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## 25 Years at NEETRAC - A Dinosaur's Perspective

Written by Ray Hill

In 1996, the future of the Georgia Power Research Center was quite dim. Georgia Power was experiencing lean times and was going through its second or third downsizing. Word was that, in order to save money, Georgia Power was planning to close down the lab. In addition, the employees would not be able to find other work within Southern Company since this was a part of the company downsizing.



Many departments in Southern Company, and others in the electric utility industry who had benefitted from working with the lab, were saddened to hear the news and sent many condolences to the lab employees. However, in the background, many friends of the lab believed that the benefits of the lab's investigative work was well worth the investment. There was one effort that included selling the lab to KEMA Laboratories. However, that was short-lived, as KEMA only offered cents around 5¢ to 10¢ on the dollar. There seemed to be no place for the lab to go. Personnel morale was dropping even more.

Then, something magical happened. There were many at Georgia Power and Southern Company who had graduated from Georgia Tech and the lab had established a good rapport with Georgia Tech because of many mutually beneficial dealings. Some of these folks got together and began to brainstorm a tremendous idea, a joining of Georgia Tech and the Georgia Power Research Center, which had already become well known in the electric utility industry as a leading research and test lab. The addition of the lab to Georgia Tech seemed a natural marriage. It took several months to work out the details, but, on January 2, 1996, National Electric Energy Testing, Research, and Applications Center (aka NEETRAC) was born. It was a membership organization, a research center, within the Electrical and Computer Engineering Department of Georgia Tech. Funding was provided by ten industrial Members through membership dues. These ten "charter Members" had the foresight and faith to invest in the future of NEETRAC.

With hopes lifted and an exciting new future in view, the lab employees and charter Members worked diligently to become a world renowned research center. It was a tough journey, but the efforts of so many who believed in NEETRAC have grown it into the premier laboratory it is today. As for this employee, who has had the privilege of watching NEETRAC grow from birth to the organization it is today, it has been an amazing journey. The interactions and friendships with the Member companies are the fruits of labors that will always be cherished. Exciting new projects and research has made this a very rewarding experience that could hardly ever be matched.

## Baseline Projects Recently Launched

NEETRAC launched the following Baseline project proposals presented during the January 2021 Management Board Meeting. If you would like to serve as an advisor for any of these projects, please email [suzanne.schmidle@neetrac.gatech.edu](mailto:suzanne.schmidle@neetrac.gatech.edu) and indicate which project interests you.

### Performance Relationship Between Enclosure Paint Standards and the Real World

**Baseline Project Number 21-064**

**PI: Tristan Cline, [tristan.cline@neetrac.gatech.edu](mailto:tristan.cline@neetrac.gatech.edu)**

Multiple international standards organizations, such as IEEE, ASTM, SAE, NACE, etc., have enclosure paint standards. Currently, most electric utility enclosures are required to meet IEEE C57.12.28 and C57.12.31. It is unclear how these or other potential standards correlate to real world results. This project proposes to scope out existing paint standards, as well as utility and manufacturer paint specifications, to understand what specifications are available and what testing, if any, has been done to correlate with real world results. Project technical advisors will provide insight and direction to determine which standards and specifications will be researched. Please note, this project is only a scoping study. No testing will be done as a part of this project. However, Technical Advisors will provide direction for future projects that may be proposed based on information uncovered in this project.



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## Baseline Project Recently Completed

The following Baseline project closeout was presented at the January 2020 Management Board Meeting. The report will be finalized and distributed to eligible Members in the coming months.

### The Impact of Tool / Die Choice on Performance of Compression Connectors

**Baseline Project Number 18-184**

**PI: Joe Goldenburg, [joe.goldenburg@neetrac.gatech.edu](mailto:joe.goldenburg@neetrac.gatech.edu)**

Connector reliability is “low hanging fruit” for improving system reliability. Many of the supplier-approved tool/die/connector combinations are “fit only” and not backed up with qualification testing. Project #17-036 demonstrated non-equivalence between tool and die combinations with one connector. Phase II (this project) broadened the scope to help identify tool/die/connector effects on system performance. These results will help to inform decisions about choices that improve reliability.



