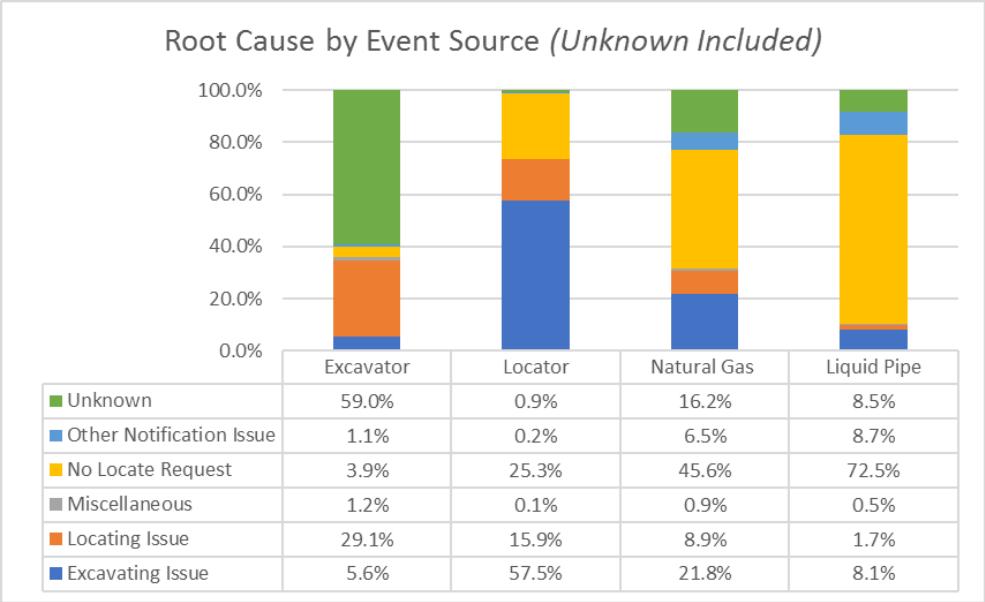
Overview of Root Cause Groupings

Figures 1 and 2 display the percentages of the root cause groupings by reporting stakeholder for the four years of near miss data, first with unknown root causes included, and then with them filtered out, leaving only *known* root causes. For this analysis, abandoned facilities are grouped with the locating root cause group rather than miscellaneous for all four years to be consistent with the revised root cause

[5] This number accounts for multiple reports of the same event using the same method applied to damages for the annual DIRT report and online dashboards. The total number of near miss reports entered in DIRT over this four-year period was 24,542. This process compresses the near miss data by 2.3%, compared to an average of approximately 20% for damage reports over the same period.

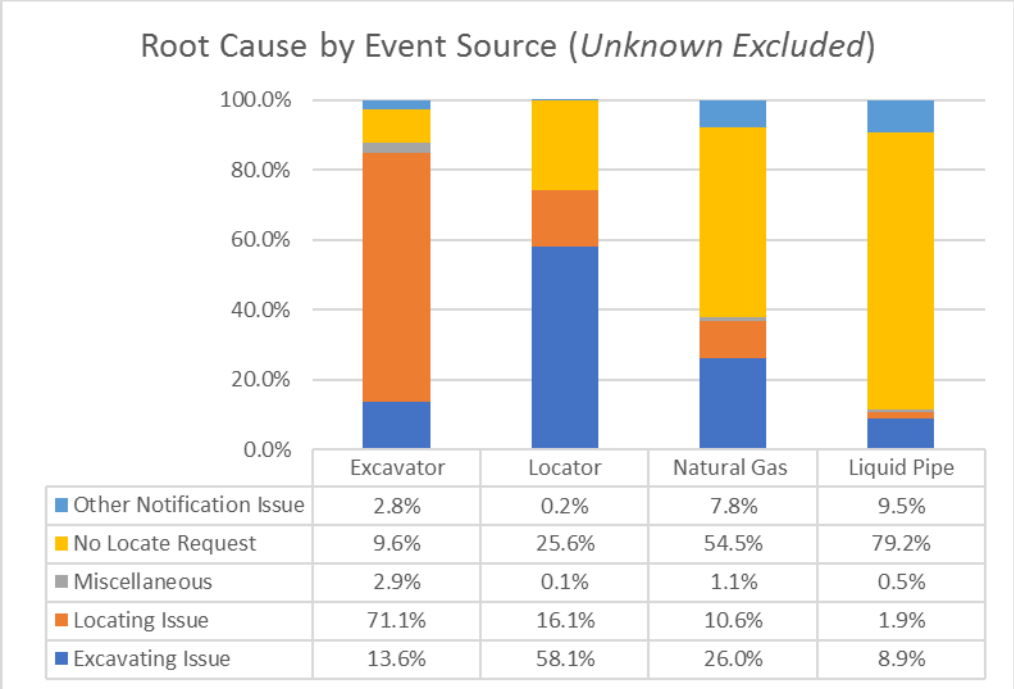
[6] One call center and insurance sources were removed as part of the 2018 revisions to DIRT.

