

# **Perspectives on Facility Damage - 2002**

(Volume II, Version -a-)

An annual report published by Utility Notification Center of Colorado reviewing underground facility damages resulting from excavation activity.

For Calendar Year 2002  
and  
Covering Years 2001 -2002 Facility Damages

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This report may be referenced as the Utility Notification Center of Colorado analysis on underground facility damage.

## **Perspectives on Facility Damage – 2002**

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### **Introduction**

UNCC would like to thank all member organizations that complied with the state damage reporting requirements and submitted facility damage information for 2002. This year's review brought to us a few new insights about facility damage as well as confirmed past perceptions. In addition, we have made an effort to minimize the vast amount of data detail and instead focus on the implication of the data to our stakeholders and how this information might be used to influence possible legislative efforts and to positively impact UNCC's mission to protect underground facilities and prevent injury and loss of human life.

This report first presents an executive summary of our findings along with eight conclusions for the stakeholders. Those stakeholders include:

- Member facility owners and operators
- Underground facility locators
- One-Call
- Excavators

Important findings are then presented that highlight the key elements of the data. The 2002 summary data follows with a comparison to the 2001 data. An analysis of the data is presented with implications to the stakeholders were appropriate, along with significant changes between years.

The underground facility owners in the state of Colorado have provided the information compiled in this report in accordance with CRS 9.1.5-101-106. The information in this report has been collected, summarized and published for the sole purpose of improving industry practices, protecting the underground infrastructure and preventing the loss of life.

### **Executive Summary**

The 2002 facility damage data included 12,704 damage incidents, a 14.5% increase over the 11,092 damages reported in 2001. Member organizations reporting increased from 65 in 2001 to 71 in 2002, a 9.2% increase. Regrettably, 3 injuries and 3 deaths were reported in 2002. Similar to last year, the single most important observation was that for 61% of the reported facility damage incidents (62% in 2001) a locate was in fact requested by the excavator and processed by UNCC - and a damage still occurred. Conversely, for 39% of the reported facility damages (38% in 2001), a locate was not requested by the excavator. This one finding clearly identifies the necessity for excavators to both request locates and to visually verify the exact location of the underground facility before they excavate. To a much lesser extent, the data shows that facility owners and operators must ensure that the facilities are accurately marked within the time allowed under the law.

### **Conclusions**

Analysis of the 2002 data resulted in eight conclusions for the stakeholders:

#### **Excavators:**

1. Excavators should strive to improve efforts in requesting locates;
2. Excavators should visually verify the facility prior to excavation;

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### **Facility owners and operators:**

3. Facility owners and operators need to accurately locate underground facilities;
4. Facility owners and operators should complete all requests within the time outlined under the law;
5. Facility owners and operators, especially Tier II, should submit all damages for analysis to UNCC.

### **UNCC:**

6. UNCC, in conjunction with member organizations, should consider expanding and targeting its outreach efforts to improve public awareness of the legal requirements to “call before you dig”, especially for homeowners and contractors new to the state or unfamiliar with the law.
7. UNCC should continue to improve and expand its damage prevention educational programs for excavators, owners and operators to clearly communicate the need to:
  - a. complete all locate requests within the time outlined under the law (owners);
  - b. accurately locate underground facilities (owners);
  - c. visually verify underground facilities prior to excavation (excavators).

### **The underground facility industry:**

8. The industry should continue to review and pursue appropriate legislation that will create accountability among the stakeholder groups and ensure compliance with the law, aimed at preventing injury to persons and property and preventing interruption of services resulting from damage to underground facilities.

One of our primary goals with damage reporting for 2002 was to improve the quality of the data by encouraging members to reduce the occurrence of the “Unknown” and “None of the above” options on several of the data categories. Although there was considerable improvement, continued progress can be made by facility owners and operators through better on site investigations and documentation when damages occur.

As familiarity with the data submission and reporting system improves and the stakeholders continue to obtain value from the analysis and conclusions drawn from the information, the damage data reporting program should continue to positively impact our industry.

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### Important Findings

#### Root Cause

Of the total damages reported, 60% had a locate request while 40% did not

- A Locate was not requested
  - 29% of the time the excavator did not request a locate and damage occurred
  - 11% of the time the member selected the “None of above” option
- A Locate was requested
  - 34% of the time the facility was correctly marked and damage still occurred
  - 14% of the time facility was incorrectly marked and damage occurred
  - 10% of the time facility was not marked and damage occurred
  - 3% expired locate, insufficient marking, or call center error (0.1%)

#### Facility Type

Two facility types comprised 85% of total damages reported

- Communication facilities sustained 58% of damages, 41% of these without a locate request
- Gas facilities sustained 27% of damages, 40% of these without a locate request

#### Facility Distribution Type

- 96% of the reported incidents caused damage to distribution and service/drop services
- 4% of the reported incidents caused damage to transmission/primary services

#### Excavation Type

Three excavation types comprised 69% of total damages reported

- 43% of the reported damages were caused by backhoes, 32% of these without a locate request
- 18% of the reported damages were caused by trenchers, 35% of these without a locate request
- 8% of the reported damages were caused by hand tools, 56% of these without a locate request

#### Excavator Type

Two excavator types comprised 86% of total damages reported

- 81% of the reported damages were caused by contractors, 38% of these without a locate request
- 5% of the reported damages were caused by occupants, 65% of these without a locate request

#### Work Type

Five work types comprised 53% of total damages reported

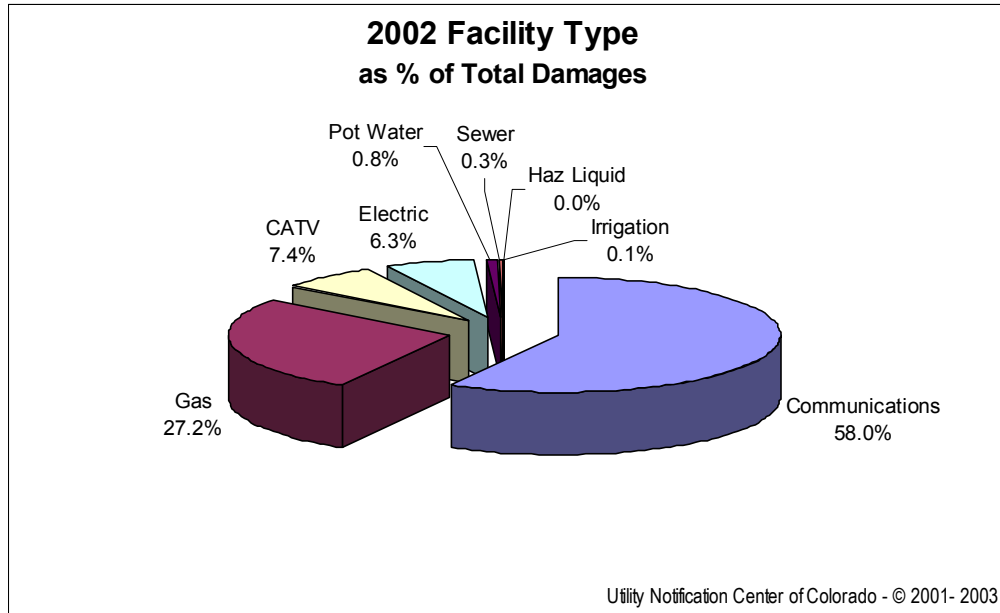
46% of total damages were caused by these five work types to just two facility types:

Work Type	% Total Damages	% No Request	Share of facility damage due to work type:	
			Communication	Gas
Landscaping	15.5%	56.3%	20.6%	9.4%
Electric	10.2	22.1	8.8	12.1
Fencing	9.8	64.0	11.9	4.0
Sewer	9.7	24.8	5.9	18.4
Water	<u>7.9</u>	13.3	<u>9.2</u>	<u>4.7</u>
TOTAL	53.1%		56.4%	48.6%

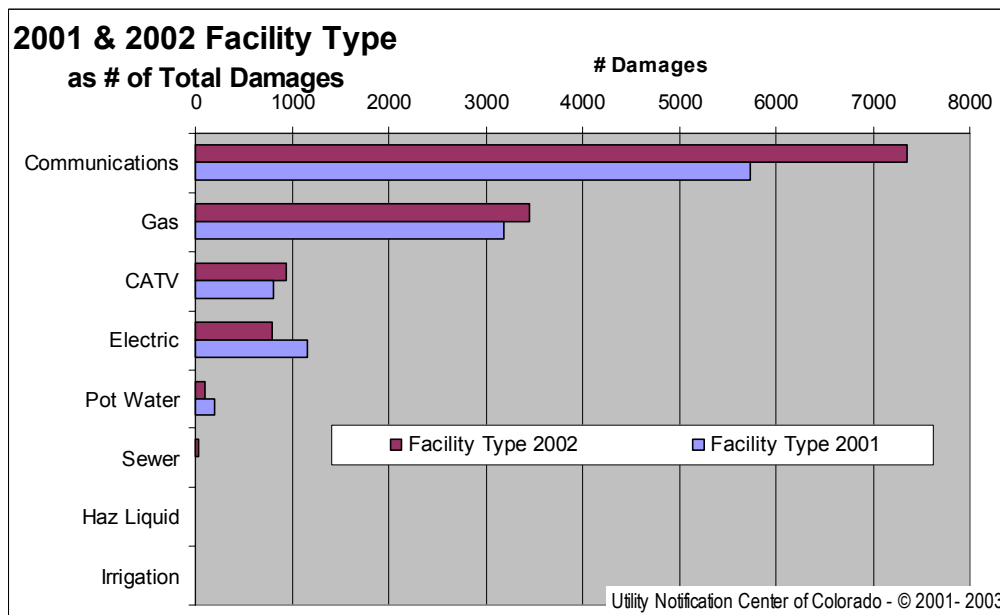
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**Facility Type**

What underground facility types were damaged in 2002?



