



2013 DIRT Report

For The Year 2012

Damage Information Reporting Tool

Analysis & Recommendations for the Province of British Columbia



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Introduction

I. BC Common Ground Alliance

The BC Common Ground Alliance (BCCGA) is a non-profit organization established to lead development of consistent practices and coordination of activities to ensure the highest possible standards of worker safety, public safety and damage prevention in connection with underground infrastructure.

The BCCGA is a unique consensus-driven organization with a direct conduit to regulatory innovation. It is open to any individual or organization with an interest in safety and underground infrastructure. The BC Common Ground Alliance considers that all involved with underground infrastructure or disturbance are responsible and accountable for the safety of their own procedures. It acknowledges, however, that it is in everyone's best interest to work together to develop safe and consistent practices.

The BCCGA has over 400 members and reaches a network of over 2,500 excavators throughout the province.

The BCCGA works to offer practical tools and to foster an environment in which anyone residing or doing business in British Columbia is aware of and compliant with best practices in regard to underground infrastructure or disturbance in order to ensure the safest possible environment for the workers and citizens of the province.

For more information please visit our website at:
www.commongroundbc.ca

II. Damage Information Reporting Tool

Historically, quantifying hits to underground infrastructure in BC has been uneven at best. In some cases, statistics have not been collected at all. In others, data is incomplete and does not provide a clear picture of the circumstances of the hit. Further, these statistics are usually kept by individual companies and are not shared. As a result, there has not been a comprehensive summary of how many damage events occur each year, the causes of these events or the circumstances surrounding, causing or preventing these events. This report begins the process of generating a high-level picture of safety and damage prevention in relation to excavation practice and the protection of underground infrastructure. This, in turn, should help all stakeholders improve worker safety, public safety and protect underground infrastructure in BC.

A high-level picture of excavation safety is vital in the creation of a stronger culture of safety around excavation in BC. With a thorough understanding of the circumstances surrounding hits regulators, lawmakers, businesses, and education and awareness organizations can target safety initiatives to the situations where they are most needed. This targeting has the potential to lead to more effective safety and damage prevention programs, which should translate into less damage and improved worker and public safety.

This report is built on information collected using the Common Ground Alliance USA's (CGA) Damage Information Reporting Tool (DIRT). Since 2003, DIRT has been the North American standard for data collection and reporting of underground damage information. It is a secure web application that allows users to remain anonymous and submit damage/ near miss reports, browse files by the user's organization, and submit feedback and questions. Anyone involved in underground facilities can contribute to and generate information from the DIRT tool.

In 2011, the BCCGA purchased Virtual Private DIRT. This has allowed the Alliance to provide a data collection tool that is tailored to the needs of British Columbia. Any company or excavator doing business in BC can submit data by registering at www.cga-dirt.com and selecting the British Columbia Virtual Private DIRT.

The primary purpose in collecting underground facility damage data is to analyze data, learn why events occur and determine what actions by both utility owners and excavators can prevent them in the future, thereby ensuring the safety and protection of people and infrastructure. The use of BC Virtual Private DIRT allows the BCCGA to identify root causes, perform trend analyses, and ultimately help educate stakeholders so that damages can be reduced through more effective practices and procedures.

This report is a summary of the BC Virtual Private DIRT data (currently available) regarding events that have occurred in 2012. It is the hope of the BCCGA that this report will be a useful tool for stakeholders in improving safety procedures, communications and training. Findings are analysed in the categories of facilities affected, excavation practices used and the cause of the damage or near miss event.

Increased stakeholder reporting will create a more complete picture of circumstances surrounding damage events, allowing future reports to better serve all stakeholders.

The BCCGA encourages all interested parties to help us in our efforts by submitting their damage reports to the BC Virtual

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Private DIRT. To participate, simply go to www.cga-dirt.com and register as a user. Once your registration is confirmed, you can begin submitting damage information or generate reports on the existing data.