groups effective Jan. 1, 2018. The rationale is that an abandoned facility may cause a live facility to be mislocated or not located at all, making it more of a locating issue.[7]



	Excavator	Locator	Natural Gas	Liquid Pipe
Unknown	59.0%	0.9%	16.2%	8.5%
Other Notification Issue	1.1%	0.2%	6.5%	8.7%
No Locate Request	3.9%	25.3%	45.6%	72.5%
Miscellaneous	1.2%	0.1%	0.9%	0.5%
Locating Issue	29.1%	15.9%	8.9%	1.7%
Excavating Issue	5.6%	57.5%	21.8%	8.1%

Figure 1—Near Miss Root Cause by Event Source, Unknown Root Causes Included



	Excavator	Locator	Natural Gas	Liquid Pipe
Other Notification Issue	2.8%	0.2%	7.8%	9.5%
No Locate Request	9.6%	25.6%	54.5%	79.2%
Miscellaneous	2.9%	0.1%	1.1%	0.5%
Locating Issue	71.1%	16.1%	10.6%	1.9%
Excavating Issue	13.6%	58.1%	26.0%	8.9%

Figure 2—Near Miss Root Cause by Event Source, Unknown Root Causes Excluded

[7] See the 2018 DIRT Report for more information on root cause groupings and the revisions that took effect in 2018.

With unknown root causes included in the analysis (Figure 1), unknown is the leading root cause for excavators (including road builders). However, it should be noted that this is somewhat better (59%) than the percentage of unknown root causes in their damage reports (69%) over the four-year period. For reports with a known root cause (Figure 2), excavators cite a locating root cause in 71.1% of their near miss reports, which is slightly below the percentage of locating root causes (74.8%) in their damage reports.

Reporting Stakeholder	Near Miss Reports All RC Data	Damage Reports All RC Data	Near Miss Reports Known RC Data	Damage Reports Known RC Data
Excavators	29.1	23.2	71.1	74.8

Table 2—Percentage of Root Cause (RC) Locating Issue, Near Miss vs. Damage Reports, 2015-2018

Figures 1 and 2 show that no locate request is the leading root cause in near miss reports from natural gas and liquid pipeline reporting stakeholders. This is quite a bit higher than the percentages in damage reports over the same time period.

Reporting Stakeholder	Near Miss Reports All RC Data	Damage Reports All RC Data	Near Miss Reports Known RC	Damage Reports Known RC
Natural Gas	45.6	29.2	54.5	34.3
Liquid Pipeline	72.5	17.6	79.2	18.6

Table 3—Percentage of Root Cause (RC) No Locate Request, Near Miss vs. Damage Reports, 2015-2018

Since near miss reports submitted by locators have a small percentage of unknown root causes, the percentages of the other root causes shift very little when unknown data is filtered out. There is also little difference in the distribution of root causes when comparing near miss versus damage reports submitted by locators, as discussed in more detail later in this report.

Near Miss Reports Submitted by Excavators

A common complaint of excavators is locators not responding to locate requests, either in a timely fashion or not at all (see examples (a) and (b) in *DIRT User Guide* "near miss" definition). Some state regulations do not allow the excavation to commence unless positive response is received from all affected facility operators, while some require the excavator to re-notify the one call center and wait some period of time (e.g., 3 hours) before commencing. If the excavator delays the work until the issue is resolved, then no actual damage occurs, but the delay constitutes downtime. The *Best Practices Manual* glossary contains the following definition:

> **Positive Response:** Communication with the excavator prior to excavation to ensure that all contacted (typically via the one call centers) owner/operators have located their underground facilities and have appropriately marked any potential conflicts with the area of planned excavation.[8]

Several one call centers operate automated positive response (APR) systems in which facility operators and locators input information on the status of locate requests (e.g., marks complete, no conflict, delayed), and excavators then check the status of their locate request, by phone or online, before commencing work.

[8] Also see Best Practices 4-9, 5-8, 5-9.