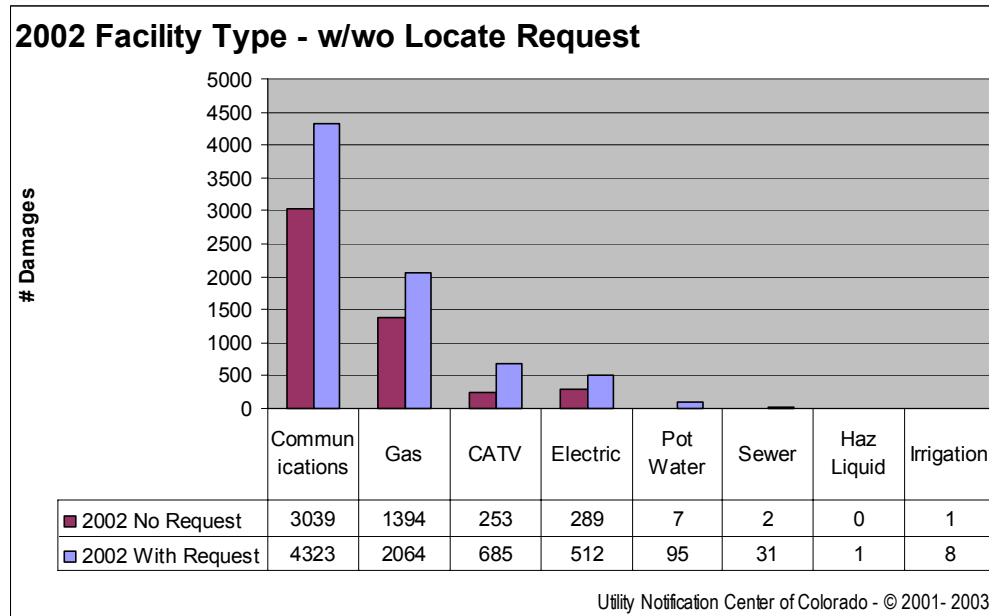
How does this compare to 2001?



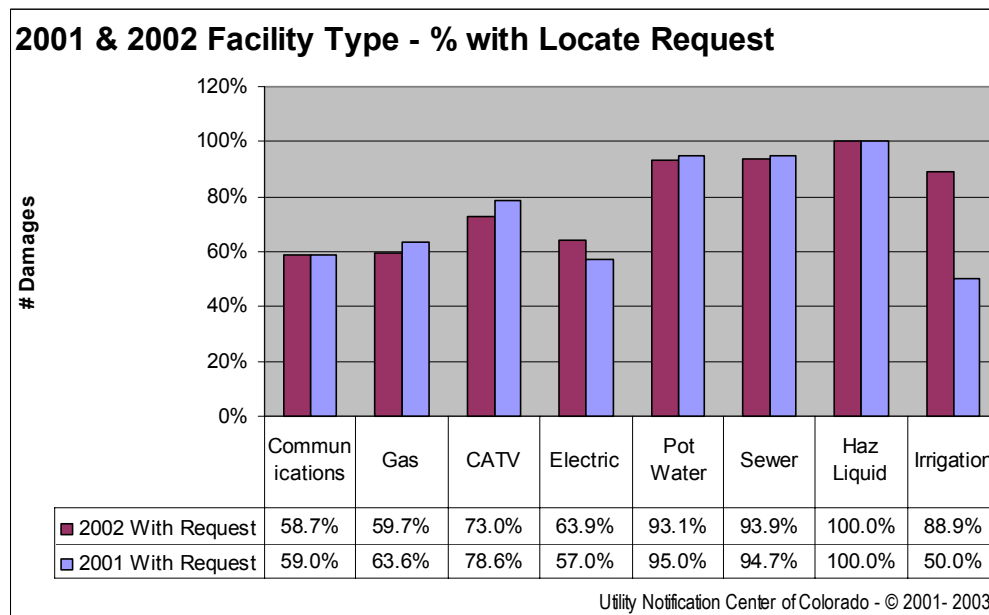
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For each Facility type, were locates requested or not?



For each Facility type, did the % damaged with a locate request increase in 2002 over 2001?



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### **Facility Type Analysis**

Communication and Gas facilities continue to sustain the lion's share of the damages; 85.2% for both, with Communications the majority at 58% of total damages.

Approximately 60% of the reported damages had a locate request for both Communications and Gas facilities. This means 40% of these damages did not have a locate request. This ratio was very similar in 2001.

Potable Water, Sewer, Hazardous Liquid and Irrigation facility types did not sustain significant damages and excavators obtained a locate 89-100% of the time.

### **Significant Changes**

The number of damages to Communication facilities increased by 28.5% over 2001, though the total reported damages only increased by 14.5%. Damage to Electric and Potable Water facilities actually decreased in 2002 by 43% and 95% respectively, though the actual damages were relatively small compared to Communication and Gas facilities.

## Perspectives on Facility Damage – 2002

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### **Facility Demographic Analysis**

#### **Member Type Analysis**

Of the 12,704 reported damages, only 94% were reported by Tier I members and 1% reported by Tier II members. The data suggests that Tier II members either are not experiencing facility damages or are not reporting the damages.

#### **Damage Cost Analysis**

Members reported 8,063 damages (63.5% of total) with a cost greater than \$0. These reported damages accounted for \$3.9 million of total damage cost.

96.9% of these reported damages (7,812) cost \$2,000 or less.

The average for these was \$308 with a median ( $\frac{1}{2}$  more,  $\frac{1}{2}$  less) of \$107.

4.1% of these reported damages (251) cost more than \$2,000.

These included three damages in excess of \$40,000.

\$170,000 damage: a communication transmission line cut with a directional drill by a contractor performing cable TV work. A locate request was made and was correctly marked. 250,000 customers were affected by the damage.

\$87,500 damage: a water service line pulled from the main with a backhoe by a contractor performing sewer work. A locate request was made and was correctly marked. 30 customers were affected by the damage.

\$43,382 damage: an electric distribution was damaged with an auger by a contractor performing fencing work. A locate request was not. No customers were reported affected by the damage.

#### **Damage Duration Analysis**

Members reported 1,514 damages (11.9% of total) with a duration greater than 0 hrs.

These reported damages accounted for 4,054 hours of total damage duration.

99.5% of these reported damages (1,506) lasted 25 or fewer hours.

The average for these was 1.9 hrs with a median ( $\frac{1}{2}$  more,  $\frac{1}{2}$  less) of 1.0 hrs.

0.5% of these reported damages (8) lasted 26 or more hours.

These included two damages in excess of 100 hours.

800 hour damage: a fiber optic service line cut with a hand tool by a contractor performing irrigation work. A locate request was made and was correctly marked. There was no reported cost to repair the damage.

120 hour damage: a natural gas gathering line punctured with a backhoe by a private occupant performing fencing work. A locate request was not made. The reported cost to repair the damage was \$10,000 and it resulted in a fatality.



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### **Customers Affected Analysis**

Members reported 8,137 damages (64.1% of total) with one or more customers affected. These reported damages accounted for 1.05 million affected customers.

99.2% of these reported damages (8,069) affected 1,000 customers or less.

The average for these was 58 customers with a median ( $\frac{1}{2}$  more,  $\frac{1}{2}$  less) of 1 customer.

0.8% of these reported damages (68) affected more than 1,000 customers.

These included three damages that affected in excess of 25,000 customers.

259,000 customers affected: a communication transmission line cut with a directional drill by a contractor performing cable TV work. A locate request was made and was correctly marked. The repair cost was \$170,000.

144,000 customers affected: a communication transmission line cut with an unknown device by a contractor performing communications work. A locate request was made and was correctly marked. The repair cost was \$18,497.

25,000 customers affected: a communication transmission line cut with a trencher by a contractor performing pipeline work. A locate request was made and was inaccurately marked. The repair cost was \$5,190.

### **Injury and Fatality Analysis**

Three injuries and three fatalities were reported in 2002.