## Baseline Project Recently Completed - Cont'd

### Analysis and Benchmarking Methods for Standard Reliability Indices

**Baseline Project Number 17-048**

**PI: Nigel Hampton, [nigel.hampton@neetrac.gatech.edu](mailto:nigel.hampton@neetrac.gatech.edu)**

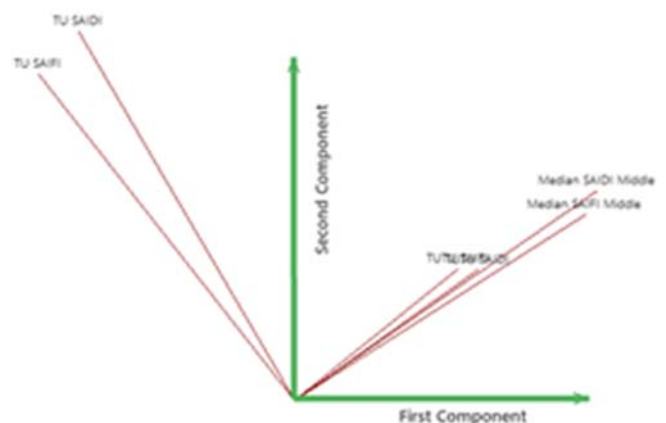
SAIDI, SAIFI, and CAIDI are internationally recognized and defined indices used to describe elements of electric service reliability. Additionally, they are often used to catalyze / direct system improvement activities. Existing work focuses on collecting and summarizing indices data (IEEE, EIA, NRECA) usually on an annual basis. In this project, NEETRAC developed analytical approaches and identified trends for the standard indices used by the utility industry. The magnitude of the work completed meant that the outcomes were reported in two parts:

Part 1 (reported in Issue 72) of this project developed methods to be applied to SAIDI and SAIFI (without Major Event Days) with the purpose of: (i) determining typical achievements, (ii) performing robust trending of reliability, (iii) quantifying improvements, and (iv) predicting likely future results.

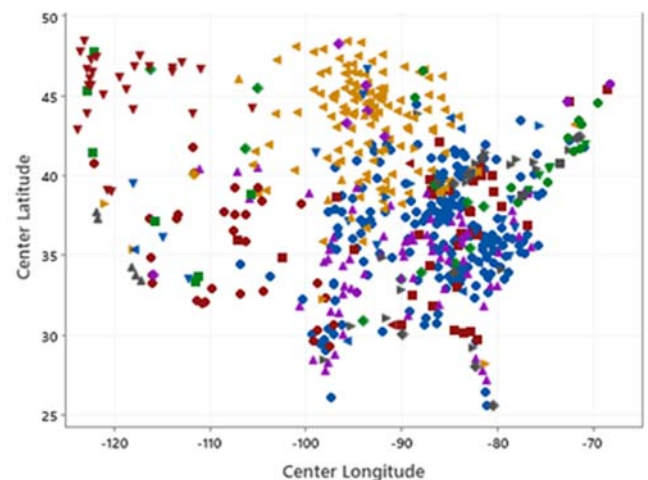
Part 2 of this project used Machine Learning methods to develop approaches that: (v) provided an unbiased scoring / ranking method based on historical utility reliability indices, and (vi) used large scale utility reliability and metadata compilation to identify appropriate peer benchmark utilities. Proof of Concept procedures were undertaken using public data collected by IEEE and EIA that had been curated by NEETRAC

Reliability is commonly characterized by separate annually reported indices, SAIDI and SAIFI. These traditional approaches are not well suited to accounting for both frequency / duration of outages and long-term trends. This project has developed a Reliability vector for utilities using long term index data (see table below).