III. Limitations

In presenting this report, it is important to note its limitations:

- While every effort has been made to ensure we have collected the most up to date information for this report, due to the voluntary nature of participation and aspect of confidential self-reporting, this report does not include all of the events that occurred in British Columbia in 2012.
- From anecdotal feedback, it is clear that not all stakeholders have chosen to report. However, with proper education it is the hope of the BCCGA that each year will see increased industry participation.
- The self-reporting nature of DIRT means that the information reported can be coloured by the interests of the reporting stakeholders. Again through education, these biases can be overcome through increased stakeholder participation representing diverse viewpoints.

- As the BC Virtual Private DIRT has been adopted only recently, some of the data has been converted from internal databases maintained by independent operators. As a result, it appears that some operators did not collect information pertaining to certain prescribed DIRT fields. As such, in a number of cases some fields were not been completed. In the future, the BCCGA hopes to improve the quality of data by educating users on what information is most valuable to collect.
- A year-over-year comparison is difficult to present in this report due to external variables that affect the data (i.e. housing starts, construction activity, economic growth, etc.) For this reason, comparison has not been included in this report. The BCCGA is continuing to explore a suitable methodology for year-over-year comparison.

Though we plan to improve data collection further in the future, the BCCGA is confident that the information in this report will be useful in improving, targeting and developing safety and awareness programs within the province. The current stakeholders reporting represent the largest stakeholder groups in the province. The current data also represents a geographical distribution that allows us to analyze the entire province.



SECTION 1 - THE DATA

The data used in this report comes primarily from hydroelectric, gas transmission, gas distribution and electric stakeholders. In 2012, 1,222 events were submitted to BCCGA through Virtual Private DIRT. This includes hits to infrastructure as well as “near miss” events without damage. Natural gas stakeholders submitted 90% of reports, and thus primarily reflect hits on natural gas infrastructure. The natural gas distribution network is the largest underground plant operator in BC and is geographically distributed throughout the province. For these reasons, it is likely that the activity around natural gas infrastructure is indicative of activity around other underground infrastructure in British Columbia. Though there were a number of organizations reporting for the first time in 2012, these organizations represent a very small percentage of the reports. Thus, the data for 2012 reflects similar reporting stakeholders as the 2011 DIRT Report.

1.A EVENTS BY REGION

COUNTY	Events		Population 2012*	
	COUNT	%	Count	%
Alberni-Clayoquot	2	0.16	31548	0.70
Bulkley-Nechako	0	0.00	39319	0.87
Capital	58	4.76	376423	8.33
Cariboo	37	3.04	65738	1.45
Central Coast	0	0.00	3277	0.07
Central Kootenay	22	1.80	60901	1.35
Central Okanagan	88	7.22	188454	4.17
Columbia-Shuswap	28	2.30	53578	1.19
Comox-Strathcona	38	3.12	109664	2.43
Cowichan Valley	14	1.15	83544	1.85
East Kootenay	36	2.95	60456	1.34
Fraser-Fort George	48	3.94	97479	2.16
Fraser Valley	86	7.05	288815	6.39
Greater Vancouver	551	45.20	2443739	54.06
Kitimat-Stikine	0	0.00	39185	0.87
Kootenay Boundary	19	1.56	31888	0.71
Mount Waddington	0	0.00	11753	0.26
Nanaimo	29	2.38	151510	3.35
North Okanagan	44	3.61	83320	1.84
Northern Rockies	6	0.49	6378	0.14
Okanagan-Similkameen	21	1.72	82955	1.84
Peace River	16	1.31	66137	1.46
Powell River	7	0.57	20548	0.45
Skeena-Queen Charlotte	1	0.08	19416	0.43
Squamish-Lillooet	10	0.82	42425	0.94
Stikine	0	0.00	1070	0.02
Sunshine Coast	12	0.98	30589	0.68
Thompson-Nicola	46	3.77	30589	0.68