One fatality occurred on a CATV distribution line cut with a backhoe by a contractor performing water work. A locate request was made and the facility was marked correctly.

One fatality occurred on a natural gas gathering line punctured with a backhoe by a private occupant performing fencing work. A locate request was not made.

One fatality occurred on a natural gas distribution line cut with a grader by a contractor performing lot grading work. A locate request was not made.

One injury occurred on a natural gas gathering line cut with a backhoe by a farmer performing agricultural work. A locate request was not made.

One injury occurred on a natural gas service line cut with a backhoe by a contractor performing unknown work. A locate request was made and the facility was marked correctly.

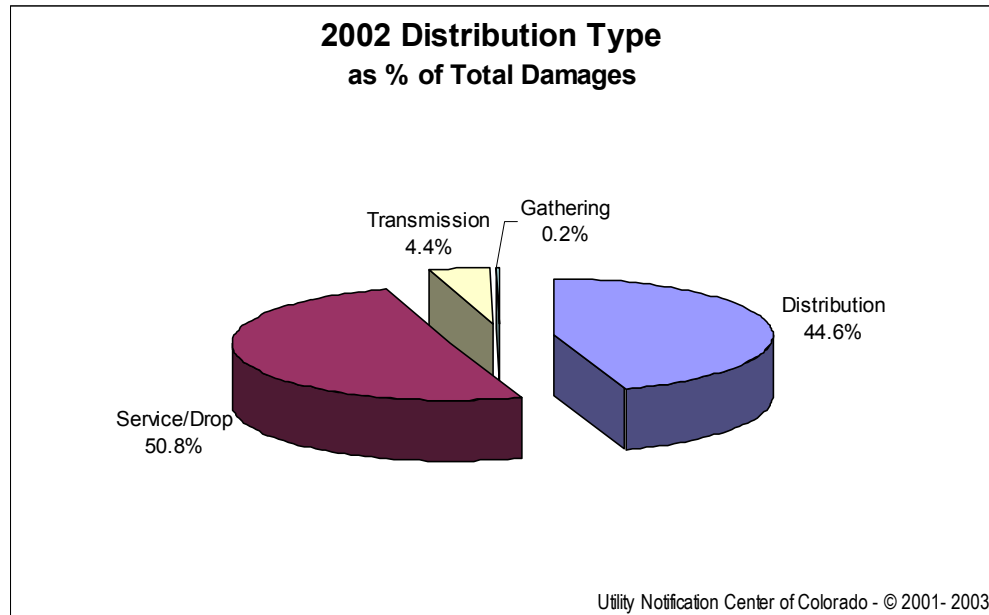
One injury occurred on a natural gas distribution line cut with a backhoe by a contractor performing sewer work. A locate request was made and the facility was marked correctly.

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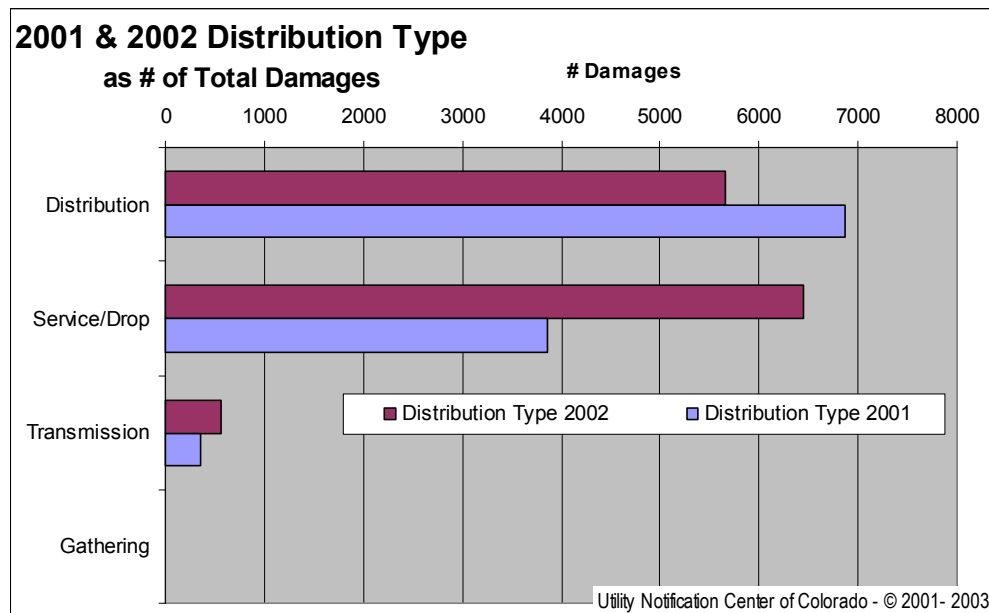
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### Distribution Type

What underground Facility Distribution types were damaged in 2002?



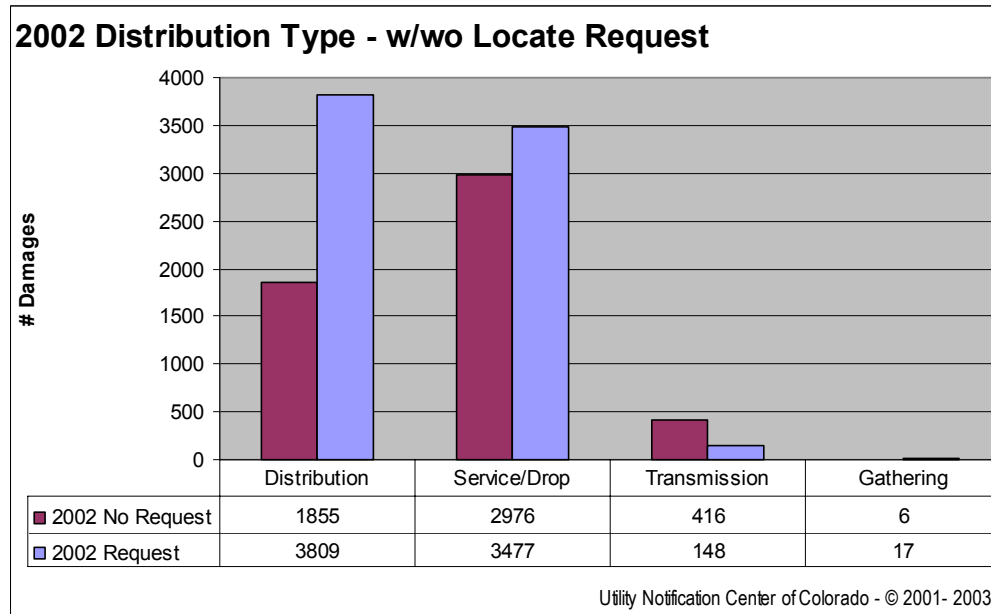
How does this compare to 2001?



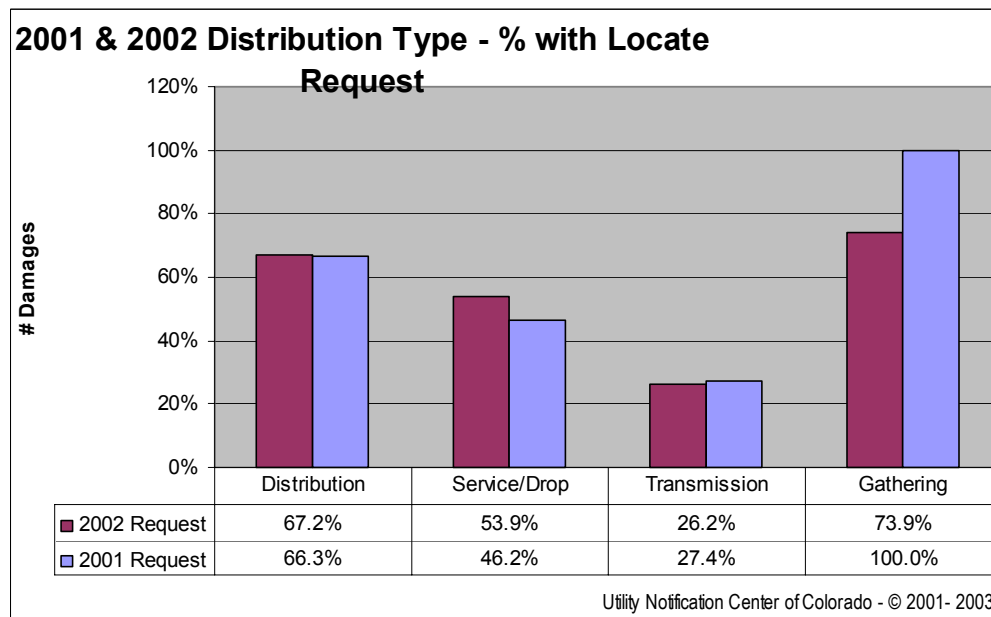
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For each Facility Distribution type, were locates requested or not?



