

# AT A GLANCE



## Overhead Distribution Assets

Program 180.001

### Research Value

- Provides guidance to improve overhead structure resilience
- Understand options to inspect alternative pole materials, such as composites
- Identify materials and approaches to improve lightning protection
- Access to component performance data, such as overhead connectors, wildlife guards, and composite crossarms
- Evaluation of emerging asset condition monitoring technologies
- Access to online design tools, such as conductor slap and impedance calculators
- Provides test results from emerging technologies, such as solid-dielectric insulated trans-formers

Utilities aim to design, construct, and maintain overhead distribution systems to operate reliably in outdoor environments that may experience extreme weather or harsh conditions over decades. However, asset managers often have insufficient information to enable optimal equipment and hardware selection, potentially leading to decreased reliability and increased O&M expenses.

The objective of this research is to evaluate overhead equipment and hardware performance, assess inspection tools and technologies, and document practices that can help utilities improve overhead asset reliability, resiliency, and service life. Asset managers can use test results to make effective asset decisions over an asset's life cycle. Application of this information can:

- Enhance procurement specifications
- Inform asset selection and installation
- Enable effective application of inspection technology
- Inform inspection and maintenance cycles

This project also intends to capture and document knowledge regarding overhead asset design and application. This material might be incorporated into guides, videos, and other training material for utilities.

**For more information**

scan the QR code or visit

[distribution.epri.com/overhead](https://distribution.epri.com/overhead).



## Research Highlights

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- **Resilient Structure Design** – This task plans to develop a means of assessing the ability of a structure to dissipate impact loads, such as those created during tree strikes or when neighboring structures fail, i.e., cascading failures. Research results could help utilities develop new resilient standards.
- **Alternative Pole and Crossarm Material Evaluation** – This task examines the short- and long-term performance of alternative pole and crossarm materials, such as composites, steel, ductile iron, and concrete. In 2024, this task plans to investigate the short- and long-term performance of existing and emerging concrete pole materials.
- **Grounding and Lightning Performance** – This task examines the application and performance of grounding systems and lightning protection approaches. In 2024, this task plans to evaluate additional conductive backfill options and an alternative surge arrester design.
- **Overhead Connector Performance Testing** – This task tests the electrical and mechanical performance of connectors under varying load and/or environmental conditions. In 2024, this task plans to test piercing secondary connectors..
- **Assessment of Conductor Performance and Emerging Materials** – Newer high-temperature, low-sag (HTLS) conductors are one option that utilities could employ to enable higher line capacity while maintaining existing conductor weight. This task will review HTLS conductor and other technology options to increase line capacity.
- **Evaluation of Emerging Transformer Technologies** – This task plans to evaluate cast-resin insulated, medium-voltage pole-top transformers through laboratory testing and material analyses.
- **Evaluation of Pole Inspection Technologies** – This task plans to investigate inspection technologies for composite poles. Approaches could include comparing inspection results collected using potential technologies with remaining strength data collected through destructive laboratory testing
- **Online Condition Monitoring and Inspection of Overhead Systems** – This task investigates and tests online monitoring systems and inspection tools that could improve overhead distribution system reliability by identifying potential asset failure or vegetation contact before it causes an outage.
- **Visual Inspection and Condition-Based Monitoring** – Non-contact inspections have value, but remaining asset life is often unknown or subjectively assessed. This task researches the relationships between distribution component health and visual data such as imagery, video, LiDAR, and other digital data. .
- **Technology Scouting** – The pace of change in distribution technology is accelerating, with new technologies, approaches, vendors, and service providers entering the market and offering new solutions. This research will scout new technologies for overhead distribution and identify opportunities for further investigation and demonstrations.

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June 2023

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