With the revisions made to the DIRT root causes implemented in 2018, the means for excavators to report near misses due to late locates changed. As noted above, the question identifying damages versus near misses was moved and rephrased from "*Was there damage to a facility?* (Yes/No)," to one of several choices under "*Type of Event*."

A new root cause was also added with the intention to make it easier to understand where this type of situation should be captured. In the pre-2018 version of DIRT, a late locate should have been captured by "Facility was not located or marked." However, this root cause could be difficult to distinguish from "Facility marking or location not sufficient." The term "*not sufficient*" was intended to refer to the accuracy of marks but understandably could have been confused with the timing of the markout, especially if the *DIRT User Guide* was not consulted. The relevant *DIRT User Guide* material is shown below.

- **Facility was not located or marked:** No locating or marking was completed prior to excavation activities. This assumes valid notification to the one call center and waiting the proper time according to state law.

- **Facility markings or location not sufficient:** Includes all areas where marking was inaccurate or otherwise insufficient in designating the location of the buried facilities, but **NOT** covered by the following choices found elsewhere in Part I:
    - Facility could not be found/located
    - Incorrect facility records/maps
    - Abandoned facility

As part of the DIRT revisions for events on or after Jan. 1, 2018, the locating issue group of root causes was revamped. The two root causes shown above were removed and replaced by several new locating root causes, including the following (with corresponding *User's Guide* material).

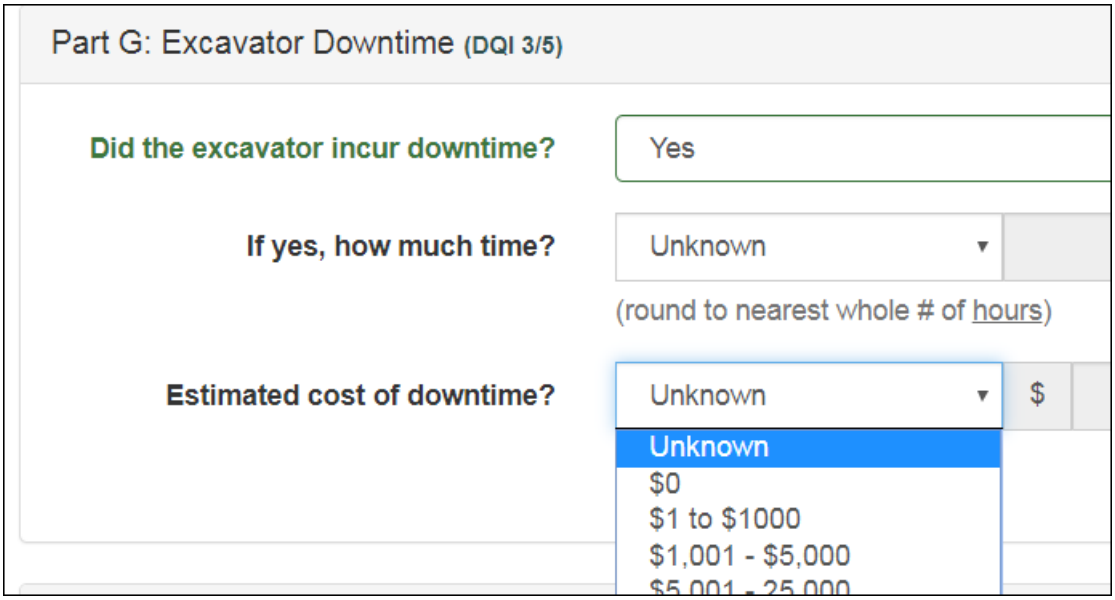
Locating Issue

Facility not marked due to:

◉ Facility not marked due to no response from operator/contract locator

- **No response from operator / contract locator:** Facility owner/operator or their contract locator received a valid ticket, but did not mark, locate or communicate (i.e., positive response where required) with the excavator prior to the start of work. (BP 4-9)

The ability to document whether downtime was incurred and if yes, to document the associated cost and duration, has also been included in DIRT since its inception. With the 2018 DIRT revisions, some cost ranges were combined (for example, $1 to $500 and $501 to $1000 were replaced by $1 to $1000), but otherwise Part G of the DIRT form remained the same.