For each Facility Distribution type, did the % damaged with a locate request increase in 2002 over 2001?



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### **Distribution Type Analysis**

The Service/Drop and Distribution categories continue to sustain the majority of the facility damages; 95.42% for both, with Service/Drop the largest share at 51% of total facility damages.

Approximately 67% and 54% of the reported damages had a locate request for the Distribution and Service/Drop categories. This means 35-45% of these damages did not have a locate request. This ratio was very similar in 2001.

Although the Transmission category sustained only 4.4% of the total damages reported, 73.8% of these damages did not have a locate request. Damages to the Gathering category were insignificant at 0.2%, but these damages had a locate requested 74% of the time.

### **Significant Changes**

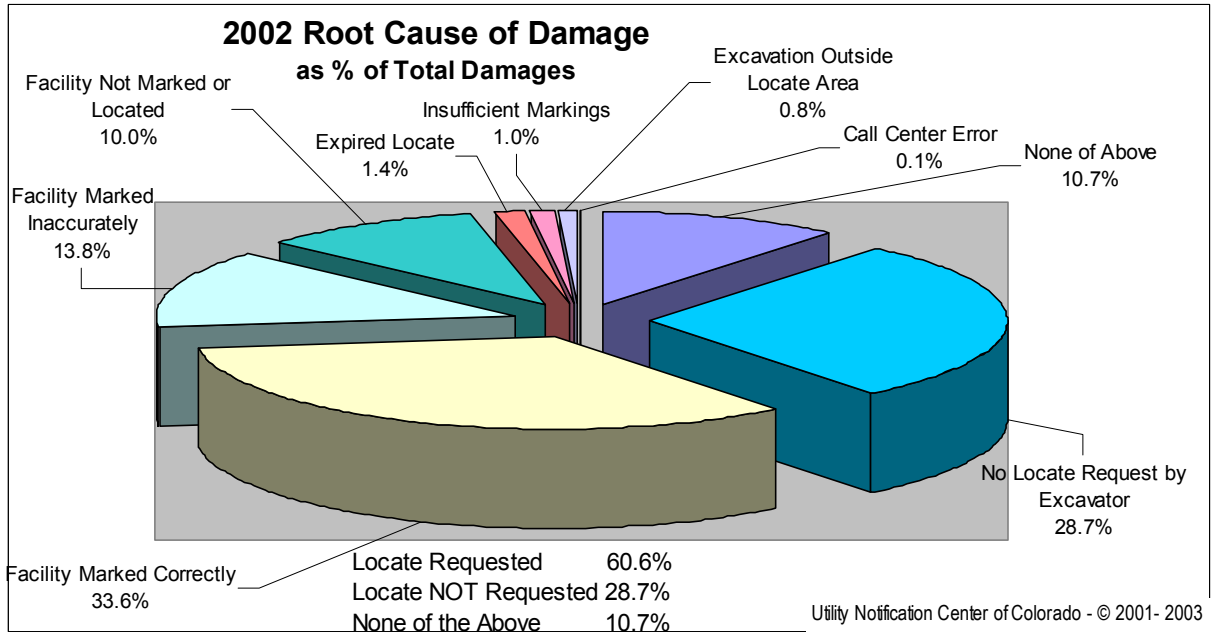
The number of facility damages in the Service/Drop category increased by 67.3% over 2001, though the total reported damages only increased by 14.5%. Also, the number of facility damages in the Distribution category decreased by 17.5% over 2001

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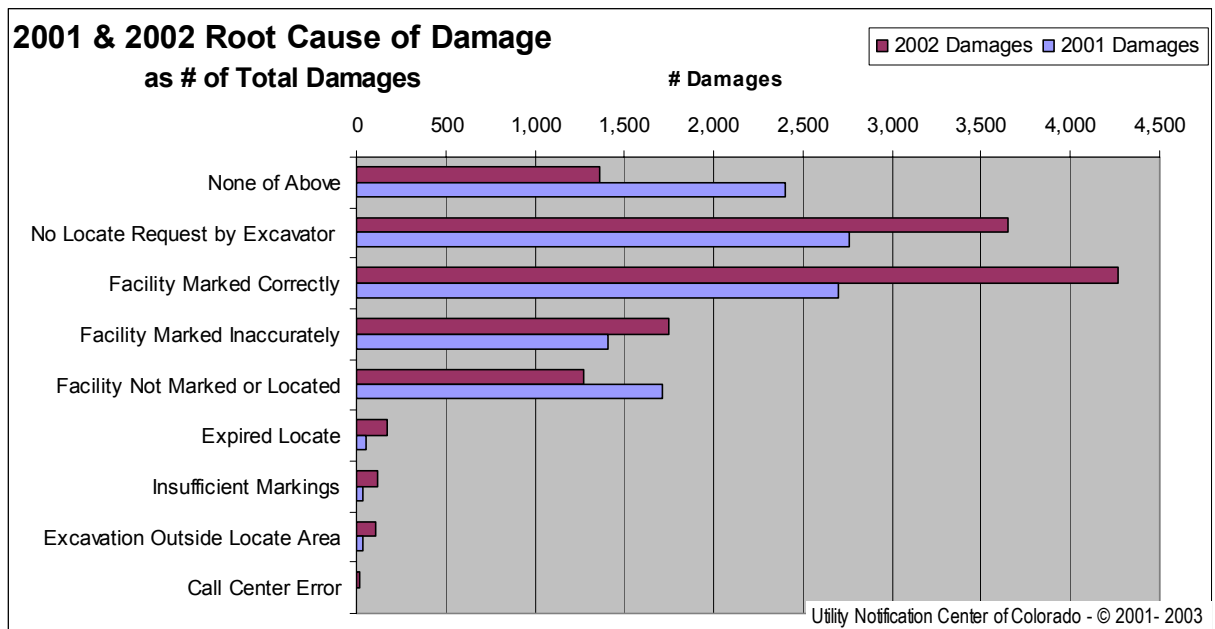
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### Root Cause of Damage

What were the Root Causes of Damage in 2002?



How does this compare to 2001?



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### Root Cause Analysis

When asked whether a locate request was made or not, members reported that nearly 61% of the damages had a locate request, while for about 29% the excavator did not request a locate, and for the remaining 10% the “none of the above” option was selected.

Even though a locate was requested for 61% of the damages;

(Finding A) for 33.6% of the damages the facility was correctly marked and damage occurred;

(Finding B) for 13.8% of the damages the facility was incorrectly marked and damage occurred;

(Finding C) and for 10.0% of the damages the facility was not marked and damage occurred.

Expired locates, insufficient markings and excavation outside of the locate area were not significant causes of damage.

(Finding D) 29% of the time the excavator did not request a locate and a damage occurred.

The four findings definitely support four conclusions:

1. Excavators should strive to improve efforts in requesting locates (Finding D);
2. Excavators should visually verify the facility prior to excavation (Finding A);
3. Facility owners and operators need to accurately locate underground facilities (Finding B);
4. Facility owners and operators should complete all requests within the time outlined under the law (Finding C).

Detailed analysis of Root Cause and Work Type indicates that five work types - landscaping, electric, fencing, sewer and water - resulted in over 53% of the total damages. Landscaping work was the largest contributor with 15.5% of total damages. The other four work types contributed between 8-10% of the total damages each. For 42% and 53% of the damages that landscaping and fencing work caused respectively, a locate was not requested. Electric, sewer and water work did not request a locate in only about 12% of the damages they caused. The predominate Root Cause of damage when a locate was requested for these types of work (except water) was “Marked correctly, damage occurred within 18 inches of marking” – supporting Conclusion 2 and indicating the need to visually verify the facility prior to excavation. In the case of damages caused by water work, the Root Cause “inaccurate facility marking” resulted in 49% of the damages – supporting Conclusion 3 and indicating the need for facility owners to accurately locate their facility.

### Significant Changes

Members have improved the quality of the data reporting and have made improvement in two areas:

There was a 43% decrease in the use of the “None of the above” option;

There was a 26% decrease in the number of damages that occurred when a locate request was made and the facility was not marked or located.

