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DIRT
Damage
Information
Reporting
Tool

CGA DIRT Analysis & Recommendations

2009 Vol. VI

URL: http://www.cga-dirt.com

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CGA™
Common Ground Alliance

Dear Damage Prevention Stakeholders:

Since 2004, the Common Ground Alliance (CGA) has collected damage and near miss data in an effort to measure damage prevention progress and to draw meaningful conclusions that can drive future efforts. With our sixth annual publication of the DIRT report, we are able to achieve these goals with greater confidence than ever before. Data analyzed for 2009 clearly depicts a consistent trend in the overall number of damages and identifies meaningful relationships between multiple data elements with greater confidence.

For each of the past five years, the CGA has reported year-over-year decreases in the total number of damages throughout the United States and 2009 is no exception. What may be more important than the actual estimate of total damages is the consistent trend downward. For the first time, the report takes a closer look at how the decrease in estimated damages may correlate to the overall level of construction activity. Chart 1 provides a side-by-side comparison of U.S. housing permits, estimated one call ticket volume and estimated damages for years 2005 through 2009.

The early DIRT reports provided a "30,000-foot view" of the individual DIRT parts. With more mature and consistent data, the CGA is able to dig deeper into the data, and the annual reports have evolved to better identify contrasts, consistencies, and correlations between data elements. For example, on page 12, the Report analyzes root cause by reporting stakeholder group. Interestingly but probably not surprisingly, the root cause varies by reporting stakeholder. The leading root causes reported by natural gas and telecommunications stakeholders involved "Excavation Practices Not Sufficient" while excavators report "Locating Practices Not Sufficient" as the most prevalent root cause. This highlights the importance of growing DIRT not just by total number of submitters but also across all stakeholder groups.

Although facility owners still submit the majority of events to DIRT, additional stakeholders are seeing value in submitting data. This year, we include new sections focusing on "downtime" and "near miss" event. These sections stem in part from an increase in data submitted by excavators, which has changed the shape of the Report and provides our stakeholders with valuable information on the overall state of damage prevention.

Through the Data Quality Index (DQI), we also focus on the quality of data being submitted into DIRT. The CGA first implemented the Data Quality Index (DQI) in 2007 in order to measure the 'completeness' of each record submitted, with varying weights assigned to the parts of the record depending on their significance. Although the DQI did improve slightly in 2009 (as seen on page 15), the DQI highlights the ongoing need to increase the quality of data submitted to DIRT. By aligning their own internal damage and near miss data collection process to DIRT, stakeholders can submit data that will yield more relevant conclusions.

As damage prevention stakeholders, being able to accurately measure and review our progress is an essential part of driving down the total number of damages, and I want to thank the damage prevention professionals who submit data voluntarily to DIRT. As DIRT and the data collection effort grows, we as stakeholders will be able to identify more effective damage prevention solutions.

Thank you for your continued commitment to damage prevention and for continuing to raise the bar.

Sincerely,

Robert Kipp

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Introduction

The Damage Information Reporting Tool (DIRT) represents the collective efforts of the Common Ground Alliance's (CGA) quest, through its Data Reporting & Evaluation Committee (DR&EC or Committee), to gather information about the occurrence of facility events, which are defined as "the occurrence of downtime, damages and near miss events." It provides all stakeholders a means to anonymously report meaningful data into a comprehensive database for analysis of the factors that contribute to the events. As more years' worth of data[1] is collected, and as the quality of the data improves, the ability to identify trends and areas of interest or concern also improves.

The overall format and structure of the 2009 Report will be different than previous Reports. This year's Report will include less discussion of data elements or DIRT Parts[2] that have remained consistent over time, and instead include data elements not analyzed in prior years, such as *Right-of-Way* (ROW) (Part B), *Downtime* (Part G), and *Near Miss* (Part H). This customized examination will also allow for new and insightful ways of analyzing elements that have been reviewed in the past, such as *Reporting Stakeholder* and *Root Cause*. Several data elements are also grouped and analyzed according to their respective One Call Systems International (OCSI) Region. These groupings identify similarities, and differences, related to events reported in specific geographic regions.

In some cases the Committee can speculate on the reasons for trends, differences and commonalities identified by the data analysis, based on the diverse collective experience and knowledge of the Committee members. Readers of this Report are encouraged to draw upon their own experiences or knowledge when interpreting the data and applying it to damage prevention efforts. The Committee encourages feedback from readers about this Report.

The number of events submitted by excavators is continually increasing. The Committee analyzed their events in greater detail in 2009, comparing their reports to other stakeholders.

As in previous Reports, similar selections (or answers) have been combined / consolidated within certain data elements in order to focus the analysis. For example: *Hoe/Trencher* includes *Backhoe/Trackhoe*, and *Trencher* selections. A summary table of these groupings can be found on page 22 of this Report.

The submission of near miss data has increased and its analysis is included for the first time in this year's Report. DIRT users are encouraged to submit not only facility damage data, but near miss data as well. A *Near Miss* is defined in the DIRT User's Guide as "an event where damage did not occur, but a clear potential for damage was identified." Near miss data may be used to educate excavators, operators, and locators in an effort to avoid similar situations in the future.

DIRT is a "tool." One definition for a tool is: "anything used as a means of accomplishing a task or purpose", i.e. "*Education is a tool for success."* The CGA's primary focus is worker safety and damage prevention. DIRT doesn't prevent damage, but it is a tool to identify opportunities for improvement and to measure the progress of such efforts. The other CGA committees can use the

[1] Unless otherwise noted, all analysis in this Report is based on known data only, meaning that *Unknown/Other* and *Data Not Collected* is excluded.

[2] Corresponding to the DIRT reporting form which can be accessed at http://www.damagereporting.org/.

results of this Report to develop educational programs and/or best practices to potentially reduce damages. In any case, stakeholders are encouraged to utilize all of the tools at their disposal to reduce damage and follow the industry's best practices.

Consistent with prior years, the data collected for all of the DIRT elements was reviewed by the Committee. While not all of this information is included within this Report, it is published and available online at: http://www.damagereporting.org/annual.

Table 1

2009 REPORT INDEX

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1. 2009 Estimate of Damages

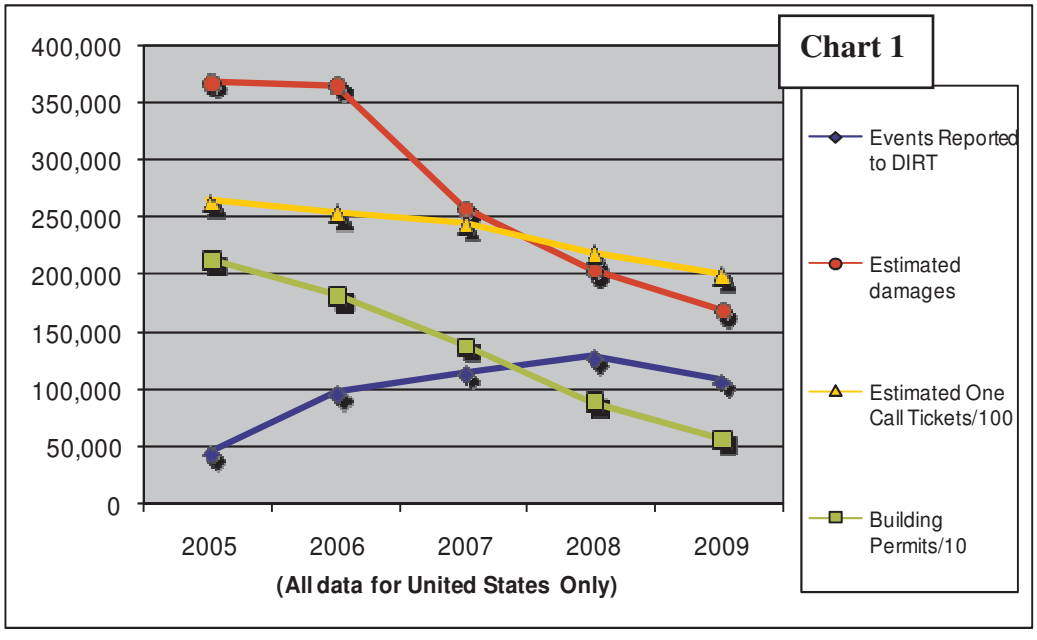
Using the same methodology[3] as prior years, an estimate of the number of damages in the U.S. was performed for 2009. The estimate is based on DIRT event submissions (excluding near-miss events) received from Colorado and Connecticut[4], and applies a ratio estimation method derived from two different publicly-available statistics: county population and housing start data. In previous years, the estimates based on population and housing starts have been relatively close. However, for 2009, the estimates are not as close, but it is believed that the estimate based on housing starts is the more realistic of the two because it is more closely related to construction activity. Unfortunately, the data is not available to produce the confidence limits for the estimate based on housing starts, although it is available for the estimate based on population. Therefore, for 2009, the Committee presents the housing start estimate with the confidence limits based on the population estimate, leading to an estimate of U.S. damages of approximately 170,000 with confidence limits of 110,000 to 230,000.