Following is the *DIRT User Guide* material on the questions in Part G:

Did the Excavator incur downtime?
See definition of "downtime" in the Glossary. Downtime may occur with or without damage to a facility. For example, an excavator may be delayed while waiting for repairs to a damaged facility that was either incorrectly marked or unmarked. Alternatively, an excavator may discover a mislocated or unlocated facility with no damage occurring, but be delayed while the facility owner/operator corrects the situation. Time spent trying to find a correctly marked but hard-to-find facility does not constitute downtime.
Examples of downtime include delays associated with the following:

a. A mislocated or unlocated facility.
b. A facility owner/operator refusing to allow work near their facilities.
c. An excavator made proper notice to the One Call Center, but upon arrival at the work site, or after checking with the Positive Response System (where required), finds on the start date that some or all of the operators have not completed the locates.
d. On a large project, the crew may be able to move to another area and continue working. In this case, include only the time required and costs associated with moving to the other area.

If yes, how much time?
Provide the amount of time the work crew is delayed that can be determined and proved, less any statutory allowed response times, i.e., excavator requested additional assistance or re-marking and facility owner is given specific response times in state statutes.

Estimated Cost of Downtime:
Only costs that are associated with the delay and can be documented should be included in the cost of downtime. These costs should take into consideration statutory allowed facility response times, i.e., excavator requested additional assistance or re-marking and facility owner is given specific response times in state statutes. Generally, the hourly or daily cost of a work crew is known and that cost can be determined and proved. An event such as a mislocate may not delay the total crew. In addition, on a large project, the crew may be able to move to another area and continue working. In this case, include only the costs associated with the time required to move to the other area, and other documented costs.

As noted previously, the percentage of locating issue root causes cited by excavators is similar in their near miss and damage reports. However, in near miss reports, they cite downtime, along with the duration and cost data, much more than in their damage reports. Approximately 31% (1,626/5,274) of their near miss reports answered "yes" to "Did the excavator incur downtime?" compared to about 18% for their damage reports over the same time period.

In response to "If yes, how much time?", 966 reports (59% versus approximately 6% in damage reports) included a duration other than zero or blank, as indicated in Figure 3.

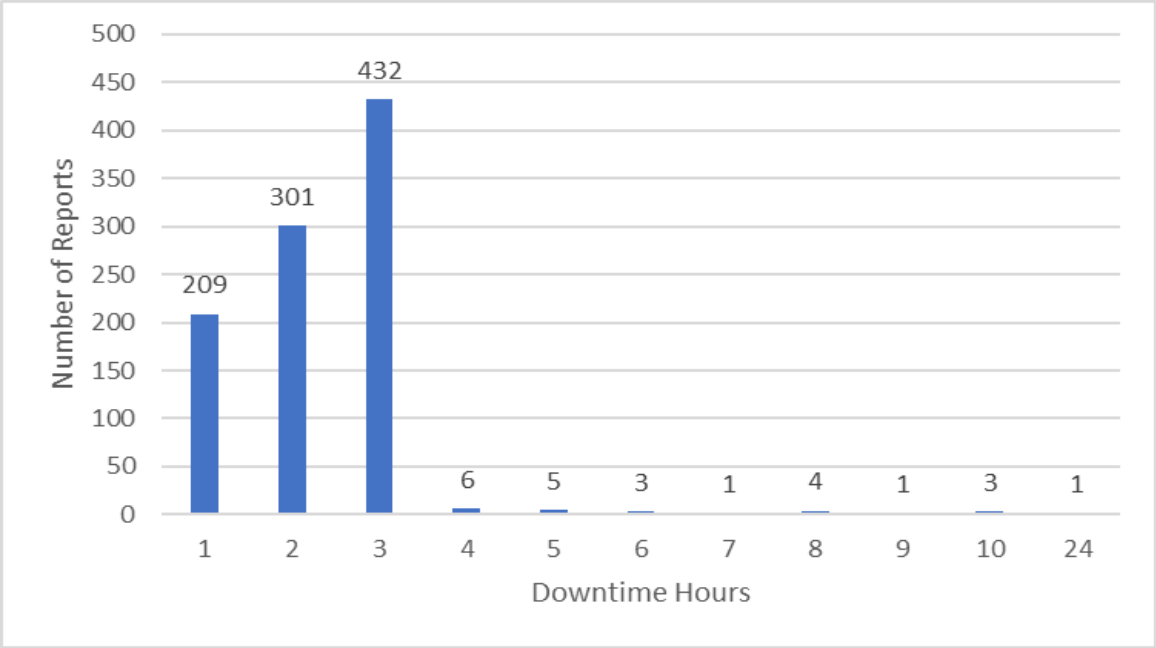


Figure 3—Downtime Hours in Near Miss Reports from Excavators/Road Builders

In response to the cost question, 691 reports (42% versus approximately 5% in damage reports) included non-zero values for associated cost, as indicated in Figure 4.