Although the total reported damages increased by only 14.5%;

The number of damages reported without a locate request increased by 32%;

The number of damages reported when a locate was requested and the facility marked correctly increased by 58% over 2001;

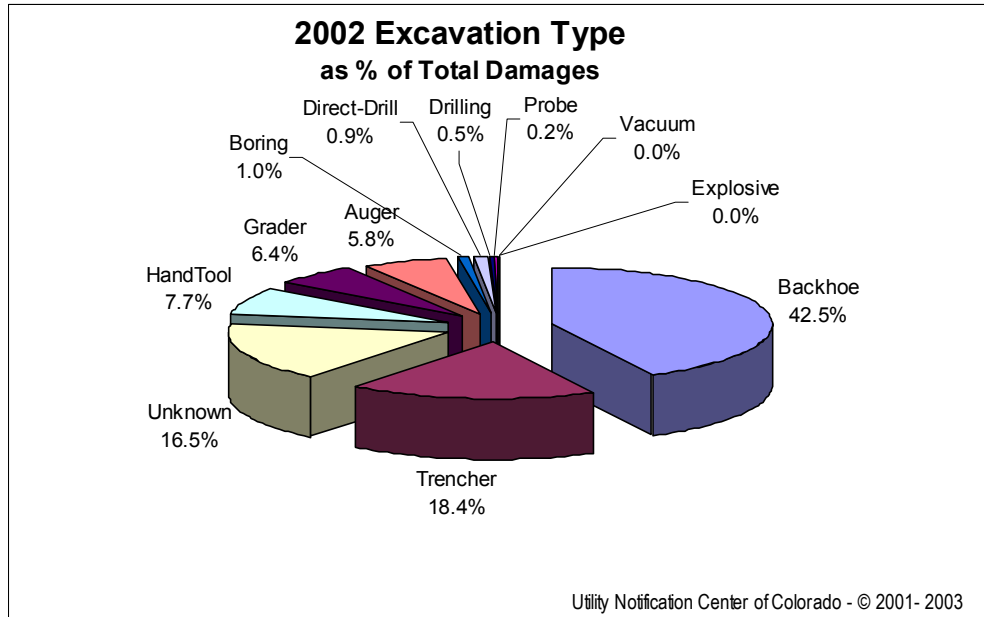
The number of damages reported when a locate was requested and the facility marked inaccurately increased by 25% over 2001.

These %increases beyond the 14.5% increase in total damages occurred primarily due to the improvement in the reporting with the reduction if the use of the “None of the above” option.

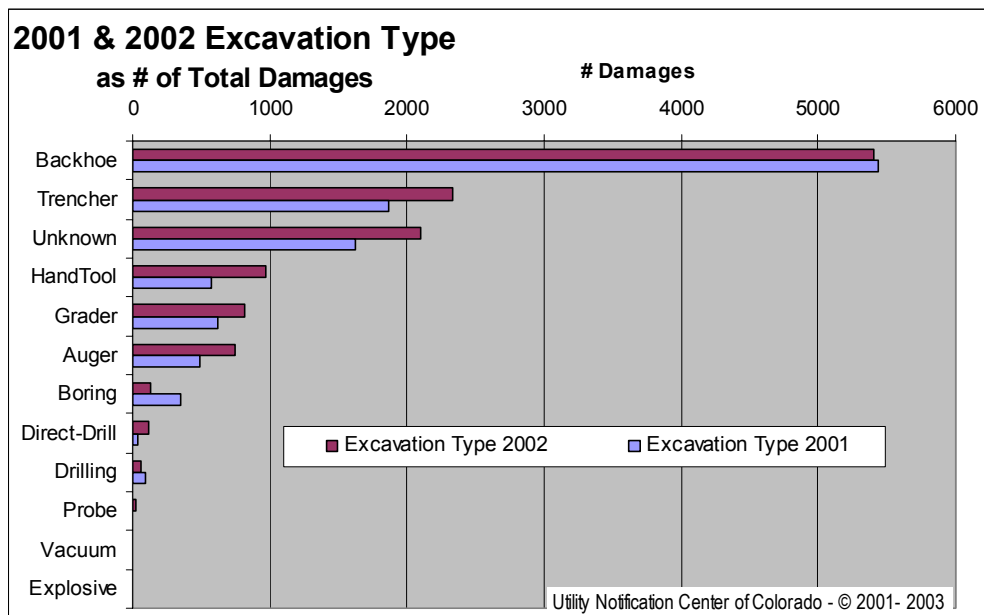
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**Excavation Type**

What Excavation types caused Facility damage in 2002?



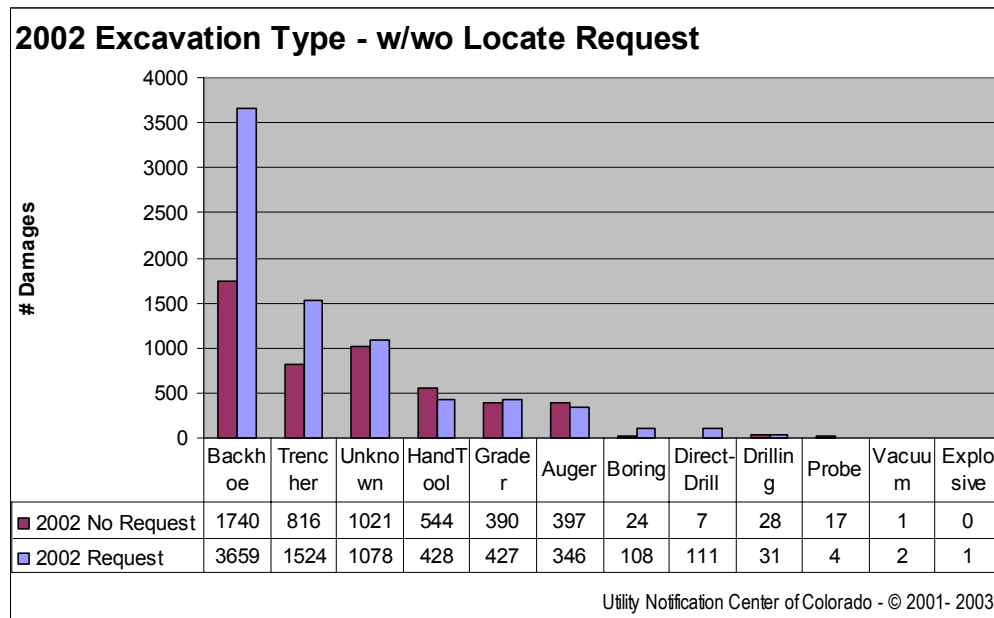
How does this compare to 2001?



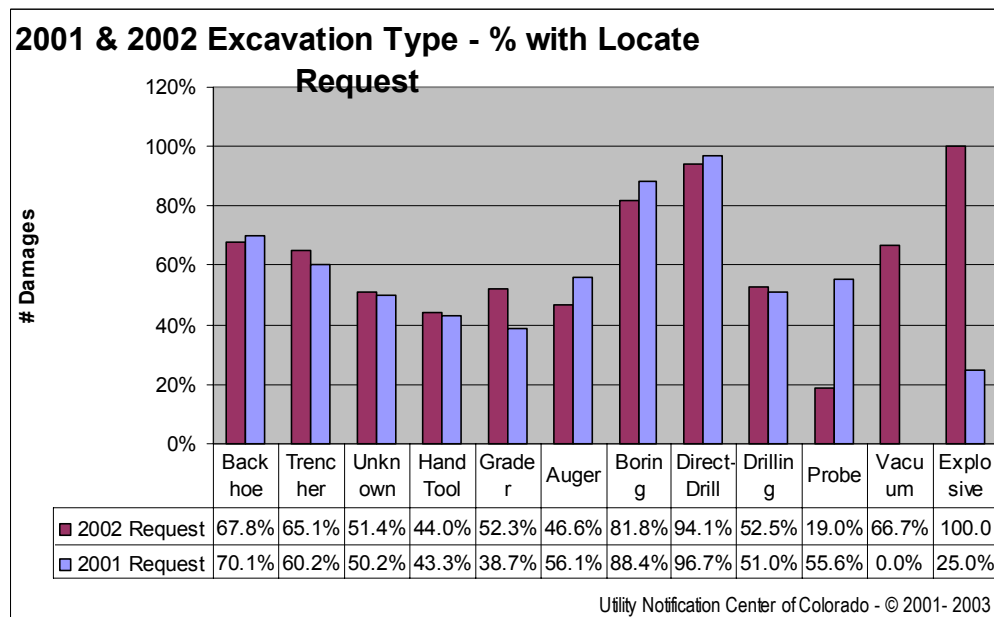
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For each Excavation type, were locates requested or not?



For each Excavation type, did the % damaged with a locate request increase in 2002 over 2001?





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### Excavation Type Analysis

Backhoes, Trenchers and Hand Tools continue to cause the lion's share of the facility damages; 68.6% for the three, with Backhoes the majority at 42.5% of total facility damages.

Approximately 68% and 65% of the reported damages had a locate request for the Backhoes and Trenchers respectively. This means 32-35% of these damages did not have a locate request. This ratio was very similar in 2001. Interestingly, only about 44% of the reported damages had a locate request for Hand Tools. This ratio was also very similar in 2001.

Graders (6.4%) and Augers (5.8%) did not cause much facility damage, while Boring, Drilling, Vacuums and Explosives (1% or less each) are nearly insignificant causes of facility damage.

Detailed analysis shows that the three Excavator types - contractors, occupants and utility companies - caused the majority of the damages using backhoes, trenchers and hand tools. The following table identifies the Excavation type, % damage caused, and % of damages with locate requests for these three Excavator types.

