



TIP 399: EPRI P34 Transmission Asset Management Analytics

Context

Transmission companies face challenges such as aging infrastructure, stringent operating requirements, financial constraints, and retiring expertise that make maintaining and managing assets difficult. In response, many electric utilities are considering or already have moved toward more analytically-based decision processes to minimize equipment life-cycle costs and risks. However, the data, analytical tools and models required for power delivery equipment risk assessment and management are not well-established. Diligent actions for maximizing performance and minimizing equipment life-cycle costs should be based upon risks associated with actual equipment condition and historical performance.

Description

The research agenda in this program focuses on: designing, developing, populating, maintaining, and extracting information from Industry-wide databases for substation equipment that will help quantify historical performance; developing condition assessment algorithms to understand and quantify existing performance; developing metrics to better assess and evaluate equipment performance; and constructing tools and methodologies to project future performance and manage risk. These elements can be designed as, and integrated into, a comprehensive decision support framework. The results of this research may support resource allocation decisions and other fleet management tasks and provide utilities with new knowledge and data vital for effective equipment asset management. Research results could be transferred to members in scientific reports, easy to use software tools, reference guides and workshops.

Research activities include:

- Develop data models that guide utilities on what data are important for developing failure rates, quantifying present condition (health) of in-service assets, prioritizing which assets need attention, formulating spares policies etc. ;
- Design, develop and populate an industry wide-database with failure and performance data for T&S assets, develop analytics using industry-wide data to uncover asset characteristics and metrics to support maintenance and capital planning strategies;
- Develop asset health assessment algorithms and risk mitigation strategies (e.g. spares policies, substation, bay, circuit and feeder risk assessments)
- Develop a consistent analytical basis for making capital and O&M decisions;

- Produce reference books, guidelines, and technology transfer workshops and
- Provide collaborative environments for sharing lessons learned and best practices.

Why It Matters

Decision support analytics and methodologies require new knowledge, tools and methodologies to help with the best allocation of O&M and capital resources for Transmission and Substations (T&S) asset.

This research can enhance asset management decision making processes and improve their results by providing data, tools and methodologies that can be used by T&S asset and maintenance managers for improved decision support.

Goals and Objectives

The objective of this program is to develop asset knowledge enablers, such as failure rates and asset health assessment algorithms, to help utilities make better T&S equipment life cycle management decisions.

Deliverables

In the current year the program expects to accomplish the following aims:

- New versions of - Power Transformer Expert System software
- New versions of - Industry-wide T&S Failure and Performance Database
- New versions of - T&S Asset Health Software
- New versions of - T&S Asset Management Guideline
- Reports documenting results and key findings from data mining and analysis of field inspection and assessment data on wood poles, overhead transmission line conductors, protection and control, CCVT's and underground transmission assets
- Asset Analytics Workshop.

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Project Start Date: January, 2018

Project End Date: December, 2019

Funding

FY2019: \$85,000

Participating Organizations

Electric Power Research Institute (EPRI)

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