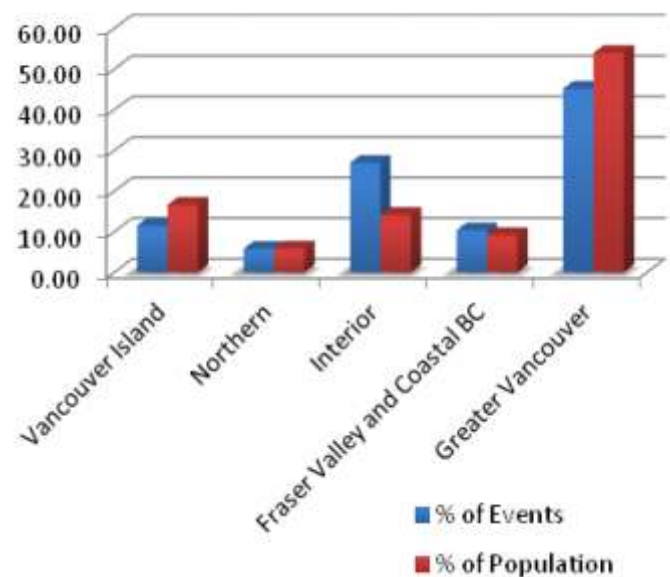
*Estimated 2012 Population from BCStats

Though the reported events for 2012 roughly reflect the geographic population distribution of the province, some exceptions should be noted. The two most populous regional

districts, Greater Vancouver and Capitol, had proportionately fewer damage events than would be expected. This indicates that the damage prevention measures in these areas are somewhat successful. Despite this, Greater Vancouver does represent 42% of all damage events in British Columbia, and should remain a primary target for damage prevention activities.

Conversely, Central Okanagan and Thompson-Nicola regional districts both show a disproportionately large number of hits. It would be useful for damage prevention organizations to focus on improving and increasing initiatives in these areas.

PERCENT OF DAMAGE EVENTS AND PERCENT OF POPULATION IN EACH GEOGRAPHIC AREA



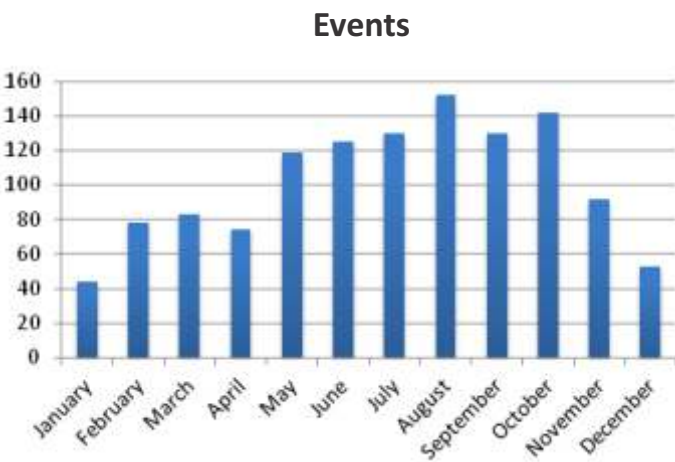
The geographic patterns are replicated when the regional districts are combined into five geographic regions. When the data is divided in this way it becomes clear that Greater Vancouver and Vancouver Island, the two most populated regions, both have proportionately fewer damage events than any other area. Also, greater Vancouver has the highest number of incidents. The Interior had comparatively more events based on population than any other geographical area with 14% of the total population but 26% of the reported events. This Interior region includes Central Okanagan and Thompson-Nicola regional districts, which had disproportionately high incident rates.

This data indicates that educational initiatives and awareness programs should be targeted at the Interior region, and that current practices may not be sufficient to prevent dangerous hits. This data also shows that the

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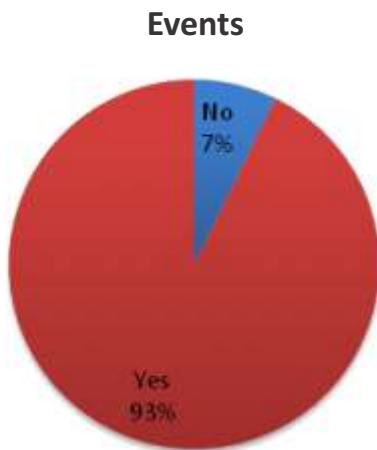
densely populated Greater Vancouver regional district has both the highest total number of hits and the fewest hits relative to population. This indicates that new initiatives in this area could reach the highest number of at-risk excavators. This also indicates that current safety practice in Greater Vancouver is more effective than in other areas of the province.