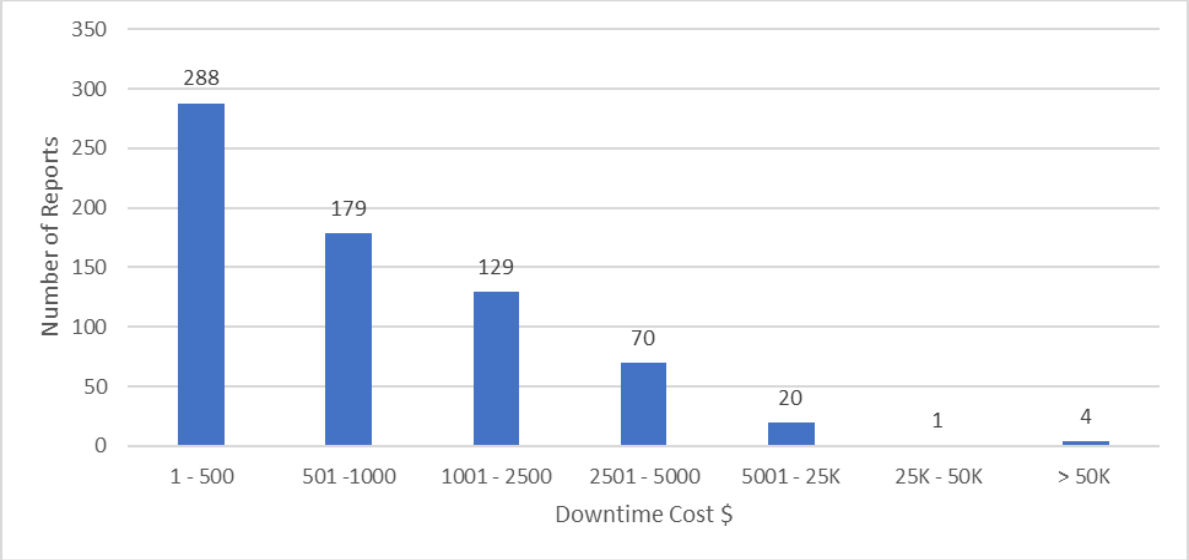


Figure 4—Downtime Cost in Near Miss Reports from Excavators/Road Builders

The five reports of $25,001 or more all reported durations of 3 hours. The single report with a duration of 24 hours had a cost of $25,001–$50,000.

This analysis demonstrates that the excavators and road builders who are reporting near misses to DIRT are documenting the work hours forfeited and cost incurred in higher proportions as compared to damage reports. However, these reports come from a limited number of states/provinces and certainly represent a tiny fraction of what occurs in the real world, as seen in the following chart.

Number of Near Miss Reports in DIRT from Excavators/Road Builders (2015–2018)	Number of States/Provinces Represented
1 to 10	18
11 to 100	9
101 to 1,000	3
Over 1,000	3

Table 4—Number of States/Provinces by Range of Near Miss Reports from Excavators/Road Builders

A report by Ahmed Jalil Al-Bayati, Ph.D., P.E., M.ASCE; Louis Panzer, and Ali Karakhan entitled *Reducing Damages to Underground Infrastructure: Performance Evaluation of One-Call Notification Program*[9] estimates that, based on data from North Carolina 811's positive response system, roughly 48% of locate requests in North Carolina are not fulfilled within the mandated three-working-day timeframe. The report also states that based on a survey of users' perceptions of effectiveness of the process, locating time scores the lowest among the services provided by locators, including accuracy and overall professionalism. North Carolina receives over 2 million locate requests per year but is one of the three

[9] DOI: 10.1061/(ASCE)SC.1943-5576.0000441. © 2019 American Society of Civil Engineers.

