



KINECTRICS

Distribution Services

Meeting The Ongoing Challenges of a
Demanding Industry



Kinectrics delivers advanced power system engineering solutions and state-of-the-art testing services. We provide expert technical support to improve our customers' key industry performance indicators such as safety, reliability and economic efficiency.

Kinectrics meets our energy sector clients' needs with advanced electrical consulting engineering solutions aimed at improving safety, reliability and economic efficiency.

REDUCE DISTRIBUTION COSTS & IMPROVE EFFICIENCY

Electrical Distribution utilities must continue to deliver electrical energy to consumers at minimum costs while maintaining reliability and power quality, and demonstrating compliance with regulatory requirements. Faced with ongoing industry reorganization, diminishing resources, reduced budgets and aging Distribution systems, utilities need to optimize utilization, maintain assets and extend equipment life. Kinectrics' Distribution Services can help utilities benefit from:

- Lower capital and operating expenses and an enhanced competitive position
- Increased efficiency and minimized losses
- Improved asset utilization, management, and maintenance
- Extended equipment life and knowledge of end-of-life options
- Reduced equipment failures and outages
- Optimal integration of Smart Grid, Distributed Generation and Substation Automation
- Enhanced customer satisfaction and retention

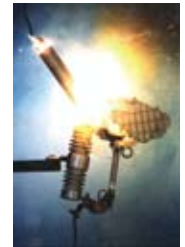


KINECTRICS' UNPARALLELED SERVICE CAPABILITIES

Kinectrics has supplied quality Distribution services to power utilities worldwide for over 35 years and established an outstanding reputation for successful technical problem solving, often where others have struggled to offer solutions. Our unmatched industry expertise and experience includes:

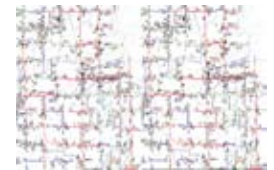
• Distribution Equipment Failure Analysis (DEFACS)

Kinectrics' DEFACS service provides emergency failure analysis and comprehensive assessment of failed components. Kinectrics' experienced forensic experts accurately identify the mode of failure, root cause and determine if the problem is widespread. Further steps can be taken to prevent future failures, provide detailed documentation for warranty claims, mitigate safety concerns, and recreate incidents in our High Current Laboratory.



• Distribution Engineering Consulting (DECON)

Kinectrics provides a full range of Distribution Engineering services including Design, Planning and Application consulting. Kinectrics' comprehensive long-range planning and strategic studies enable clients to significantly improve the utilization of assets and optimize system configurations. We provide modeling capabilities from traditional load flow, loss analysis, protection coordination and capacitor application, to more sophisticated transient analyses. Kinectrics has specialists in the application of protective devices, arresters, capacitors, transformers, cables and conductors.



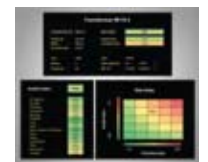
• Arc Hazard Testing and Analysis

Kinectrics has tested all types of Distribution products in our High Current (HC) facilities and are active participants in numerous standards organizations. Lab testing can be performed to assess compliance with specifications, qualify products to match utility requirements, or compare different manufactured components. Kinectrics' HC Laboratory is the world's premier tester of arc-rated PPE. The learnings and data from thousands of tests combined with a physics based modelling of arc propagation has resulted in the only OSHA endorsed Arc Flash Hazard analysis software – ARC PRO™



• Asset Management – Condition Assessment, Life Estimation & Extension, & Optimal Capital & Maintenance Expenditure

Kinectrics provides industry-leading Asset Management methodologies and tools to assess Distribution component condition, and determine appropriate utilization to minimize cost and optimize equipment life. Kinectrics can help utilities determine end-of-life, maximize asset life, and avoid or delay expensive capital upgrades. Health Indexing can assist in prioritizing capital expenditures. Maintenance procedures can be reviewed and tailored to reduce costs and maximize reliability.



• Reliability and Power Quality Services

Kinectrics can assess present system reliability and provide system configuration and component application recommendations to improve reliability. Kinectrics can make recommendations for RCM (Reliability Centered Maintenance) and assist in PBR (Performance Based Rate) programs. We can identify the causes of power quality problems, perform field measurements, modeling studies, and recommend mitigation measures.