1.B MONTHLY DISTRIBUTION

The mild climate in BC allows construction work to continue year-round. The data indicates an increase in reported events in summer and early fall. This is likely an indication of increased excavation activity during those dryer months, rather than an indication of safer practice in winter.

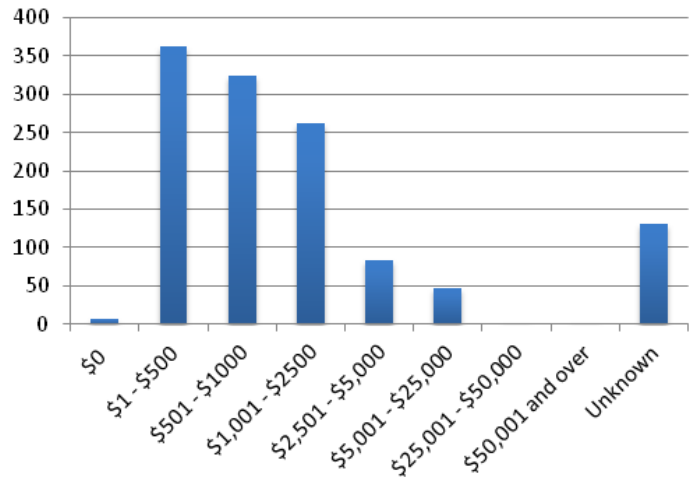
1.C SERVICE INTERRUPTION



Service was interrupted in 93% of reported events. Service interruption can pose serious safety issues. Loss of telecommunication lines in emergencies and loss of electric or gas heating in cold weather are both example of outages that

can lead to serious public safety risk.

1.D COST OF DAMAGE



DIRT asks stakeholders to report the estimated cost of repairing damage incurred by a hit. Cost of repair is a valuable metric, as a higher-cost hit can indicate greater safety risk to both workers and the public, though there is potential for injury with any hit. In 2012, 78% had an estimated cost of damage below \$2,500. Two events had an estimated cost in the \$25,001-\$50,000 range, and two were estimated above \$50,000. These high-cost events represent the greatest risk to workers and the public and should be monitored closely.

1.D SUMMARY - THE DATA

- Reported events loosely followed population lines within the province, with the Interior having more events relative to population than any other geographic area, indicating unsafe practice in this region.
- Greater Vancouver had the largest share of damage events.
- Greater Vancouver and Vancouver Island had the fewest damage events relative to population.
- Most reported events occurred in the summer and early fall.
- 78% of events had an estimated cost of damage below \$2,500. It is important to note that a lower estimated cost does not necessarily indicate a lower safety risk. There is a potential for injury with any size event.

SECTION 2 - FACILITIES AFFECTED

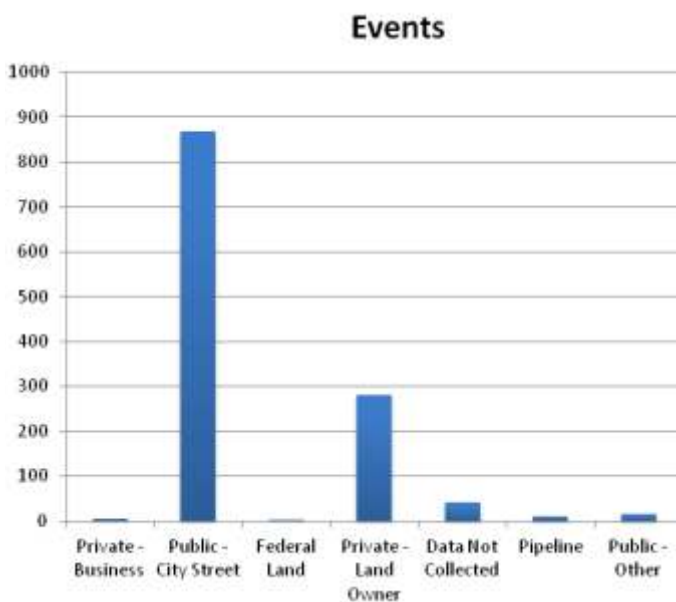
The majority of the 2012 data was drawn from natural gas stakeholders. As such, over 90% of reports listed “facility operations affected” as natural gas. Electric operations were affected in 5% of reports, and liquid pipelines were affected in 4% of events.