2. Data Element Analysis

Facility Events Submitted by Year

There were 115,232 events submitted to DIRT in 2009; 15% fewer than in 2008. This marked the first year since its inception that the number of events reported to DIRT decreased from the previous year.

This decrease may be the result of several factors, including the reality that facility damages are lower due to economic conditions and less construction activity. Many one call centers have experienced lower ticket volumes over the last several years, and the Committee's analysis of publicly-available building permit information indicates fewer permits were issued over this same timeframe. Chart 1 reflects current data from several sources providing an overall sense of the level of activity in the construction industry in recent years.



[3] See whitepaper entitled 2007 Estimate of Total Number of Damages in the US, available at http://www.damagereporting.org/annual/

[4] These two states have laws that mandate operators to report all damages, and these reports are available in DIRT.

The estimated number of damages appears to correlate with the overall decline in construction activity, as represented by *Building Permits/10* and *Estimated One Call Tickets/100*. Between 2005 and 2008, the number of events reported to DIRT increased, which was likely due to the increasing growth and acceptance of DIRT during these years. The nationwide "Call Before You Dig" number, 811, was implemented in May of 2007, approximately where the yellow and red lines in Chart 1 cross, and may have prevented the number of one call ticket submissions from dropping off more drastically. As this widespread use of 811 continues, the use of one call tickets submitted as a predictive measure of construction activity should continue to become more reliable. In future years, the ideal situation would be for *Estimated damages* to continue to decline, and for *Events Reported to DIRT* to continue to converge with it. This would hold true even if *Building Permits/10* and/or *Estimated One Call Tickets/100* reverse direction and start to increase.

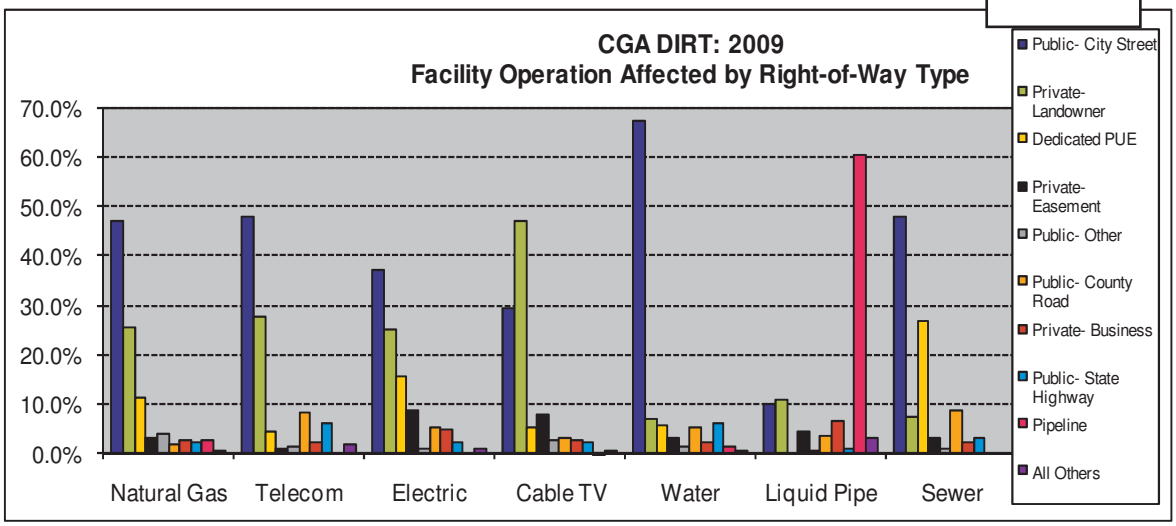
Reporting Stakeholder (Part A)

This category remained consistent with previous years as *Natural Gas*, *Telecommunications*, and *One Call* stakeholders continued to provide a majority of the data submitted to DIRT. One notable fact is that *Excavator* submissions continued to increase, from less than 900 in 2007 to nearly 5,000 in 2009. *Excavator* submissions are analyzed in further detail below in the analyses of Parts G, H, and I.

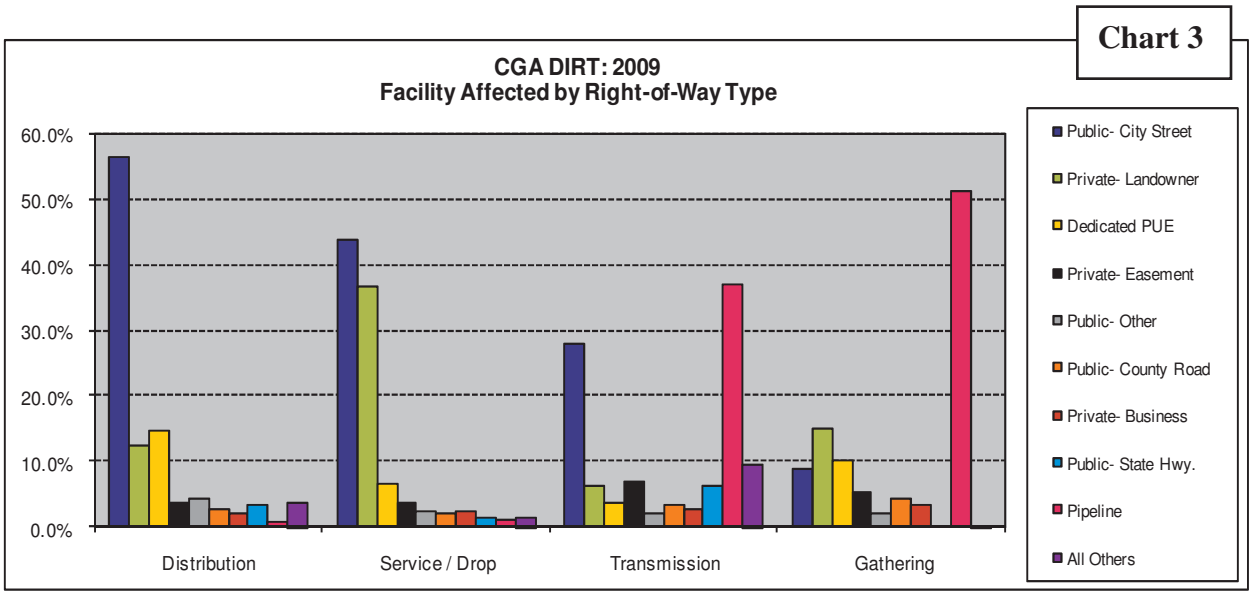
Right-Of-Way (ROW) Type (Part B)

The type of *Facility Operation Affected* may depend on where the event occurs. For instance, many events involving *Water* occur in the *Public-City Street* ROW, while most *Liquid Pipe* events occur within the *Pipeline* ROW.