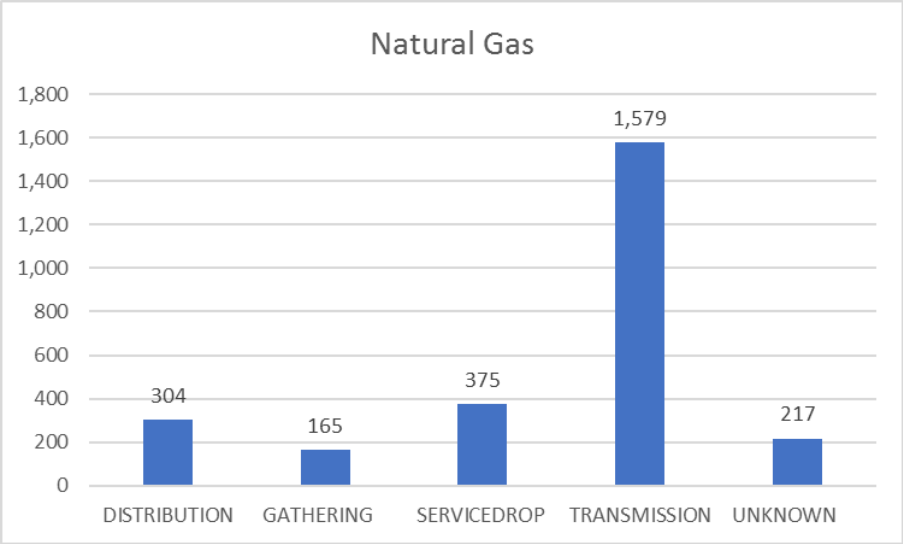
states in the 101 to 1,000 range in Table 4 (over a four-year period). Other states/provinces certainly have similar situations.

In recent months, there have been press reports about utilities and locators not responding on time to locate requests in several states (California, Michigan, Minnesota), each of which contributed less than 400 near miss reports to this four-year dataset.

As it is unlikely that DIRT data alone will provide a complete picture of the impact of late locates on excavators, the Data Reporting & Evaluation Committee could work with the OCSI Committee to obtain data from one call centers with positive response systems. That data could be used in conjunction with DIRT data to produce a more complete picture of the downtime hours and cost associated with near misses due to late locates.

Near Miss Reports Submitted by Natural Gas and Liquid Pipeline Operators

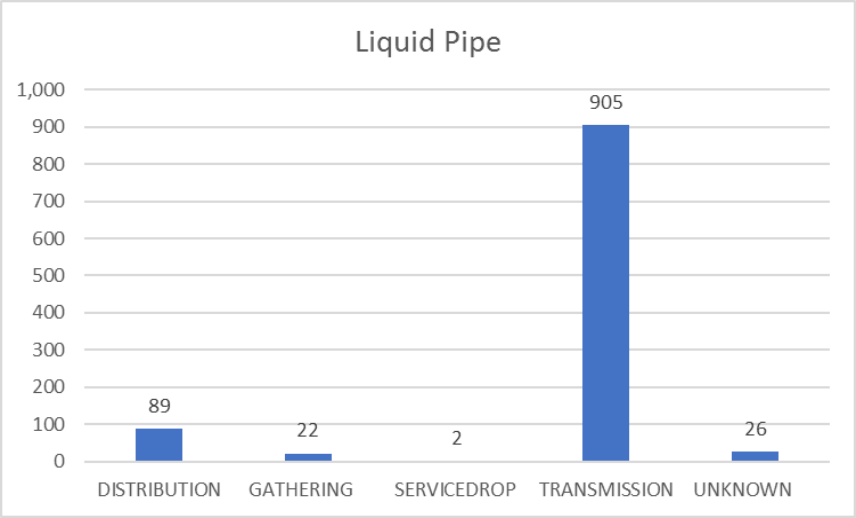
The analysis of near miss reports from natural gas and liquid pipeline operators (and later from locators) does not focus on downtime. The reports from these stakeholder groups include downtime data in much lower proportion than reports from excavators and road builders, who are in better position to capture the associated hours and costs. For natural gas and liquid pipeline operators, the major differences in near miss versus damage reports are in affected facility types. Figure 5 shows the affected facility type for near miss reports from natural gas reporting stakeholders.



The 1,579 reports involving transmission include 961 reports with root cause of no locate request, 131 other notification issues, and 344 excavation issues.

Figure 5—Type of Facility Affected for Natural Gas Near Miss Reports

Figure 6 shows the affected facility type as reported by liquid pipeline reporting stakeholders.



The 905 reports involving transmission include 661 reports with root cause of no locate request, 75 other notification issues, and 76 excavation issues

Figure 6—Type of Facility Affected for Liquid Pipe Near Miss Reports

Compared to damage reports, transmission is the affected facility type in significantly higher proportions. In the four years of near miss reports analyzed here, it is 60% for natural gas and 87% for liquid pipeline, while for damage reports, it is about 0.7% for natural gas and 18% for liquid pipelines.

Operators of natural gas and petroleum pipelines are required by regulation to patrol their rights-of-way (ROW) and to specifically look for indications of nearby construction activity. Because of the severe consequences of damage to a natural gas or liquid petroleum transmission pipeline, many operators perform patrols more frequently than the minimum required intervals.