2.A FACILITIES AFFECTED

FACILITY AFFECTED	EVENTS
Distribution	1,142
Gathering	8
Service/Drop	14
Transmission	58

Most of the damage events were in the distribution category, with transmission being the second largest category. The predominance of distribution and transmission facilities is a reflection of the currently reporting stakeholders and not an indication that these facilities are necessarily more prone to damage events.

2.B LAND TYPE



Type of Land	Events
Private - Business	5
Public - City Street	869
Federal Land	1
Private - Land Owner	280
Data Not Collected	41
Pipeline	11
Public - Other	15

There is a DIRT field which asks reporting stakeholders to identify the right of way on which an incident took place. This question establishes the type of land or property effected, and should be differentiated from the industry term “Right of Way” which indicates the area near a pipeline. This type of land would be indicated as “pipeline” in DIRT’s right of way field.

The majority of events occurred on city streets. This may reflect the physical distribution of infrastructure, or unsafe practices being used in roadwork. The second largest category was private land. This indicates that homeowners may not be aware of safe excavation practices.

2.C SUMMARY – FACILITIES AFFECTED

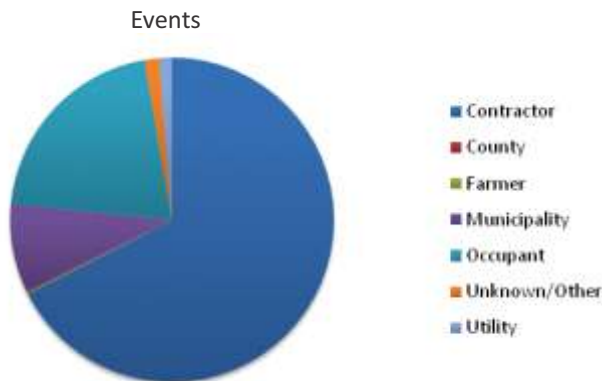
- Most events occurred when a distribution facility was affected.
- Most facilities affected were located on a city street or private land.
- Over 90% of reports selected natural gas as the facility affected.

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SECTION 3 – THE EXCAVATION

3.A EXAVATOR TYPE



Excavator Type	Events	%
Contractor	811	67.41
County	1	0.08
Farmer	2	0.17
Municipality	107	8.89
Occupant	249	20.70
Unknown/Other	17	1.41
Utility	16	1.33

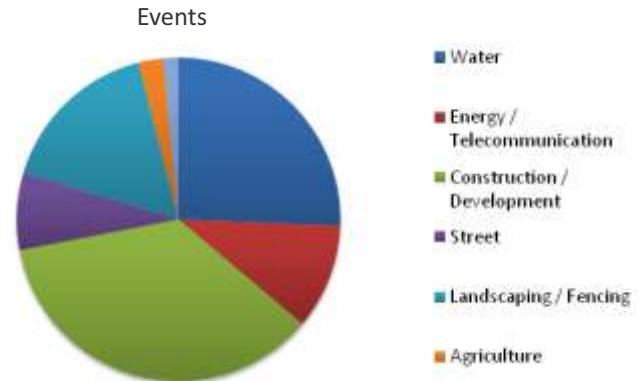
A strong majority of reported events involved the contractor / developer excavator type. This finding is consistent with the DIRT data in other regions of North America. The Municipality and Occupant categories were also selected in a significant number of reports. This data indicates that the main targets for damage prevention initiatives in BC should be contractors, homeowners, and municipalities.

3.B EXCAVATION TYPE

EXCAVATION TYPE	EVENTS	%
Hoe / Trencher	1085	93.05
Hand Tools	2	0.17
Drilling	11	0.94
Miscellaneous	68	5.83

Of reports where data was collected, over 93% of events involved the hoe /trencher group. This is consistent with past data as well as DIRT reports of other regions. This data reflects the popularity of hoes and trenchers as primary tools of excavation for large and small projects of all kinds. It may also reflect the fact that using the best practice of hand exposing underground infrastructure is less likely to result in damage.