Chart 2



A large contrast also appears when affected facility types are examined on a similar basis (see Chart 3). *Distribution* and *Service / Drop* facilities seem to be affected most often in the *Public-City Street* ROW, *Gathering* facilities are affected in the *Pipeline* ROW most often, and *Transmission* facilities appear to be a mixture of the two. *Service / Drop* facilities are also affected in a high percentage of cases in the *Private- Landowner* ROW type.



Type of Facility Operation Affected (Part C)

Consistent with previous years, *Natural Gas* and *Telecommunication* facilities tend to be involved in the majority of events submitted to DIRT. In 2009, these two utilities were affected in nearly 83% of the events. The remaining facilities affected included *Electric* (11.9%), *Cable TV* (3.6%), *Water* (1.0%), and *All Others* (0.6%). Of the events submitted in 2009, nearly 98% fell into either the *Distribution* (50.7%) or *Service / Drop* (46.9%) category. Events listing *Transmission* as the *Type of Facility Affected* made up 1.9% of the known data. However, some interesting observations were noted when reviewing events involving *Transmission* in conjunction with *Near Miss* (Part H) and *Root Cause* (Part I), and those events will be further analyzed in the respective parts below.

Type of Excavator (Part D)

The findings from this data element were also consistent with prior years, as the *Contractor / Developer* group[5] continued to be involved in a majority of the events (75%) reported in 2009. The events involving a *Municipality* as the *Type of Excavator* increased from less than 4% in 2007 to over 7% in 2009.

Type of Excavation Equipment (Part D)

The results from this data element also remained similar to previous years, with the *Hoe / Trencher* group involved in the majority of the events (63.9%). One notable trend identified was the increasing percentage of events involving *Hand Tools*: 16% in 2007, 20% in 2008, and 21% in 2009.

Approximately 61% of the 2009 events involving *Hand Tools* had a root cause of *Notification NOT Made*, and of those, the leading *Type of Excavator* groups were *Contactor / Developer* (52%) and *Occupant / Farmer* (45.3%). The 2008 Report (pages 30–31) discussed a review of the 2008 data which found that states requiring one call notification (termed "non-exempt") when utilizing *Hand Tools* had a 5.5% lower percentage of such events compared to states that do not (termed "exempt"). The same analysis was performed for the 2009 data (See Recommendation 2007-3) and found the non-exempt states had a virtually identical

[5] For a list of all of the groups referenced in this Report, see appendix on page 18.

percentage of such events. This may be due to one or a combination of the following or other possibilities:

- In exempt states, the 811 campaign may be leading excavators, including homeowners, to notify their one call center before digging, thus blurring the distinction between exempt and non-exempt states.
- In exempt states, some facility operators may not track these events in their damage data, reasoning that little could be done to avoid them since there is no violation of the applicable damage prevention regulations. The events still may be occurring but not showing up in the DIRT data, and therefore not providing a full and accurate picture of the state of events.
- Slightly different combinations of reporting stakeholders year-to-year.

Another 15.8% of the 2009 *Hand Tools* events involved a root cause of *Other Insufficient Excavation Practices* (Note: the second level as opposed to the first level root cause). Some of these may be attributable to excavators attempting to expose a facility to verify the markings. In these situations, other factors, including the age and condition of the facility, may contribute to damage.

A contradictory finding was that some events involving *Hand Tools* had a root cause of *Failure to Use Hand Tools Where Required.* Some of these may involve situations where a one call notification was made indicating *Hand Tools* as the *Type of Excavation Equipment,* but powered machinery was then used instead. However, what is actually sought in this Part is the *Type of Excavating Equipmen*t **involved in the event**. Other event reports of this nature may be due to misunderstanding the meaning of the *Root Cause* selections. Stakeholders are encouraged to consult the DIRT User's Guide for descriptions of what is intended by the root causes.

Excavator Downtime (Part G)

Excavator stakeholders submitted a small percentage of the data (4.4%). However, they submitted 28.7% of the events reporting that downtime had occurred. They also had the highest Data Quality Index (DQI) of the reporting stakeholders for this Part, likely due to the fact that they are in the best position to know if they experienced downtime. Table 2 breaks down the root causes involved in the events with downtime submitted by excavators. For contrast, the root causes reported by *Natural Gas* reporting stakeholders, the largest contributor of downtime events, is also provided. It is also noteworthy that approximately 50% (330 out of 658) of the *Near Miss* (see Part H below) events reported by excavators also involved downtime.

Chart 4

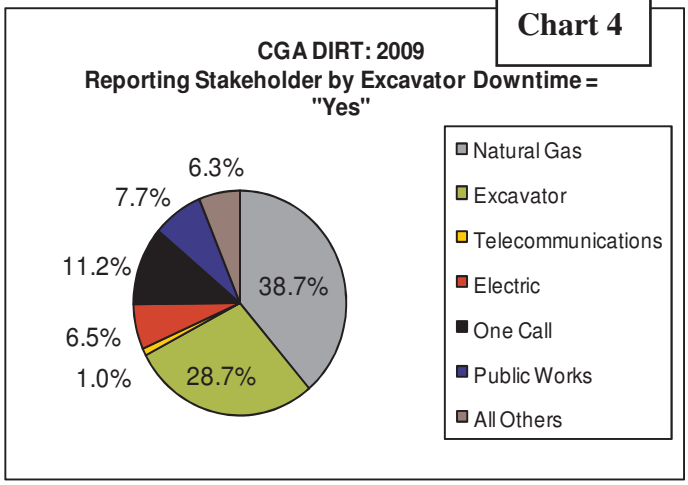


Table 2

ROOT CAUSE	REPORTING STAKEHOLDER	
	Excavator	Natural Gas
Excavation Practices Not Sufficient	15.4%	40.0%
Notification NOT Made	2.5%	28.0%
Locating Practices Not Sufficient	77.5%	28.9%
Notification Practices Not Sufficient	1.9%	1.6%
Miscellaneous Root Cause	2.7%	1.5%

Damage to Facility (Part H)

It was observed that the number of reports answering "*No*" to the question "*Was there damage to a facility?*" has increased each year. These are considered *Near Miss events*, as discussed in the Introduction. This could be in the form of a utility that was not located when a valid locate request was submitted, one that was marked incorrectly, an excavator digging without a locate request, or some other reason. More *Near Miss* events have been reported each year, with 1,128 submissions in 2007, 1,808 in 2008, and 2,088 in 2009. Recognizing this is a small number of events, the Committee noted that a high percentage of these events involved *Transmission* as the *Type of Facility Affected*.

Table 3

ROOT CAUSE DETAIL- LOCATING PRACTICES NOT SUFFICIENT
(Excavator Stakeholders Reporting Near Miss Events Only)

	2009 Events
Facility Was Not Located or Marked	58.0%
Facility Marking or Location Not Sufficient	38.9%
Incorrect Facility Records/ Maps	1.9%
Facility Could Not be Found or Located	1.3%

While excavators contributed only 4.4% of the total DIRT events, they are the single largest reporting stakeholder of *Near Miss* events (35.9% - see Chart 5. The majority of *Near Miss* events submitted by excavators fell into the *Root Cause* group *Locating Practices Not Sufficient* (63% - see Chart 6). Further examination of those records revealed that, respectively, 58% and nearly 39% indicated root causes of *Facility Not Located or Marked* and *Facility Markings or Location Not Sufficient* (see Table 3).