The U.S. Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration's (PHMSA) pipeline safety regulations require the following for natural gas:

§192.705 Transmission Lines: Patrolling

(a) Each operator shall have a patrol program to observe surface conditions on and adjacent to the transmission line right-of-way for indications of leaks, construction activity, and other factors affecting safety and operation.

For natural gas, the patrol frequency depends on the "class location," which is based on the number and characteristics of buildings intended for human occupancy and places of public assembly in proximity to the pipeline (see §192.5).

Following is the ROW patrolling requirement for liquid pipelines:

§ 195.412 Inspection of rights-of-way and crossings under navigable waters.

(a) Each operator shall, at intervals not exceeding 3 weeks, but at least 26 times each calendar year, inspect the surface conditions on or adjacent to each pipeline right-of-way. Methods of inspection include walking, driving, flying, or other appropriate means of traversing the right-of-way.

In addition, the American Petroleum Institute (API) publishes Recommended Practice (RP 1162) Public Awareness Programs for Pipeline Operators with guidelines for pipeline operators on development, implementation, and evaluation of public awareness programs. PHMSA's regulations require regulated natural gas and liquid petroleum operators to have public education programs that follow the guidance provided in API RP 1162 (see CFR 49, sections 192.616 and 195.440). API RP 1162 addresses near misses as follows (emphasis added):

> **8.4.4 Measure 4—Achieving Bottom-Line Results**
> One measure of the "bottom-line results" is the damage prevention effectiveness of an operator's Public Awareness Program and the change in the number and consequences of third-party incidents. As a baseline, the operator should track the number of incidents and consequences caused by third party excavators. **This should include reported near misses**; reported pipeline damage occurrences that did not result in a release; and third-party excavation damage events that resulted in pipeline failures. The tracking of leaks caused by third-party excavation damage should be compared to statistics of pipelines in the same sector (e.g., gathering, transmission, local distribution). While third-party excavation damage is a major cause of pipeline incidents, data regarding such incidents should be evaluated over a relatively long period of time to determine any meaningful trends relative to the operator's Public Awareness Program. This is due to the low frequency of such incidents on a specific pipeline system. The operator should also look for other types of bottom-line measures. One other measure that operators may consider is the affected public's perception of the safety of pipelines.

In the U.S., the states have pipeline safety patrolling regulations that are at least as stringent, and possibly more stringent. Obviously, it is these requirements that drive near miss reporting by pipeline operators with the focus on transmission pipelines and root cause of no locate request.

Transmission pipeline operators have asked if DIRT guidance establishes distances for unauthorized excavation activity near a buried facility in order to be considered a near miss. The Data Reporting & Evaluation Committee has not developed any guidance beyond the definition from the *DIRT User Guide*. Because DIRT collects data relating to different types of facilities and operations from various stakeholder groups, there is no "one-size-fits-all" answer to this question. The recommendation is that if it is something that would warrant documentation and follow-up according to your company policies and procedures, then it should also be reported in DIRT as a near miss.

Near Miss Reports Submitted by Locators

Near miss reports submitted by locators were examined to see if there were any significant differences as compared to their damage reports. Figure 7 compares facility operation for damage reports versus near miss reports for 2015 through 2018, which shows a strong alignment between the two event types.

