North Carolina Damages Analysis:
Use of Comprehensive Data Analysis for Process Improvement
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Introductions

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Committed to Shared Responsibility
Volume:
- 2012: 1,139,860
- 2018: 2,012,022

Miles of roadway:
The NC Department of Transportation has more than 80,000 miles of highways. (Texas is the only state that has more.)
Project Background

• NC 811 created the first SuperMega Spreadsheet™ in 2013.
• 2012 data, by county, was input into the sheet, including:
  • Basic census population numbers
  • Ticket and transmission volumes
  • Positive Response Codes
  • Damages per thousand transmissions and tickets
  • “Failure to Call” root cause
  • Percentages of online ticket creation use
  • First time caller percentages and survey data
  • Education specifics – numbers of people reached
  • UCC attendance
• NC 811 created the first SuperMega Spreadsheet™ in 2013.

• Data was analyzed manually by yours truly.

• Covered the first 2 quarters in 2012 vs. 2013

• A written report was issued discussing the findings.
Project Background (cont.)

• Since then, a sheet and a report was generated every year since.
• The sheet itself was modified to include facility specific detailed damage information.
• In 2018, NC 811 engaged Dr. Al-Bayati to perform more robust statistical analysis on the data.
• Additional support to the findings was added by conducting surveys of excavators, both professional and first time callers.
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The sheet itself was modified to include facility specific detailed damage information.

In 2018, NC 811 engaged Dr. Al-Bayati to perform more robust statistical analysis on the data.

3 published articles to date

Additional support to the findings was added by conducting surveys of excavators, both professional and first time callers.

• Let’s start with the Why...

  • Without measuring, how can you know if improvements are being made?
  • This is true for everything we do and almost every task can be quantified to objectively determine whether the results confirm progress is being made.
  • The trick is determining the next question: the “What should be measured?”

Too meaty: less meaty
And now the “What?”

- The obvious metric we are focused on as a measure of improvement is not waist size or weight. It is the reduction in damages.
- In 2013 we decided to put everything we had into the bowl. This was primarily because we couldn’t be sure what efforts were making the most impact in moving the needle.

Everything we could think of...
In addition to SMS data...we like our data like we like our oysters: raw.

- Incidents data including number, stakeholder group, facility owner, facility damaged, work type, failure to call, etc.
- Tickets and transmissions numbers (NC 811 and CGA).
- Number of positive response codes such as code 999, code 32, etc.
- Number and location of funded educational methods such as billboards and fuel tanks as well as “eyes on” calculation method.
- 3-hour notices
- First-time caller survey data.
- Causes of damages (other than failure to call) as having been reported to NC811.
- The time (duration in hours or days) between the ticket creation time and positive response time; Not sure if this doable.
What Next?

- Over the years we made some conclusions about the data we had accumulated. But this method was more observational than statistically tested.
- In 2018 we established a relationship with WCU to perform analysis of the data accumulated.
- Our goal was to evaluate the data we had in an objective, statistically validated way.
- It was time to put the data under the microscope.
The Research Study

• Engaged into a contract with WCU.

• Original agreement included the use of SAS (“Statistical Analysis System”) to identify correlations and confirm whether the results were considered valid using mathematical modelling.

• What does it mean to perform a valid study of the data?
The Research Study

• In addition to the raw data analysis, surveys were conducted with first time users and professional excavators.

• 985 responses were received from homeowners, 450 from professionals.

• Questions were designed to measure satisfaction with overall process, including NC 811.

• We wanted to know their experience: from the call itself to the response time by locators as well as whether any damages occurred during their excavation.
Results and Recommendations

WHO is reporting data is extremely important.

Bias isn’t always intentional.

In some cases, the way the data that is put into the system is based on an understanding of the law itself.

In this case, NC 811 damage data was more heavily supplied by excavators than locators.
Results and Recommendations

When “unknown” root cause data is removed, the results indicated a difference between what CGA DIRT reports and what NC 811 reports.

Remember, data is provided without being vetted by investigation.

The root cause of locating practices in NC is validated by additional positive response and survey data.
Contrary to data reported through DIRT, NC 811 data reflects that marking accuracy and visibility is more often correct when performed by the utility owners themselves vs. the contract locators.
Results and Recommendations

Examining the “employer type” in the damage data illustrates the fact that Utility Owners, conducting work, were reported to have the highest incidents of damage to telecommunication facilities.

Figure 7. Damages to Underground Utilities per Employer Type
This chart illustrates the work type of Telecom/CATV was the leading type contributing to damages, followed by Water, Construction then Natural Gas.

Construction contributed the second highest amount of damages to natural gas.

Telecom/CATV work produced the highest amount of damage to Telecom/CATV facilities.
Results and Recommendations

“No Locate” damages reported by work type. These highlight educational opportunities within these groups

• Landscaping (25%)
• Construction (23%)
• Telecom/CATV (22.6%)
• Water installation/repair (11%)
Results and Recommendations

When asked how these first time users know about calling, their results surprised us to some degree.

Media was considered TV, radio and Internet.

Billboard, at 33%, reinforced that method.

Print took a distant third.
Results and Recommendations

What is a 999 code?

What is a 3 hour notice?

Analyzing the raw data brought to light a disparity between 3 hour notice and 999 codes in Durham.

The recommendation is training. But…
Results and Recommendations

Survey Results verified data received through positive response with actual personal experiences
Survey results from the first time users. They were happy with NC 811. Good with overall process, locator professionalism and accuracy. Not so much with completion time.
North Carolina Damages Analysis: Wrap Up

• Bias exists and is inherent in any one method of data gathering.
• Having multiple data gathering, analysis methods and sources is critical.
• When outcomes are reinforced they should be taken seriously.
• Correcting flaws in the process can be done through education but ONLY when the audience that is a contributor to the flaw is known.
• Utility Companies can benefit from a top down review of these issues and conclusions.
• Continuous measurement will help to determine if the education methods and audience reached resulted in a reduction in damages.
QUESTIONS?

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Research can be found at:
https://www.nc811.org/education.html