3.C WORK PERFORMED



WORK PERFORMED	EVENTS	%
Water	199	26.01
Energy / Telecommunication	82	10.72
Construction / Development	278	36.34
Street	60	7.84
Landscaping / Fencing	127	16.60
Agriculture	19	2.48
Unknown / Other	12	1.57

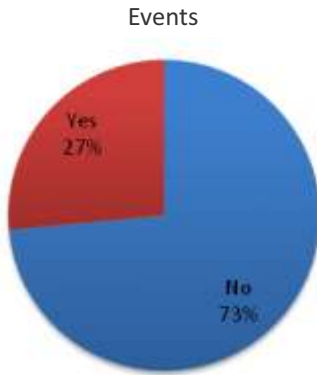
Of reports where data was collected, 36% of events fell into the construction / development group. The top three groups, construction / development, water and landscaping / fencing represent 78% of all known work performed in damage events.

3.D SUMMARY – THE EXCAVATION

- 67% of events had an excavator type in the contractor / developer group.
- 93% of events occurred while using a backhoe, trackhoe or trencher.
- The most-selected work performed group was construction / development, followed by water and landscaping / fencing.

SECTION 4 – THE CAUSES

4.A NOTIFICATION



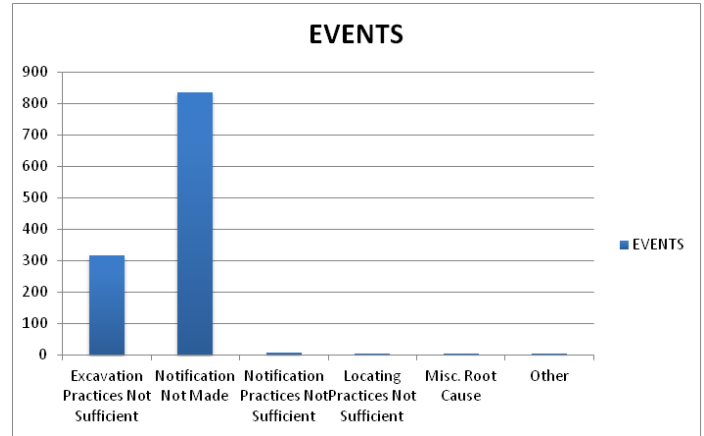
All excavators are required to call before they dig in the province of BC. In 2012, 73% of damage events occurred when BC One Call was not notified. It is likely that many of these events could have been avoided if proper notification was initiated.

The BC One Call Centre is an important safety resource. BC One Call partners with its member institutions to communicate the location of underground infrastructure. When compared with other provinces and US states, BC clearly underuses this valuable service. In 2012, Alberta One Call serviced over 360,000 calls while BC One Call only saw 119,845 tickets. It is clear that increased awareness and use of BC One Call would be an extremely effective step towards reducing damage to underground in British Columbia.

From any phone in British Columbia, BC One Call can be reached toll-free at 1-800-474-6886 or from Telus or Rogers cellular phones by pressing *6886. More information can be found at <http://www.bconecall.bc.ca>.

In addition to contacting BC One Call, private marking and locating services can be found throughout the province to help verify facilities.

4.B ROOT CAUSE



- Where a root cause was listed, over 70% of the damage events in BC had a root cause of notification not made. This supports the importance of notification in reducing excavation damage.
- The “excavation practices not sufficient” group was also responsible for a large portion of the 2011 events. It is possible that excavators are not aware of the appropriate techniques and practices when working around underground infrastructure. It is essential that any safety or awareness initiative encourage both One-Call use and safe digging practice. The BCCGA publishes an industry-reviewed Best Practices guide which is available free of charge at www.commongroundbc.ca.