Chart 5

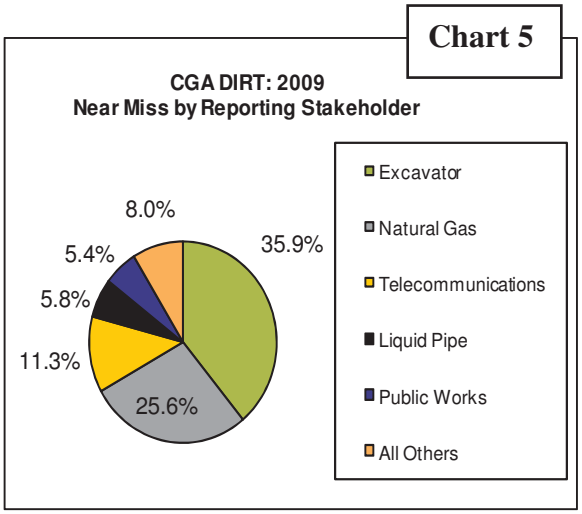
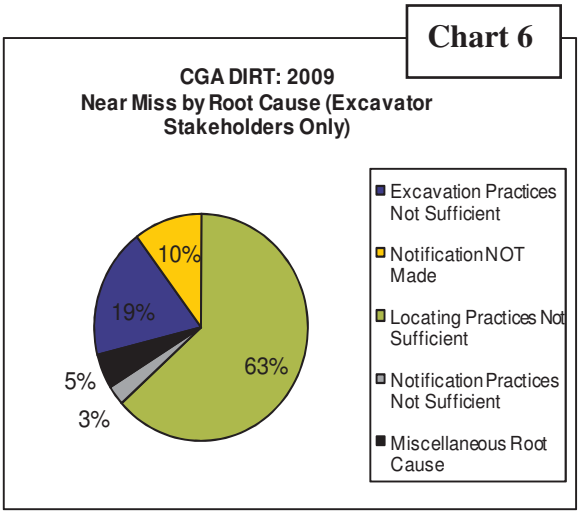
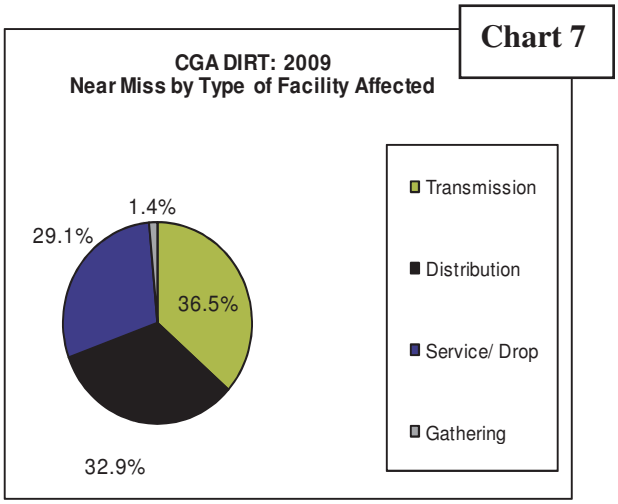


Chart 6



While events involving *Transmission* as the *Type of Facility Affected* constitute only 1.9% of the overall dataset, they account for the largest share of the *Near Miss* events (36.5% - see Chart 7).

Chart 7



Examining this issue from a different perspective, of the 1,221 events involving *Transmission* as the *Type of Facility Affected*, 615 (50%) were near miss events. Within the 615, 250 involved *Natural Gas,* 213 involved *Telecommunications,* and 112 involved *Liquid Pipe* as the *Reporting Stakeholder / Affected Facility Operation.* Furthermore, the 112 reports constitute **46%** of the **total number of reports** (243) from the *Liquid Pipeline* reporting stakeholder group.

Of the events involving *Transmission* with a known root cause, 52% indicated *Notification NOT Made* (See Table 3). Many of these events are likely discovered during pipeline patrols (particularly for *Natural Gas* and *Liquid Pipeline*) or by operator personnel during other field activities, for example a locator on the way to another job. This concentration of events involving *Transmission* in near miss events is likely attributable to a heightened awareness of the potential for more severe consequences if transmission facilities are damaged, and therefore a greater likelihood of them being documented and reported to DIRT.

Root Cause (Part I)

The percentage of events listing *Notification NOT Made* as the root cause decreased in 2009 compared to 2008. This may be due to the positive impact of the 811 campaign, increased enforcement of damage prevention regulations, or some combination of these and other factors. The decline in events involving *Notification NOT Made* is offset by increases in the *Locating Practices Not Sufficient* and *Excavation Practices Not Sufficient* groups, with the latter now having the largest percentage (see Chart 8).

Chart 8

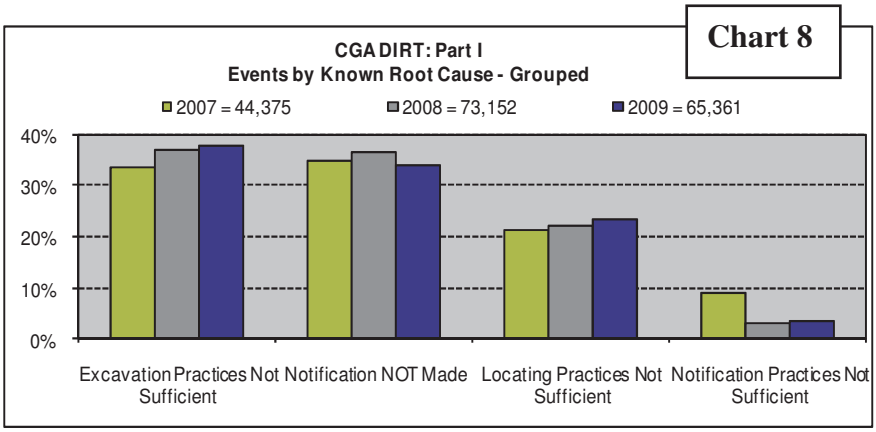


Table 4 provides the detailed breakdown (i.e. second level) of *Excavation Practices Not Sufficient* group. It is apparent that *Marks Not Maintained* and *Hand Tools Not Used* are being cited in an increasing percentage of events, and that *Clearance Not Maintained* continues to be reported in a high percentage of events. These are areas where stakeholders should continue to strive for improvement, which would lead to reduced damages in the future. In addition, stakeholders reporting *Other Excavation Practices Not Sufficient* are encouraged to perform necessary investigations to determine if the root cause actually fits one of the other available selections. Again, stakeholders are encouraged to consult the DIRT User's Guide for descriptions of what is intended by the root causes.

Table 4

ROOT CAUSE DETAIL- EXCAVATION PRACTICES NOT SUFFICIENT	2007 Events	2008 Events	2009 Events
Other Insufficient excavation practice	63.6%	39.1%	36.9%
Clearance not maintained	11.3%	36.6%	34.4%
Hand tools not used	16.5%	13.5%	17.1%
Marks not maintained	4.1%	6.2%	6.9%
Test hole not used to verify	2.9%	3.2%	3.2%
Exposed facility not supported	1.4%	1.2%	1.3%
Backfilling practices not sufficient	0.2%	0.2%	0.2%
Events with known data	**14,996**	**27,100**	**24,837**

While the overall data set shows that *Excavation Practices Not Sufficient* is the root cause group reported most often, events with *Transmission* as the *Type of Facility Affected* indicate *Notification NOT Made* as the root cause the most often. However, as indicated in the analysis of Part H, many events involving *Transmission* and *Notification NOT Made* are near miss events, which is the case for 72% of the events represented by the highlighted 39.5% figure below (Table 5).

Table 5

ROOT CAUSE GROUP	TYPE OF FACILITY AFFECTED			
	Distribution	Service / Drop	Transmission	Gathering
Excavation Practices Not Sufficient	37.3%	37.7%	26.4%	31.8%
Notification NOT Made	31.2%	35.1%	39.5%	32.2%
Locating Practices Not Sufficient	26.4%	22.2%	25.4%	31.0%
Notification Practices Not Sufficient	4.1%	3.9%	5.5%	2.9%
Miscellaneous Root Cause	1.0%	1.1%	3.2%	2.1%

Last year's Report examined the relationship between the *Root Cause* and *Reporting Stakeholder* data elements for the first time (see 2008 Report, pages 8-9). Since *Natural Gas* and *Telecommunication* stakeholders submit the majority of records, the overall DIRT dataset tends to reflect the root causes that they report. In both 2008 and 2009, the majority of events submitted by these two stakeholder groups indicated root causes of *Excavation Practices Not Sufficient* and *Notification NOT Made*. However, by examining this topic in more detail, differences are found among the reporting stakeholders. As in 2008, and as discussed in the analyses of Parts G and H above, the majority of events submitted by excavators indicate *Locating Practices Not Sufficient* as the *Root Cause* group. In contrast, locators report a low percentage of events involving *Locating Practices Not Sufficient*, and a high percentage involving *Excavation Practices Not Sufficient* (see Chart 9). Other reporting stakeholders that also emphasize *Locating Practices Not Sufficient*, but get overshadowed in the overall dataset, are *Public Works, Private Water, Engineering, Road Builder, Railroad* and *One Call*[6]. These are included in *All Others* in Chart 9.