<b>Excavator Type</b>	<b>Excavation Type</b>	<b>% Total Damages Caused By Excavator with Tool</b>	<b>% of these With A Locate Request</b>
Contractor	Backhoe	33.9%	68.%
Contractor	Trencher	16.6%	68.%
Contractor	Hand Tool	5.6%	48.%
Utility Company	Backhoe	2.1%	65.%
Occupant	Hand Tool	1.9%	33.%

The data may indicate that although contractors and utility companies are obtaining a locate request 2/3's of the time, they should visually verify the facility prior to excavation so as not to damage the facility.

Additionally, the data indicates that contractors and occupants are only obtaining a locate request 1/3 to 1/2 of the time when using non-mechanical hand tools. To reduce facility damage when using hand tools, contractors and occupants should request a locate and still visually verify the facility prior to excavation.

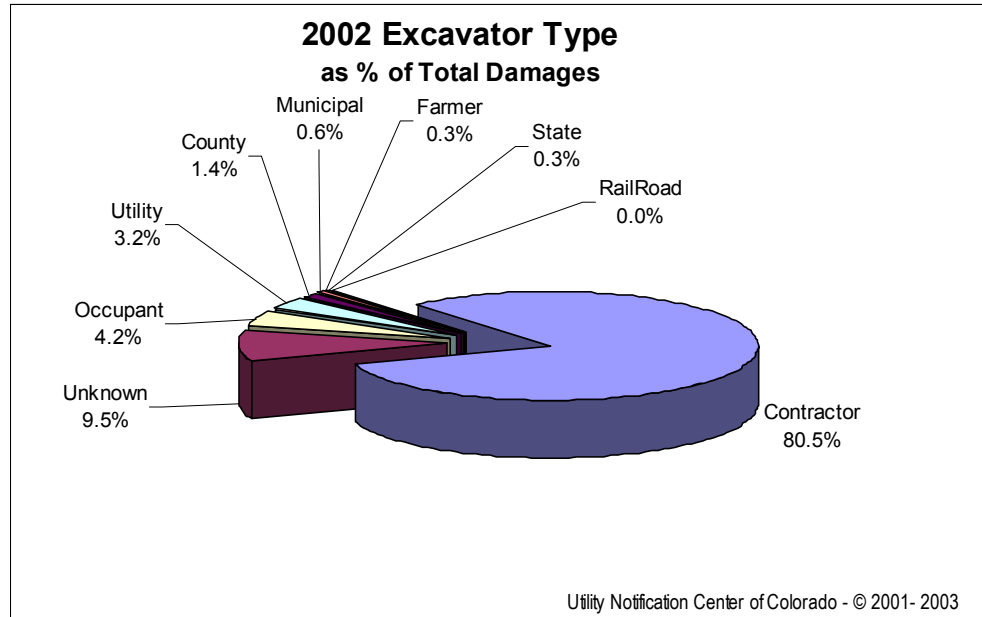
### Significant Changes

The number of facility damages caused by Trenchers and Hand Tools increased by 25% and 71% respectively over 2001, though the total reported damages only increased by 14.5%.

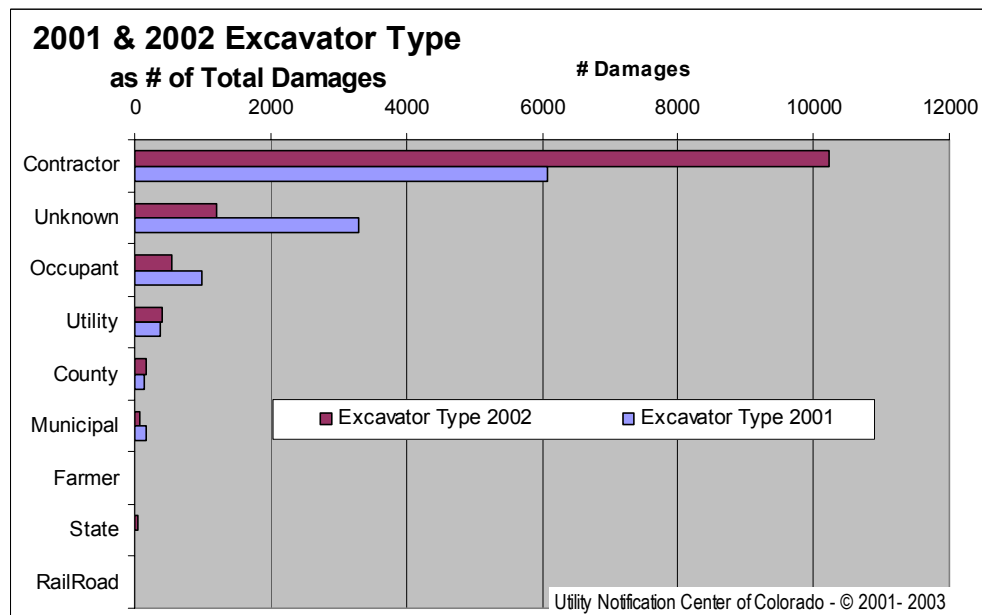
Also, the "Unknown" option increased by 30% over 2001, suggesting a need for owners to improve reporting in this area.

**Excavator Type**

What Excavator types caused Facility damage in 2002?



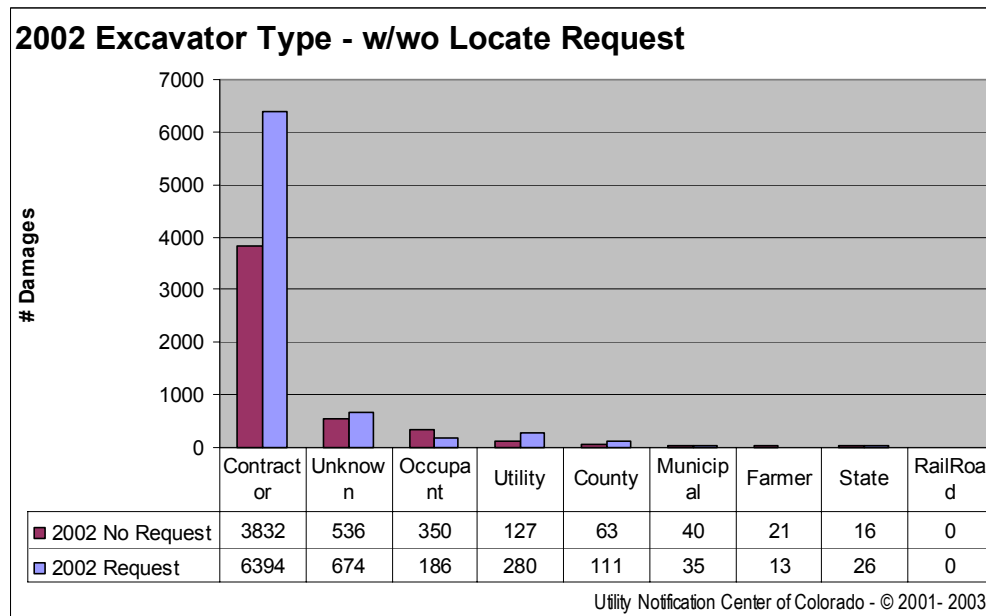
How does this compare to 2001?



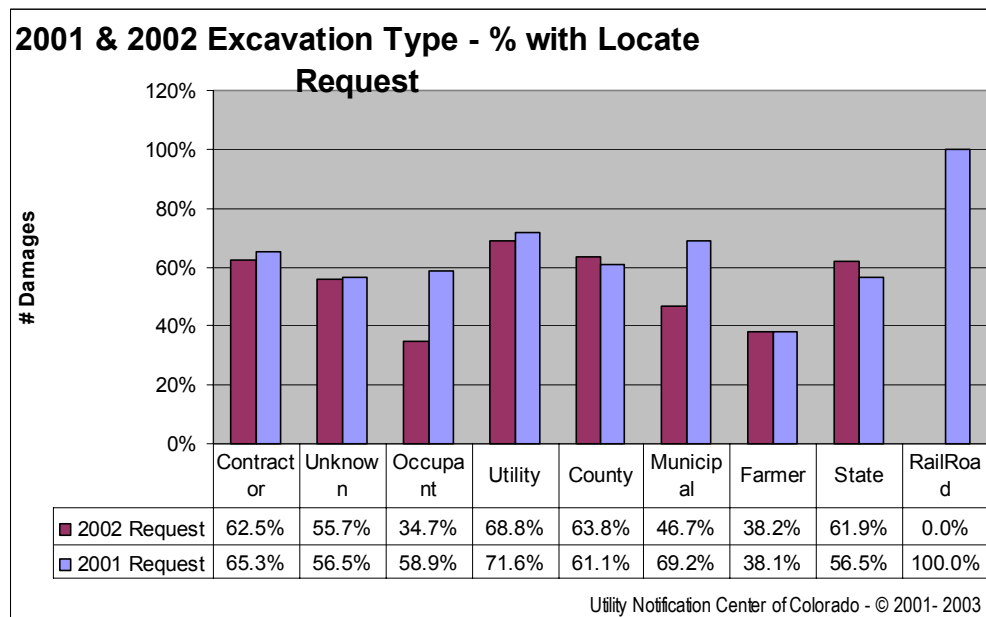
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For each Excavator type, were locates requested or not?