4.3 SUMMARY – THE CAUSES

- 73% of damage events occurred when the BC One Call Centre had not been notified.
- The majority of events were caused by insufficient notification and location practices.
- Increased notification and use of BC One Call could have a significant impact on the frequency of hits to underground infrastructure in British Columbia.
- Improved excavation practice could also significantly reduce damage events in BC.

CONCLUSIONS

SECTION 5 - CONCLUSIONS

Since 2003, DIRT has been used throughout North America to collect data on accidents and near miss events involving underground infrastructure. This data allows province-wide, cross-industry analysis that can be used by the Common Ground Alliance and other groups to design and target safety initiatives in the hope of reducing future incidents.

In 2012, BC Virtual Private DIRT collected 1,222 event reports from stakeholders. This represents a small increase in reporting stakeholders from 2011. While more cross-sectorial industry participation will make a more powerful data set in subsequent reports, a number of important conclusions and recommendations can be drawn.

These include:

1. INCREASED REPORTING

Conclusion:

Increased stakeholder reporting would greatly improve the depth of content for future DIRT reports.

Recommendation:

BCCGA will work with industry and stakeholders to increase reporting of damage and near-miss events. This is in the interest of both worker and public safety.

2. IMPROVED REPORTING

Conclusion:

Many categories did not draw sufficient responses to be included in this report. Improved reporting would allow more powerful conclusions to be drawn, and allow the BCCGA and other organizations to better target education and awareness initiatives.

Recommendation:

BCCGA will work with industry and stakeholders to collect more detailed information concerning damage and near-miss events. This will be achieved by educating industry on the value of this information.

3. BC ONE CALL

Conclusion:

The majority of events occurred when notification did not occur. It can be inferred from this that proper notification and location verification could significantly reduce incidents in British Columbia. In fact, increased use of BC One Call may be the most valuable step towards decreasing damage to underground infrastructure in BC. This is concurrent with previous findings in BC

Recommendation:

It is imperative that the excavation community, including commercial, government, and private diggers, be made aware of the availability and benefits of the BC One Call Centre and the rules and regulations associated with underground infrastructure.

4. LOCATION OF EVENTS- GREATER VANCOUVER

Conclusion:

The Greater Vancouver Regional District, while having a lower percentage of hits per capita, still has the majority of incidents in the province. This is due to the higher population and thus higher levels of both infrastructure and excavation activity.

Recommendation:

Targeting education and awareness activities in Greater Vancouver should reach the largest number of excavators and thus have the greatest effect on the number of damage events in BC.

5. LOCATION OF EVENTS- THE INTERIOR

Conclusion:

The Interior region had more events proportionate to population than any other geographic area, while also having the second-largest share of damage events in the province.

Recommendation:

Increased safety training in the Interior area could be beneficial to reducing excavation damage. Though these programs would not reach as many excavators as programs in Greater Vancouver, they would reach a population with particularly high risk relative to population.

CONCLUSIONS

SECTION 5 - CONCLUSIONS *Continued*

6. LOCATION OF EVENTS- GREATER VANCOUVER AND VANCOUVER ISLAND

Conclusion:

Vancouver Island and Greater Vancouver both had a low number of hits relative to population. This indicates that practices are safer in these areas than in other geographical regions.

Recommendation:

Safety organizations should investigate the safety initiatives and practices being used in these geographic areas, and try to identify the causes of safer practice so that these can be replicated elsewhere in the province.

7. TIMING OF EVENTS

Conclusion:

There are increased damage events in the summer months.

Recommendation:

In British Columbia, excavation safety and awareness programs should focus on the months of May to October. To avoid disturbing busy work times, programs that require a time commitment, such as safety courses, should ideally be scheduled outside of this busy time. Awareness techniques that require little or no time commitment from the excavator, such as poster campaigns, should take place during the busiest months.

8. CONTRACTOR COMMUNITY

Conclusion:

The majority of events occurred when contractors were working.

Recommendation:

Safety and awareness programs would be most effective if targeted towards contractors, particularly those that are usually contracted by private businesses and landowners.

9. HOMEOWNER COMMUNITY

Conclusion:

20% of reported events occur due to the actions of a homeowner.