	Median	Trend
<b>SAIFI</b>	1	0 to -0.3 / year
<b>SAIDI</b>	125 mins	0.5 to -4 min / year



Practitioners of reliability studies often compare the SAIDI / SAIFI indices or rank positions to peer utilities. Identification of peers for these benchmarking commonly undertaken on the basis of geography. However, this geographical approach does not take into account the reliability indices or utility characteristics. This project has demonstrated an Unsupervised Machine Learning algorithm to determine the optimal number of peer groups based on data. Utility peer groups are shown graphically based on utility location – the same symbol represents members of the same group.



## Baseline Project Recently Completed - Cont'd

### Distribution Systems Using Covered Conductors

**Baseline Project Number 19-083**

**PI: Nigel Hampton, [nigel.hampton@neetrac.gatech.edu](mailto:nigel.hampton@neetrac.gatech.edu)**

Covered overhead conductors come in a wide variety of styles and designs. The awareness of and interest in deploying covered conductors is increasing in many localities. This project showed that there was a dearth of current public data so it collated available product and utility experience information. The data was significantly augmented with input from NEETRAC Members and TAs, who were key collaborators that provided the fact base that underpins the findings. Manufacturers will also be able to use the knowledge from this project in product support and development activities.

### New NEETRAC Member



NEETRAC would like to welcome our newest Member, The Okonite Company. The Okonite Company was founded in 1878 making it one

of the original insulators of electrical wire and cable in the United States. Okonite is now headquartered in Ramsey NJ and makes cables that range from 300V to 345kV insulated products that include Instrumentation, Power and Control, Medium Voltage, and High Voltage cables.



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### Management Board Meetings

The next three Management Board meetings have been scheduled for the following dates:

**May 19 - 20, 2021 (virtual)**

**September 22 - 23, 2021**

**January 26 - 27, 2022**

For details, please visit the Member Section of the NEETRAC website at [www.neetrac.gatech.edu](http://www.neetrac.gatech.edu).

### 2021/2022 NEETRAC Member Management Board Representatives

1. Alumaform.....	Pete Landsgaard	19. Okonite.....	Bill Crawford
2. Ameren.....	James Huss	20. Pacific Gas & Electric.....	Marlon Viduya
3. American Electric Power.....	Jim Salerno	21. PPL Corporation.....	Chris Fatzingere
4. BC Hydro.....	Fred Dennert	22. Prolec GE.....	Carlos Gaytan
5. Borealis Compounds, Inc.....	Susan Song	23. Prysmian Group.....	Bill Temple
6. Consolidated Edison.....	Frank Doherty	24. Public Service Electric & Gas.....	Ed Gray
7. Dominion Energy.....	Liz Sullivan	25. Rauckman Utility Products.....	Jim Rauckman
8. Dow Chemical Company.....	Brent Richardson	26. S&C Electric.....	Marshall Mauney
9. DTE Energy.....	Naera Hagnazarian	27. San Diego Gas & Electric.....	Christian Henderson
10. Duke Energy.....	Chris Fletcher	28. Smart Wires.....	Haroon Inam
11. Eaton.....	Alan Yerges	29. Southern California Edison.....	Alan Kasanow
12. Exelon.....	Lisa Perrone	30. Southern Company.....	Michael Pearman
13. FirstEnergy.....	Randy Coleman	31. Southern States, LLC.....	Joe Rostron
14. Gresco Utility Supply.....	Brad Schafer	32. Southwire Company.....	Yuhsin Hawig
15. Hubbell Power Systems.....	Charles Worthington	33. Tacoma Power.....	Joe Rempe
16. LS Cable & System.....	Tim West	34. TE Connectivity.....	Brian Ayres
17. Nova Scotia Power.....	Jim McFadgen	35. TVA.....	Steven Coley
18. NRECA.....	Reed Cooper	36. Viakable.....	Raul Garcia
		37. WEC Energy Group.....	Michael Smalley