For each Excavator type, did the % damaged with a locate request increase in 2002 over 2001?



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### **Excavator Type Analysis**

Contractors and Occupants continue to cause the largest share of the facility damages; 84.7% for both, with Contractors the majority at 80.5% of total facility damages.

Approximately 63% of the reported damages had a locate request for the Contractors. This means 37% of these damages did not have a locate request. This ratio was very similar in 2001. Interestingly, over 65% of the reported damages did NOT have a locate request for Occupants. This ratio changed significantly from 2001 when it was 41% without a locate request. The data suggests that Contractors should visually verify the facility prior to excavation and Occupants should request a locate and visually verify the facility prior to excavation.

Utility Companies and County agencies caused 3.2% and 1.4% of the facility damages respectively. Approximately 69% and 64% of the reported damages had a locate request, suggesting that Utility Companies and County Agencies should visually verify facilities prior to excavation.

Municipal and State government agencies, Railroads, and Farmers are not significant causes of facility damage (less than 1%).

### **Significant Changes**

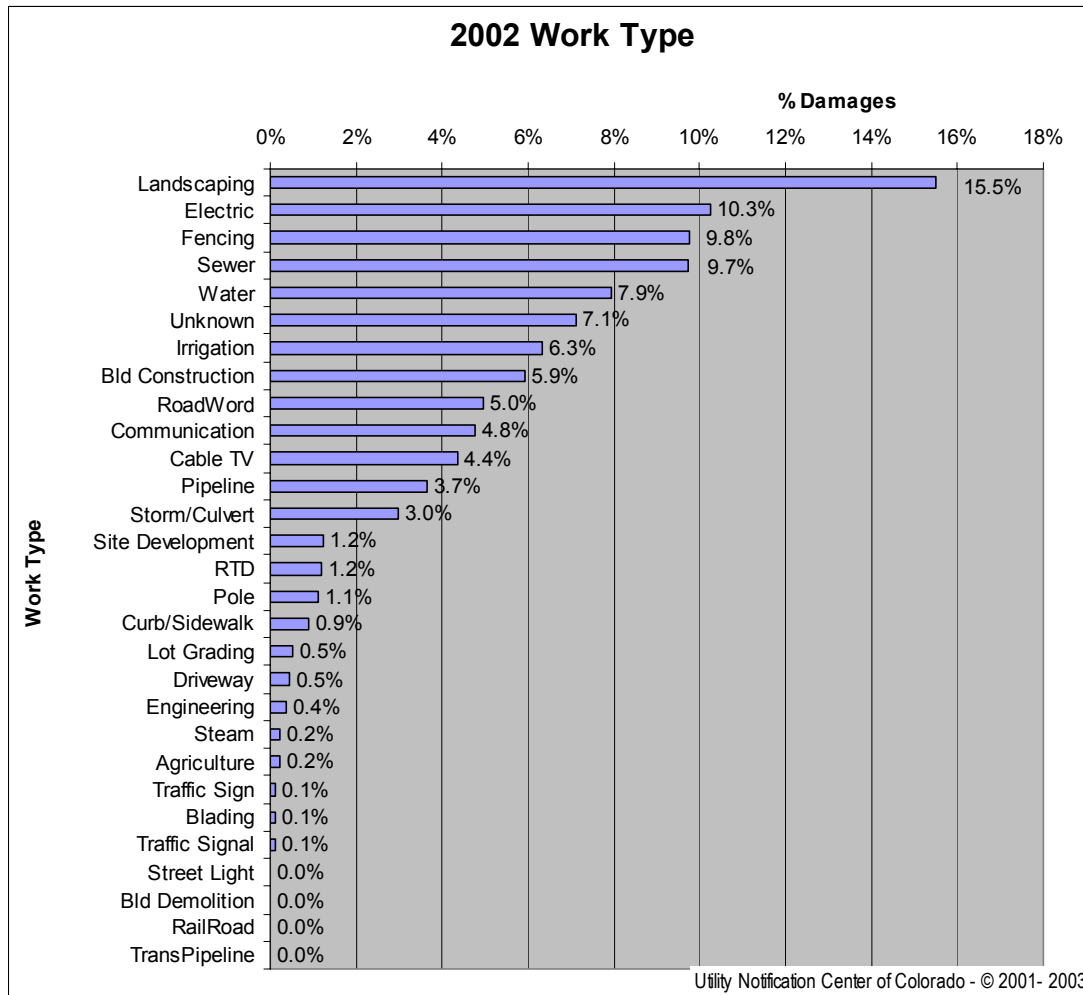
The number of facility damages caused by Contractors increased by 68% over 2001, though the total reported damages only increased by 14.5%. Interestingly, the number of facility damages caused by Occupants decreased by 45% over 2001, while the number of facility damages caused by Occupants without a locate request increased dramatically by 41% (to 65%) over 2001. This change may have been related to the state-wide drought and the large number of occupants unfamiliar with the legal requirement to call UNCC for a locate request. Also, the “Unknown” option decreased by 63% over 2001.

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### Work Type

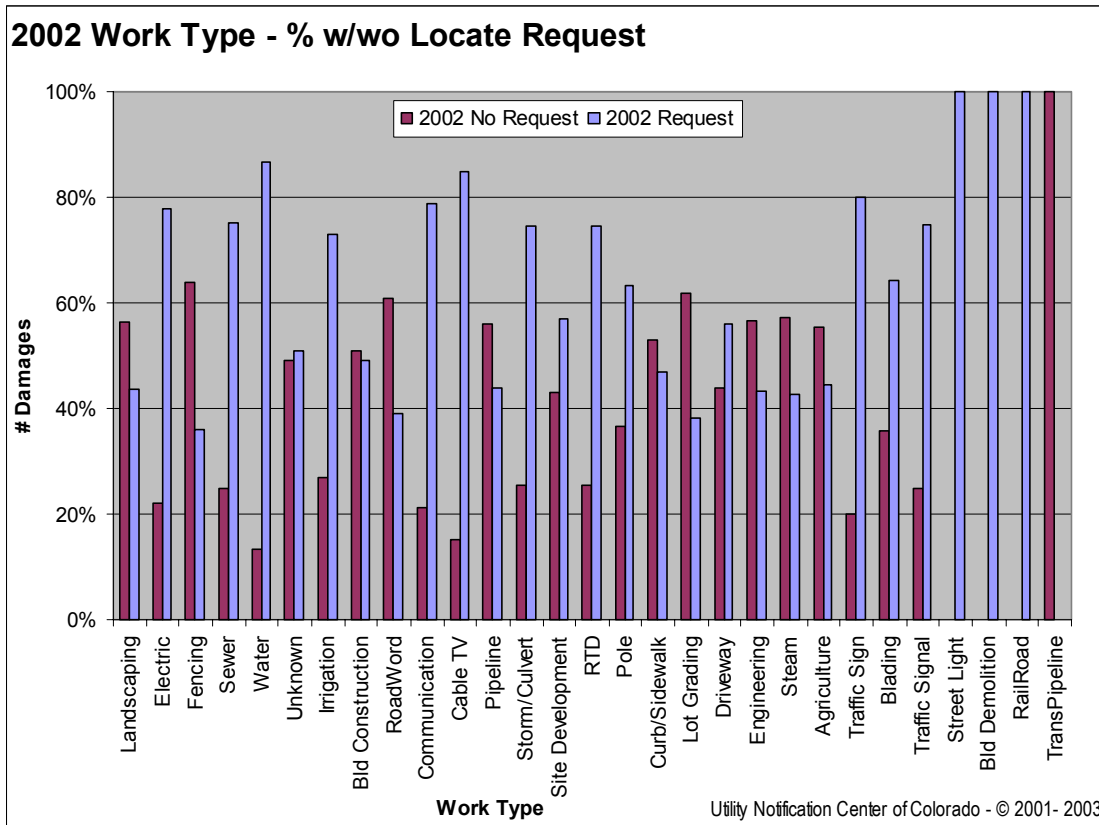
What Work types caused Facility damage in 2002?



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For each Work type, were locates requested or not?