An observation that can be made is that many stakeholders tend to report a root cause associated with the responsibility attributed to another stakeholder group. This could be a function of different perspectives of an event and/or situations where more than one root cause may have contributed to the event. It may relate to what event reports different stakeholders may choose to submit to DIRT. It may be a reflection of positioning oneself in relation to a damage repair claim or a disciplinary action by an employer.

A few points must be kept in mind relative to this analysis:

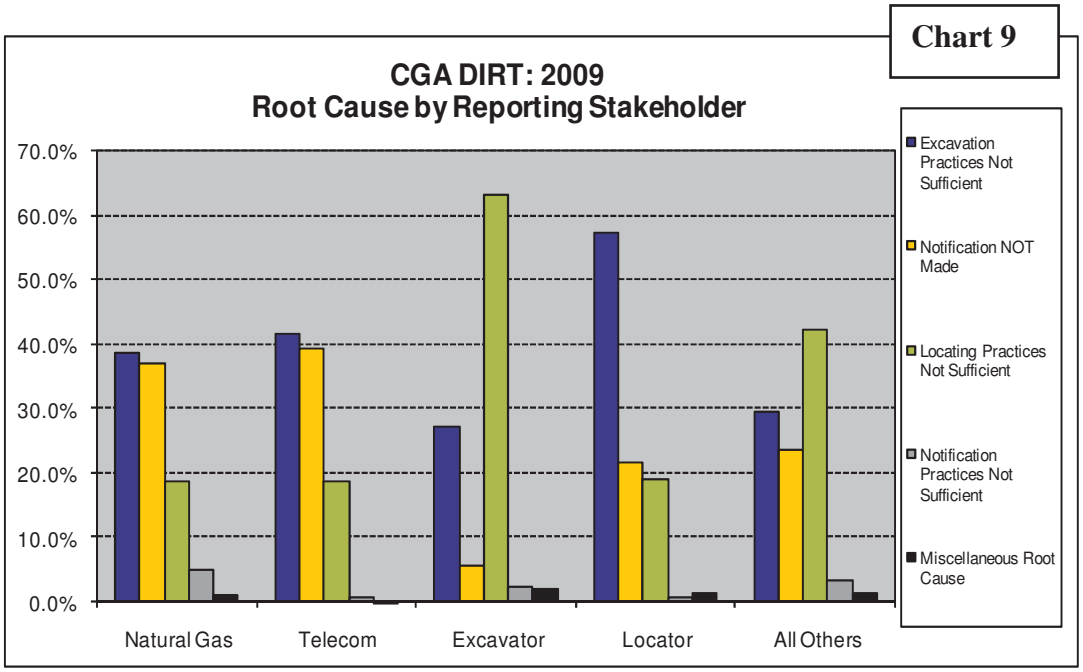
- Natural Gas stakeholders (96 individual organizations) submitted 46,549 records, with 79.2% having a known root cause.
- Telecommunications stakeholders (35 individual organizations) submitted 25,968 records, with 67.8% having a known root cause.
- Excavator stakeholders (21 individual organizations) submitted 4,988 records, with 78.9% having a known root cause.

[6] Because under 5% of their event reports include a known *root cause* (see the DQI section above), the number of records from the *one call* stakeholder group represented here is also small and overshadowed in the overall dataset.

- Locator stakeholders (11 individual organizations) submitted 1,424 records, with 73.0% having a known root cause.

The distribution of root causes reported by natural gas and telecommunications stakeholders is very similar, and has been relatively stable year-to-year. For excavators and locators, with the small number of records and reporting organizations, a few of the relatively larger reporters within those groups can influence the results, and the results can change more dramatically year to year.

The purpose of this analysis is to make stakeholders aware of how their own reports compare to those of other stakeholders. The Committee emphasizes that DIRT reports are anonymous, and the purpose of DIRT is to identify factors that contribute to damages and near miss events so that corrective actions can be implemented. Each individual stakeholder is encouraged to embrace 'Shared Responsibility' in the damage prevention process.



3. Regional Analysis

Facility Events within OCSI Region

Facility event information was submitted to DIRT and compiled for the eight Regions (as defined by One Call Systems International, i.e. OCSI) illustrated on the map below.

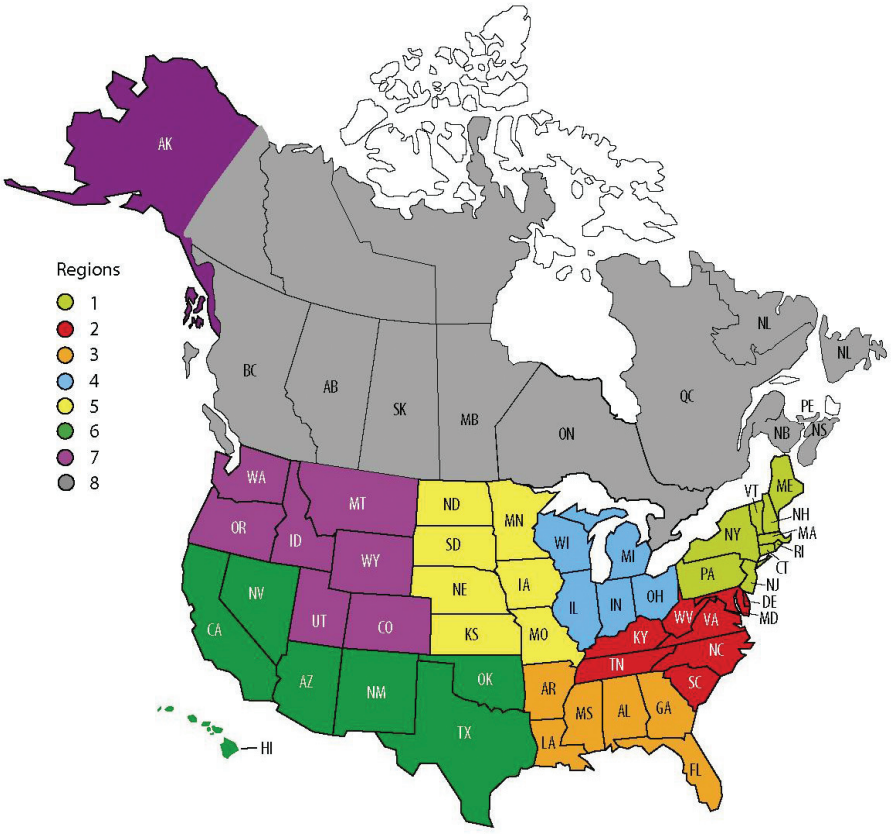
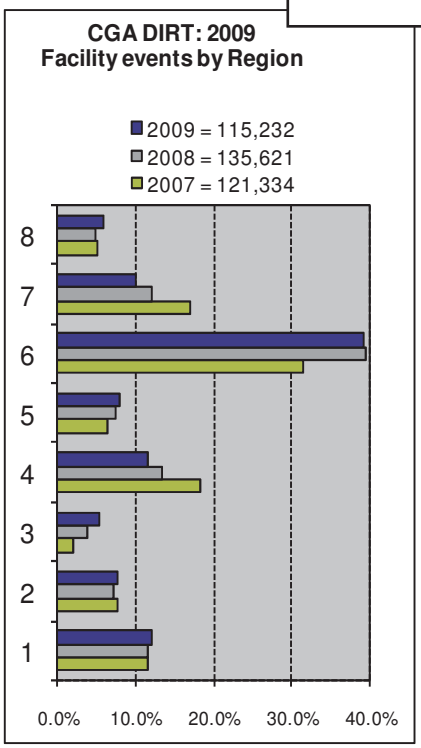
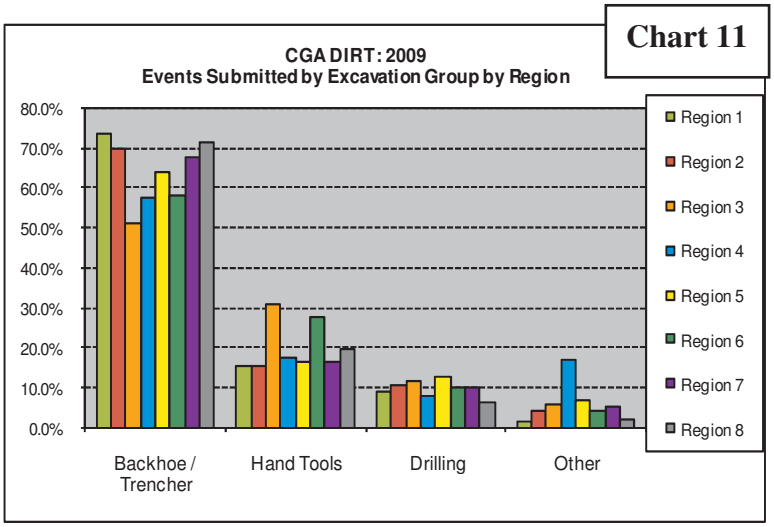