Recommendation:

Safety and awareness programs should emphasize that safe excavation practice is not limited to professional excavators. Education and awareness should be developed that targetshomeowners.

To participate in DIRT, simply go to www.cga-dirt.com and register as a user. Once your registration is confirmed, you can begin submitting damage information or generate reports on the existing data.



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APPENDIX A ~ SUMMARY TABLE OF DIRT DATA ELEMENTS

Data Summary Table		
Events Submitted		1,222
Stakeholder Group Submission	Events with Known Data	1,222
Part A	Known Share of Total Events	100%
Natural Gas	1104	90.34%
Electric	64	5.34%
Liquid Pipeline	53	4.34%
Public Works	1	0.08%
Right of Way Type	Events with Known Data	1,181
Part B	Known Share of Total events	97%
Private - Business	5	0.40%
Public - City Street	869	71.11%
Federal Land	1	0.08%
Private - Land Owner	280	22.91%
Pipeline	11	.90
Public – Other	15	1.22%
Type of Facility Operation	Events with Known Data	1,222
Part C	Known Share of Total Events	100%
Natural Gas	1,105	90.42%
Electric	64	5.23%
Liquid Pipeline	53	4.33%
Type of Facility Affected	Events with Known Data	1,222
Part C	Known Share of Total Events	100%
Distribution	1,142	93.45 %
Gathering	8	0.65%
Service/Drop	14	1.14%
Transmission	58	4.74%
Excavation Equipment Group	Events with Known Data	1166
Part D	Known Share of Total Events	95%
Hoe / Trencher	1085	93.05
Hand Tools	2	0.17
Drilling	11	0.94
Miscellaneous	68	5.83
Excavator Group	Events with Known Data	1,186
Part D	Known Share of Total Events	97%
Contractor/Developer	811	68.38
Occupant/Farmer	251	21.16
Utility	16	1.35
Government	108	9.11
Root Cause Group	Events with Known Data	1,170
Part I	Known Share of Total Events	96%

APPENDIX B ~

GROUPINGS USED IN REPORT

Geographic Area

Group

Greater Vancouver
 Fraser Valley and Coastal BC
 Interior
 Northern
 Vancouver Island

Administrative Region

Greater Vancouver
 Central Kootenay, Fraser Valley, Powell River, Sunshine Coast
 Cariboo, Central Okanagan, Columbia-Shuswap, East Kootenay, Kootenay Boundary, North Okanagan, Okanagan - Similkameen, Squamish-Lillooet, Thompson-Nicola
 Fraser - Fort George, Northern Rockies, Peace River
 Alberni - Clayquot, Capital, Comox-Strathcona, Cowichan Valley, Nanaimo

Excavator Grouping

Group

Contractor / Developer
 Occupant / Farmer
 Utility
 Government
 Other

Type of Excavator

Contractor, Developer
 Occupant, Farmer
 Utility
 Province, Regional District, Municipality
 Railroad

Excavation Equipment Grouping

Group

Hoe / Trencher
 Hand Tools
 Drilling
 Other

Type of Excavation Equipment

Backhoe, Trackhoe, Trencher
 Hand Tools, Probe
 Auger, Bore, Directional Drill, Drill
 Grader, Scraper, Road Milling Equipment, Explosives, Vacuum Equipment, Farm Implement

Work Performed Grouping

Group

Water
 Energy / Telecommunication
 Construction / Development
 Street
 Landscaping / Fencing
 Agriculture

Type of Work Performed

Sewer, Water
 Natural Gas, Electric, Steam, Liquid Pipe, Telecom, Cable TV
 Construction, Site Development, Grading, Drainage, Driveway, Demolition, Engineering, Railroad, Waterway
 Roadwork, Curb / Sidewalk, Storm Drainage, Milling, Pole, Traffic Signals, Traffic Signs, Streetlight, Public Transit
 Landscaping, Fencing
 Agriculture, Irrigation

APPENDIX B ~ continued

Root Cause Grouping

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 centre
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 centre made but not sufficient, Wrong information provided to one call centre
Misc. Root Cause	Abandoned, One call centre error, Deteriorated, Previous damage

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