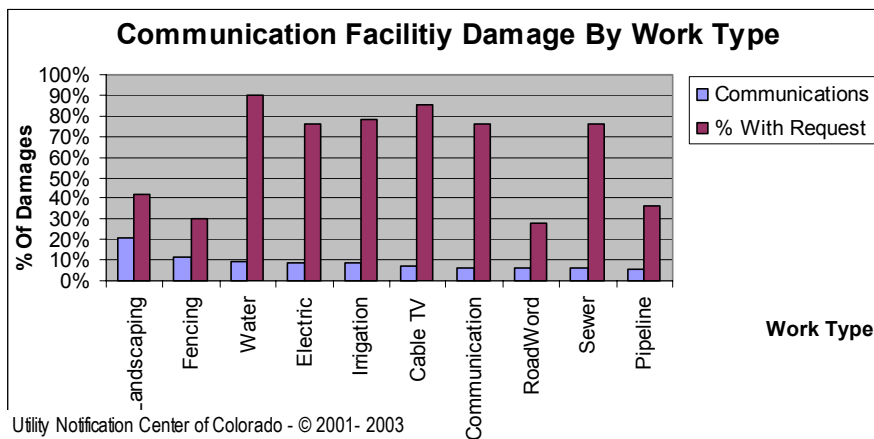


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For the most damaged Facility types, what Work types caused the most damage?

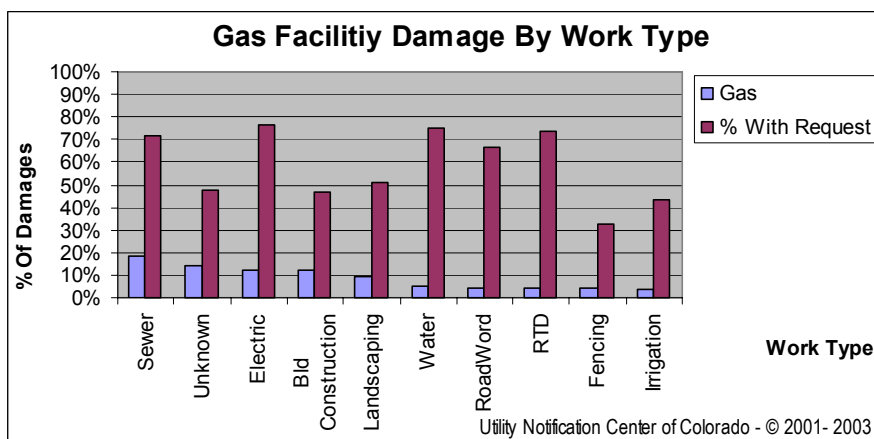
Communication Facilities: 58.0% of the damages



Landscaping and Fencing Work caused the most damage to Communication Facilities and obtained locates only about 30-40% of the time prior to excavation, along with Road Work and Pipeline - the least often.

Other work types obtained locates over 70% of the time.

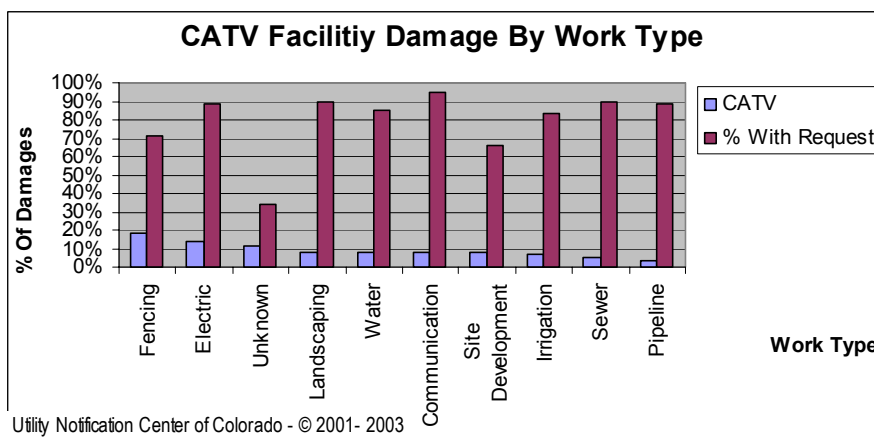
Gas Facilities: 27.2% of the damages



Sewer, Electric and Bld Construction Work caused the most damage to Gas Facilities. Sewer and Electric Work obtained locates about 70% of the time prior to excavation.

Bld Construction as well as Landscaping, Fencing and Irrigation work types obtained locates only 30-50% of the time.

CATV Facilities: 7.4% of the damages



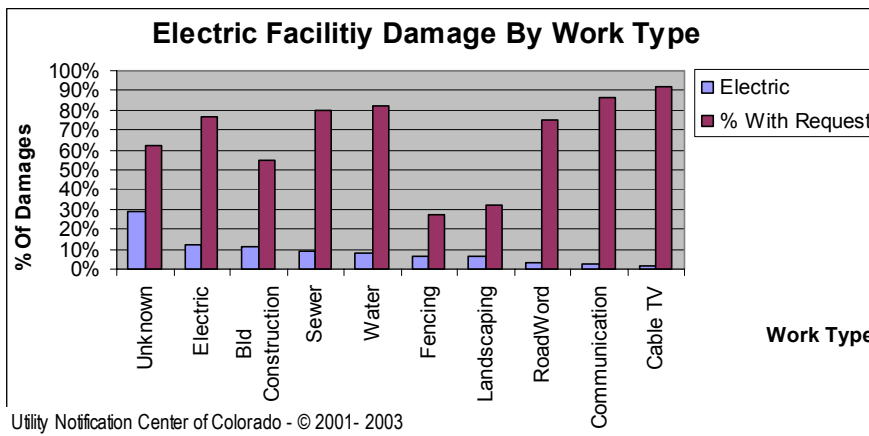
Fencing, Electric and Landscaping Work caused the most damage to CATV Facilities and obtained locates 70-90% of the time prior to excavation.

It is interesting that most other work types obtained locates about 70% or more of the time for CATV Work.

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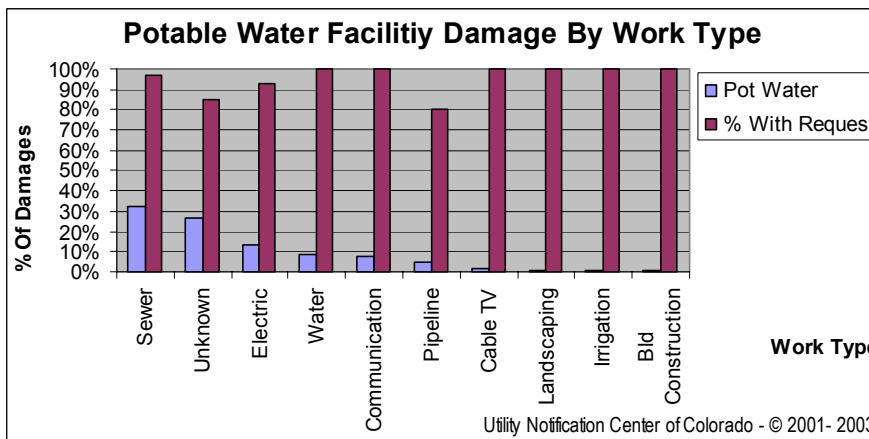
**Electric Facilities: 6.3% of the damages**



Electric, Bld Construction Sewer and Water Work caused the most damage to Electric Facilities and most obtained locates 70-80% of the time prior to excavation.

Bld Construction obtained locates about 55% of the time while Fencing and Landscaping work types obtained locates about 30% of the time.

**Potable Water Facilities: 0.8% of the damages**



Sewer and Electric Work caused the most damage to Potable Water Facilities. All work types obtained locates 80-100% of the time prior to excavation.



## **Perspectives on Facility Damage – 2002**

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### **Work Type Analysis**

Landscaping, Electric, Fencing, Sewer and Water Work cause the greatest share of the facility damages; 53.2% for these five work types, with Landscaping (15.5%) the majority and the others about 10% each.

Approximately 36% and 44% of the total reported damages had a locate request for the Landscaping and Fencing work types respectively. This means about 60% of the damages reported for Landscapers and Fencers did not have a locate request. Interestingly, over 75% of the reported damages did have a locate request for Electric, Sewer and Water work types.

Irrigation, Bld Construction, Road Work, Communications, Cable TV, Pipeline and Storm Drain/Culvert work types caused some facility damage (less than 6% each). The other work types were insignificant causes of facility damage (less than 1% each).

Landscaping and Fencing work caused most (32.5%) of the damage to Communication facilities. Sewer and Electric work caused most (30.5 %) of the damage to Gas facilities. Fencing and Electric work caused most (32.0 %) of the damage to CATV facilities.

Landscaping, Fencing, Bld Construction and Road Work work types were also the least likely to obtain a locate prior to excavation, only about 51-64% of the time. Whereas, Electric, Sewer, Water, Irrigation, Communication and Cable TV work types were the most likely to obtain a locate prior to excavation, about 73-87 % of the time.

Communication owner/operators reported “Unknown” work type only ½ of 1% of the time. They did an excellent job of reporting all damage details. Gas, CATV, and Electric owner/operators reported “Unknown” work type 35%, 11% and 29% of the time respectively. This suggests the need for continued improvement in the data collection and reporting process.

### **Significant Changes**

This data set was not analyzed in 2001.