Chart 10



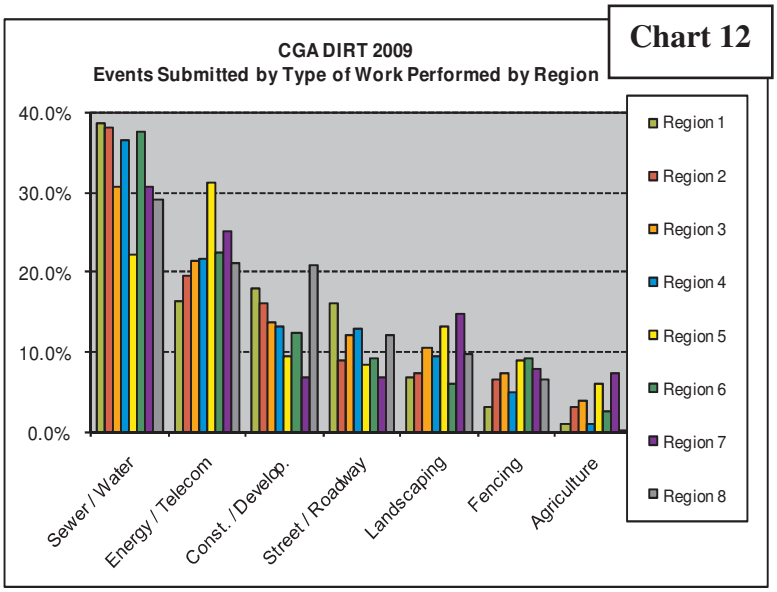
Reviewing the *Type of Excavation Equipment*, it is apparent that, regardless of Region, the *Hoe / Trencher* group is involved in the majority of events, which merely reflects that they are the most commonly used type of excavation equipment. One interesting item is the high percentage of events involving hand tools in Regions 3 and 6. This may be due to exemptions in some of these states regarding the use of hand tools, the soil types, or the climate in these Regions.

Chart 11



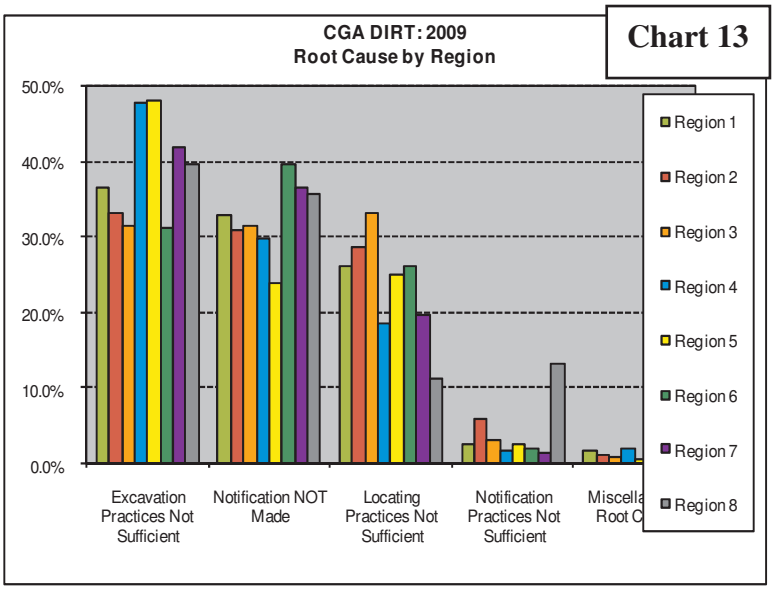
In reviewing *Type of Work Performed* on a regional basis, two noteworthy observations are revealed. One is the high percentage of events involving *Energy / Telecom* work in Region 5, the Midwest Region. The Committee speculates that a concentration of wind turbine projects in that Region may be a factor. Secondly, Region 8 (Canada) has the highest percentage of events involving *Const. / Develop.* work.

Chart 12



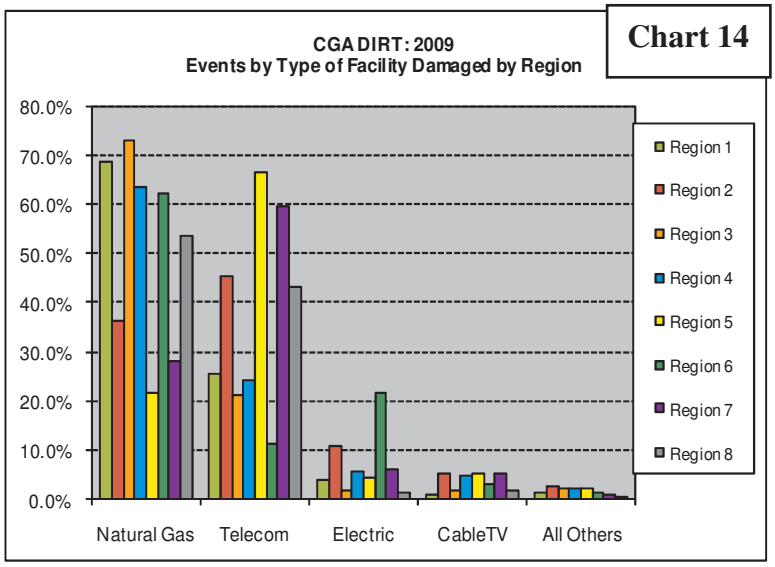
Reviewing first-level *Root Cause* on a regional basis, it appears that the high percentage of events involving *Excavation Practices Not Sufficient* in Regions 4 and 5 may present training opportunities. The high percentage of *Notification Practices Not Sufficient* in Region 8 (Canada) may indicate a need to promote one call procedures and legislation.

Chart 13



Consistent with the overall dataset, the majority of events on a regional basis involved *Natural Gas* or *Telecom* facilities. However, there is the high percentage of events involving *Electric* facilities in Region 6. This may or may not be an accurate reflection of the overall construction activity in these Regions, but rather may simply reflect which organizations are submitting data in each Region.

Chart 14



4. Data Quality Index Indications (DQI)

The Committee has monitored the Data Quality Index, or DQI, since 2007. DQI provides a gauge for the overall level of completeness of the data submitted to DIRT. Only with accurate and 'complete' (answers other than *Unknown / Other* or *Data Not Collected*) data can meaningful analysis be performed.