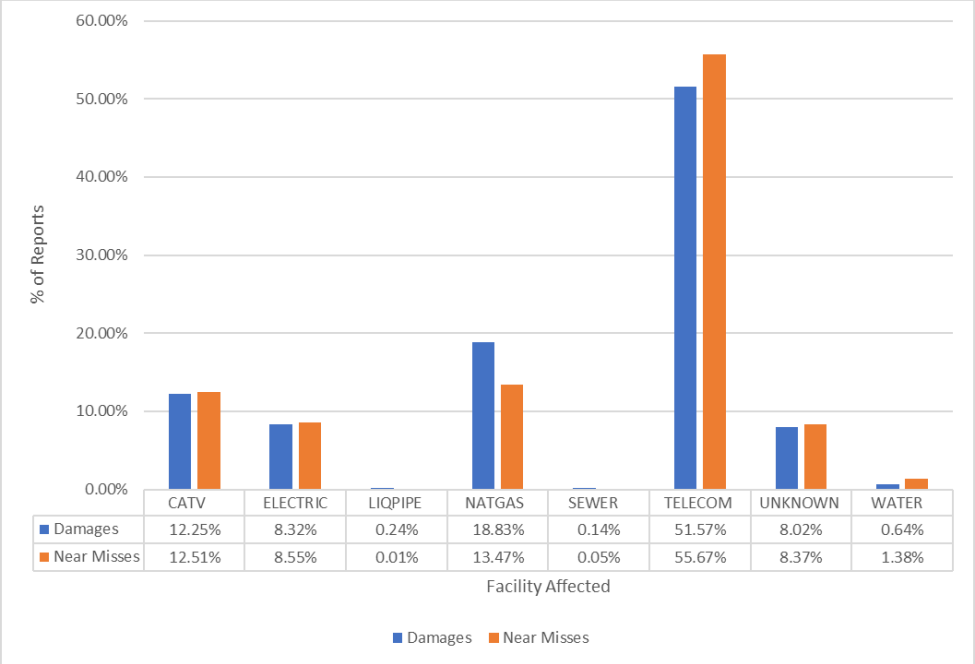


Figure 7—Facility Operation for Locator Near Miss Reports

Figure 8 is a similar comparison for the root cause groups. Again, there are slight variations, but the relative rankings are the same for the top three groups (excavating issue, locating issue, and no locate request), which comprise 93% of the damage reports and 99% of the near miss reports.

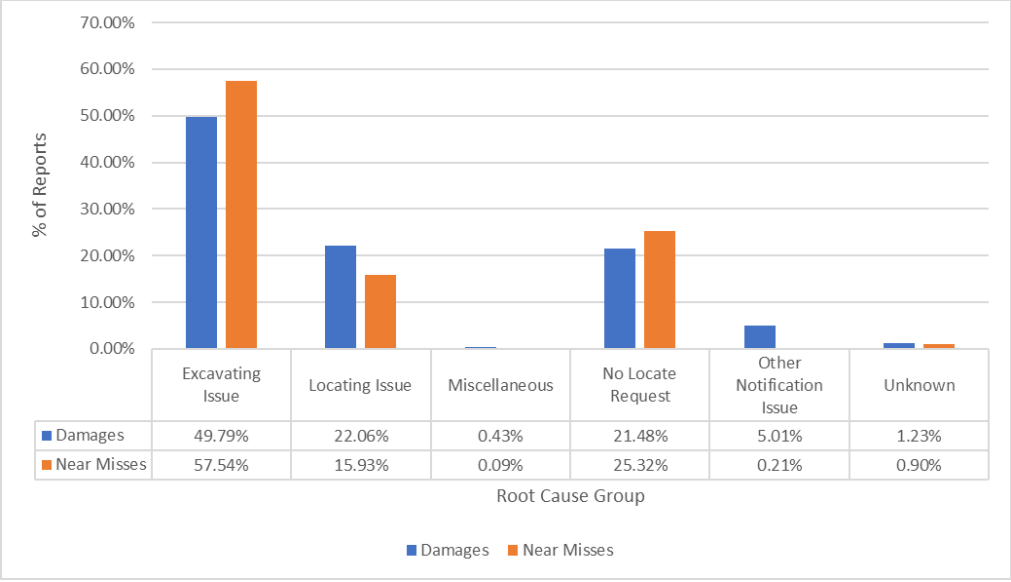


Figure 8—Root Cause Groups for Locator Near Miss Reports

The data was examined to see if locator reports cite transmission facilities in their near miss reporting at a higher rate than in damage reports. There were a total of 32 near miss reports involving transmission facilities from locators from 2015 to 2018, representing 0.25% of total reports. Of the 32, 29 involved liquid pipelines, of which 18 had a root cause of no locate request.

For damage reports over the same period, about 0.3% involve transmission facilities. About 56% of those involve telecommunications facilities.

Overall, there appear to be little significant differences in the characteristics of near miss versus damage reports submitted by locators in terms of root causes, facilities and facility operations affected.

Conclusions

- Near miss DIRT reports submitted by excavators and road builders cite locating issue root causes at approximately the same percentage as in their damage reports. However, their near miss data is of higher quality than their damage data, and is more likely to cite downtime along with the associated duration and cost, as intended by the original *Study of One-Call Systems and Damage Prevention Best Practices.*
- Near miss reports submitted by natural gas and liquid pipeline stakeholders involve "transmission" as the facility affected and "no notification made to one call center/811" as the root cause in higher percentages than damage reports from those same stakeholders.
- Near miss reports from locators are not significantly different from their damage reports in terms of root causes, facility operation, and facility type affected.