Chart 15

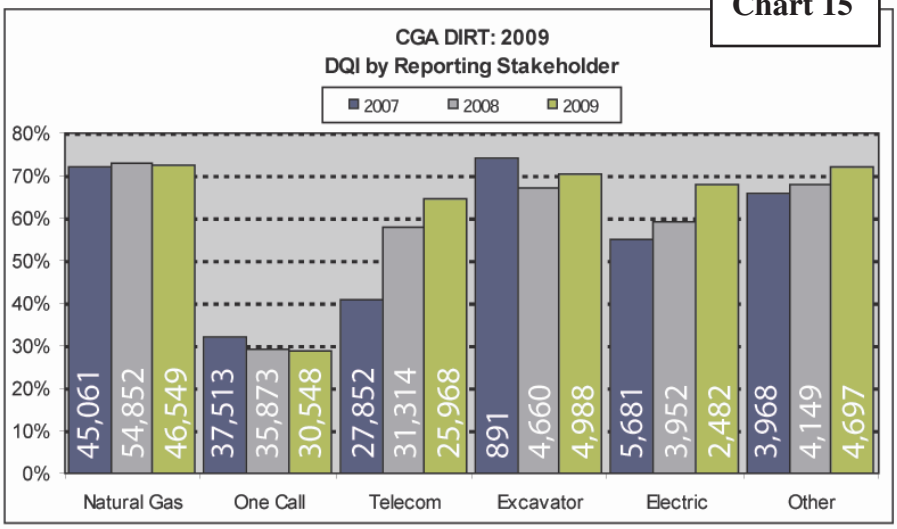


Chart 15 shows the DQI and total number of records submitted for each reporting stakeholder group from 2007 to 2009. As in 2007 and 2008, the one call center stakeholder group has the lowest overall DQI. This is believed to be due to several one call centers submitting large volumes of event reports to DIRT based solely upon receipt of an emergency ticket called in by an affected operator or excavator when damage has occurred. Typically, these tickets include only a date and location, with no root cause or many of the other data elements that DIRT requires but may not be known at the time of the initial damage notification. This leads to their low overall DQI. Recognizing this fact, members of the Committee and OCSI (also a CGA committee) are developing a process to improve the data collection process when an event is reported (or, called in) to a one call center at the time of the event (See Recommendation 2009-1).

Table 6

PART	DESCRIPTION & WEIGHT	2008 % of Overall DQI	2008 % of Org. DQI	2009 % of Overall DQI	2009 % of Org. DQI
A	Who is submitting the information (5%)	99%	98%	99%	96%
B	Date & Location of Event (12%)	66%	75%	66%	78%
C	Affected Facility Information (12%)	63%	87%	65%	90%
D	Excavation Information (14%)	59%	83%	57%	85%
E & F	Notification, Locating, & Marking (12%)	80%	95%	76%	91%
G	Excavator downtime incurred (6%)	12%	49%	17%	63%
H	Description of Damage (14%)	34%	74%	40%	76%
I	Description of Root Cause (25%)	55%	78%	57%	81%
	TOTAL WEIGHTED DQI	57%	80%	59%	83%

Table 6 shows the percentage of overall DQI and percentage of organization DQI for each DIRT Part. Percentage of overall DQI is the aggregated DQI of all the records in the dataset. The percentage of organization DQI is the averaged DQI of all the organizations that submitted data. The organization DQI is larger because there are a small number of organizations submitting large quantities of low DQI records and many organizations submitting small numbers of records with a high DQI.

5. Report Findings Summary

The estimate of the number of damages in the U.S. continues to decline. This may be partially due to decreased construction activity due to economic conditions, in conjunction with reductions due to targeted damage prevention efforts. The Committee examined one call tickets and building permits as indices of construction activity, and found that the decline in the estimate of damages appear to correlate with declines in those metrics.

For the first time since its inception, the number of events submitted to DIRT declined, which may be a reflection of an actual decrease in the number of damages. It does appear to be converging with the estimated number of damages.

Many data elements within the DIRT tool seem to be "maturing" over time, with increasing consistency year-to-year in terms of the percent of known data represented by an element within a Part, as seen in the Summary Table of Important DIRT Elements on page 20. For example, the percentage of records from the *Natural Gas* and *Telecommunications* reporting stakeholders (Part A) remained constant. In Part I, *Excavation Practices Not Sufficient* changed by one percent. This leads to more reliable and meaningful analysis, both within the data elements themselves and when performing analysis to identify relationships between the various data elements within the tool.

Extensive root cause analysis was performed in this Report, particularly in terms of analysis with *Reporting Stakeholder, Downtime, Near Miss*, and *Type of Facility Affected*. These analyses identified some interesting contrasts, such as how excavator reporting stakeholders tend to emphasize *Locating Practices Not Sufficient*, and how events involving *Transmission* as the *Type of Facility Affected* mainly involve *Notification NOT Made*.

Excavators continue to submit an increasing percentage of events, many of which involve *Downtime* and *Near Miss* data. In fact, there is extensive overlap (i.e. single reports of a near-miss event with downtime involved) between these two data elements in reports from excavators. In addition, excavators have the highest DQI of the reporting stakeholders for these data elements, indicating that *Downtime* and *Near Miss* are special areas of concern to excavators.

Transmission facilities, in particular *Liquid Pipeline*, are represented in near miss events at significantly higher rates than in the overall dataset. This concentration of reports involving *Transmission* in near miss events is likely attributable to a heightened awareness of the potential for more severe consequences if transmission facilities are damaged, and therefore a greater likelihood of them being documented and reported to DIRT.

6. Recommendations

Prior Recommendations – Status

This section provides a status update on recommendations presented in prior Reports. The Committee adopted three recommendation status choices:

1) Under Review: The recommendation is new or under consideration by the Committee.
2) In Progress: The recommendation is being acted upon.
3) Closed: The recommendation has been acted upon and is complete.

2004-7) The Committee should continue to develop ongoing metric(s) to help track damages and measure changes.

STATUS - In-Progress

Action Taken: During preparation of the 2009 Report, the Committee gathered and analyzed various industry data from several sources in order to establish benchmarks for estimated damages given a certain level of construction activity. The 2009 Report includes graphs and information about building permits in the United States, as well as one call ticket submissions. Information about public infrastructure and miles of specific utility types was also gathered, but was not believed to be complete or reliable enough to include in the Report at this time. The Committee continues to examine additional industry resources to build upon this recommendation.

2006-1) The Committee should identify methods to improve the quality and completeness of event information.

STATUS - Closed

Action Taken: The DQI (Data Quality Index) was developed and implemented in 2007. It is an ongoing 'measure of completeness' that is calculated on each record, or set of records, submitted to DIRT and is immediately provided to the user upon submission.

2007-1) The Committee should closely monitor whether facilities installed in a joint trench are less susceptible to damages. The share of 2007 events involving facilities known to be installed in a joint trench was 6%. However, only 21% of the 2007 events provided a *Yes* or *No* answer, and of that, 87% came from Region 6. Therefore, it is difficult to determine if there may be unique circumstances in Region 6, or if there is a widespread correlation between facility events and joint trench installations.

STATUS - In Progress

Action Taken: This recommendation was examined by the Committee during preparation of the 2009 Report; however there was nothing noteworthy to include at this time. The Committee will continue to monitor this issue in future Reports.

2007-2) The Committee should determine whether the type of locator has a direct relationship to the root cause of a damage or near miss event. The Committee should analyze this relationship to determine the risks associated with contracting the location of facilities by a company that does not own the actual facility being located.

STATUS - In Progress

Action Taken: These data elements were analyzed from the 2009 dataset during preparation of the 2009 Report. It was determined that the *Type of Locator* does not appear to have an impact on the *Root Cause* group *Locating Practices Not Sufficien*t for events submitted in 2009. The Committee will continue to monitor this in the future with the goal of obtaining more complete data in these data elements to analyze.

2007-3) The Committee should determine if there is a correlation between facility events involving *Service / Drop* and *Distribution* facilities, categorized as *Notification NOT Made,* and lack of a one call notification requirement when hand digging. If a correlation is found, the Best Practices committee may identify practices to educate involved stakeholders in an effort to decrease these types of events.

STATUS - Closed

Action Taken: Because *Service / Drop* and *Distribution* make up the overwhelming majority of the events with a known *Type of Facility Affected* (46.9% and 50.7% respectively), it is obvious that these are the facilities most affected by hand digging and lack of one call notification. In the 2008 Report, in conjunction with this recommendation, the Committee discussed a review of records from states that require one call notification when hand digging (non-exempt) versus states that do not (exempt). Because this is believed to be the key issue, the Committee is closing this recommendation and initiating a new recommendation in order to narrow the focus to the two elements of *Hand Tools* as the *Type of Excavation Equipment* and *Notification NOT Made* as the root cause (See Recommendation 2009-3).

2008-1) The Committee should continue to monitor variations in root causes reported by different reporting stakeholders.

STATUS - In Progress

Action Taken: Root causes reported by various reporting stakeholders were analyzed for the 2009 dataset. Findings were consistent with the 2008 Report, as excavators continue to submit a large percentage of events (over 65%) listing *Locating Practices Not Sufficient* , while natural gas, telecommunications and locators list *Excavation Practices Not Sufficient* most frequently. The Committee will continue to encourage objective and honest reporting, keeping the goal of damage prevention in mind. The intent when reporting data is not to place or avoid blame, but rather to learn from the experience of the event and to use that knowledge to prevent future damages.

Recommendations – 2009

2009-1) The Committee should continue to monitor the DQI of each stakeholder group. Training or other methods should be developed to assist stakeholders in improving their DQI. Again, only with accurate and 'complete' data can meaningful analysis be made.

STATUS - Under Review

Action Taken: A task team consisting of members of the DR&EC and OCSI has been formed to study the data collection process of one call centers and develop a process that will capture the additional information DIRT requires. This task team recommends that one call centers review the DIRT "Tip Card" with their staffs to help them understand what information is sought for DIRT. Additional practices are being formulated whereby one call center staffs would use "off-peak" times to follow up to obtain additional data not made available immediately after the damage or near miss event.

Also, the DR&EC is always willing to assist stakeholders and users with their data collection efforts to improve their DQI. Simply contact the DR&EC by submitting a "Feedback & Support" item on the DIRT website at www.cga-dirt.com.

2009-2) Damage and near miss events should be segregated and analyzed separately.

STATUS - Under Review

Action Taken: This year's Report is the first to examine *Near Miss* events in detail, and large contrasts were found in comparison to the entire dataset. Excavators submit 35.9% of the near miss events, despite submitting only 4.4% of the DIRT events. In addition, *Transmission* facilities, in particular *Liquid Pipeline*, are represented in near miss events at significantly higher rates than in the overall dataset. These events are different than an actual damage event. For example, if an excavator postpones the work because the utility locates are not completed on time, or if an excavator is found mobilizing excavation equipment near a

transmission right-of-way without a one call notice, it is unclear if the near miss would have in fact resulted in an actual damage.

Although separated out for the *Near Miss* analysis (Part H) in this Report, these events were included in the analyses of the other data elements. Because near miss events have been relatively few, they have not significantly influenced these analyses. However, the percentage of near miss events in DIRT is increasing. Therefore, going forward, near miss and damage events should be analyzed separately.

All stakeholders are again encouraged to collect and report near miss data.

2009-3) The Committee should examine the relationship between *Hand Tools* as the *Type of Excavation Equipment* and *Notification NOT Made* as the root cause. Approximately 61% of the 2009 events involving *Hand Tools* had a root cause of *Notification NOT Made*.

STATUS - Under Review

Action Taken: The 2008 Report (See Recommendation 2007-3, pages 30–31) discussed a review of the 2008 data which found that states requiring one call notification when utilizing hand tools (termed "non-exempt") had a 5.5% lower percentage of such events compared to states that do not (termed "exempt"). The same analysis was performed for the 2009 data and found that non-exempt states had a virtually identical percentage of such events. This Report discusses some possible reasons for this situation (See *Type of Excavation Equipment* (Part D), pages 7-8). The Committee should continue to monitor this issue, and include consideration of whether there are new or additional ways of approaching the analysis.

6. Summary Table of Important DIRT Data Elements

DIRT Data Summary Table				
		2007	2008	2009
Events Submitted		121,334	135,621	115,232
% CHANGE		16%	12%	-15%
Known stakeholder group submissions	Events with Known Data	120,966	134,800	115,033
*****Part A***	Known share of total events	100%	99%	100%
Natural Gas		46%	41%	41%
One Call		38%	27%	27%
Telecommunications		23%	23%	23%
Excavator		1%	3%	4%
Electric		6%	3%	2%
Others*		4%	3%	3%
Right of Way (ROW) Type	Events with Known Data	25,274	38,620	31,020
*****Part B***	Known share of total events	21%	28%	27%
Public- City Street		39%	43%	49%
Private- Landowner		35%	27%	24%
Dedicated PUE		10%	13%	10%
Private- Easement		4%	4%	4%
Others*		12%	13%	13%
Type of Facility Operation	Events with Known Data	108,025	121,690	103,306
*****Part C***	Known share of total events	89%	90%	90%
Natural Gas		48%	52%	54%
Telecommunications		38%	37%	29%
Electric		8%	5%	12%
Cable TV		4%	4%	4%
Others*		2%	2%	2%
Type of Facility Affected	Events with Known Data	57,130	65,968	65,029
*****Part C***	Known share of total events	47%	49%	56%
Distribution		49%	45%	51%
Sevice/Drop		49%	53%	47%
Transmission		2%	1%	2%
Gathering		0%	0%	0%
Excavation Equipment Group	Events with Known Data	70,642	82,835	67,285
*****Part D***	Known share of total events	58%	61%	58%
Hoe / Trencher		70%	63%	63%
Handtool		16%	20%	21%
Drilling		9%	11%	10%
Others*		5%	6%	6%
Excavator Group	Events with Known Data	59,568	80,324	65,111
*****Part D***	Known share of total events	49%	59%	57%
Contractor / Developer		81%	78%	75%
Occupant / Farmer		8%	8%	10%
Utility		5%	7%	8%
Government		6%	7%	7%
Excavator Downtime	Events with Known Data	17,333	18,900	21,241
*****Part G***	Known share of total events	14%	14%	18%
Yes		20%	31%	32%
No		80%	69%	68%
Root Cause Group	Events with Known Data	44,375	73,152	72,732
*****Part I***	Known share of total events	37%	54%	57%
Excavation Practices Not Sufficient		34%	37%	38%
Notification NOT Made		35%	37%	34%
Location Practices Not Sufficient		21%	22%	24%
Notification Practices Not Sufficient		9%	3%	3%
Miscellaneous root causes		1%	1%	1%

*Part A "Others" Includes: Liquid Pipeline, Road Builders, Insurance, Private Water, State Regulator, Engineering/Design, Locator, Public Works, Equipment Manufacturer and Railroad. Part B "Others" Includes: Public State Highway, County Road and Interstate. Private Business, Pipeline Power/Transmission Line, Federal Land and Railroad. Part C Type of Facility Operation "Others" Includes: Steam, Liquid Pipeline, Water and Sewer. Part D "Others": Refer to report section 8, page 22.

8. List of Groupings used in this Report

EXCAVATOR GROUP	
GROUP	**TYPE OF EXCAVATOR**
Contractor / Developer	Contractor, Developer
Occupant / Farmer	Occupant, Farmer
Utility	Utility
Government	State, County, Municipality
Other	Railroad

EXCAVATION EQUIPMENT GROUP	
GROUP	**TYPE OF EXCAVATION EQUIPMENT**
Hoe / Trencher	Backhoe, Trackhoe, 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 / Telecommunications	Natural Gas, Electric, Steam, Liquid Pipe, Telecom, Cable TV
Construction / Development	Construction, Site Dvelpment, 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, Irrigation

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
Misc. Root Cause	Abandoned, One call center error, Deteriorated, Previous damage

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