• Distributed Generation, Smart Grid, SCADA & Automation Service

Kinectrics can assist in the specification of Smart Grid or SCADA Systems, evaluate bids from suppliers, and act as a system integrator for installation and commissioning. Kinectrics has specialists in Distributed Generation Connection Impact Assessments. Our Real Time Digital Simulator (RTDS) is ideal for testing Protection and Control systems, and Kinectrics has world-class expertise in the application of microprocessor relaying with IEC 61850 protocols.



• **Technical Auditing, Expert Witness & Training Services**

In a changing power industry, it is important for utilities to have defensible information on asset value and condition. Kinectrics' expert staff can conduct comprehensive independent Distribution technology audits and benchmarking. Kinectrics will provide recommendations to address specific system, equipment, or operational objectives such as increasing reliability and safety, reducing capital and operation costs, or meeting regulatory requirements. Kinectrics also offers numerous training courses for professionals, including courses in Distribution Standards and Arc Hazard Assessment.

CUSTOMIZED RELIABILITY INVESTIGATIONS AND SOLUTIONS

Utilities face growing pressure to reduce operating costs while improving or maintaining reliability. Capital or operating expenditures required to maintain reliability need to be justified to regulators. With the majority of power interruptions occurring on Distribution Systems, customers are directly affected by system reliability. System components are geographically widespread and in close proximity to human activity making outages due to dig-ins, pole impact accidents, or trees encroaching on lines, prevalent.

Studies completed on Distribution reliability often lack value because outage causes vary between utilities, and even between areas for the same utility. Solutions for one area may not be applicable to another locale. Reliability investigations and remedies must be customized to meet individual situations.

COST-EFFECTIVE OPTIONS

Kinectrics accurately identifies the causes of reliability problems for utilities and provides cost-effective options for improving reliability and decreasing capital, operation and maintenance costs. Additional benefits gained by utilities include meeting regulatory requirements and improving relations with customers. Justification of maintenance and capital replacement expenses is also facilitated.

ESSENTIAL STEPS

Several steps must be considered to properly assess Distribution Reliability and implement effective actions to reduce outage frequency and duration:

<p>Measure existing reliability Kinectrics compares present utility reliability to requirements of regulators, customers, internal standards, and other utilities to determine if problems are system wide or local. Local component failure rates are determined to identify worst offenders.</p> <p>Determine outage causes in the area of study A study of existing databases, work orders, and trouble sheets is completed by Kinectrics. We conduct interviews with maintainers.</p> <p>Examine operation/maintenance practices Kinectrics reviews tree-trimming and condition monitoring practices, crew locations and call out times.</p>	<p>Calculate expected reliability This step is key because if existing reliability is better than expected the possibilities for improvement are very different than when existing reliability is worse than expected.</p> <p>Examine system design Kinectrics reviews line, protection, and grounding design.</p> <p>Recommend solutions Kinectrics recommends prioritized solutions based on cost-effectiveness.</p>
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Kinectrics staff has experience with all of these steps, and can prepare detailed proposals to address gaps where available client expertise or resources are insufficient to carry out one or several of these steps. We customize our databases of component failure rates and outage causes to accurately reflect local conditions. Numerical analysis is completed with Kinectrics software using specialized techniques.

Component Failure Investigation

Kinectrics also has experience completing detailed components failure investigations. If a utility is experiencing multiple cable, insulating spacer, or fuse failures, Kinectrics can examine several failed samples and often determine the cause of the problem, which may be due to manufacturing defects, installation problems, or unusual operating stress, such as transients or overload. Kinectrics is often called in as an authoritative third party to mediate disputes between manufacturers and utilities.

Lab Test of Components

Kinectrics offers a fully equipped high-voltage and high-current laboratory for equipment testing to determine expected performance. For example, components can be subjected to accelerated aging tests for tracking resistance, or cable water treeing. Different manufacturer equipment can be compared or tested to determine interaction results. A variety of underground cable elbows and bushings can be mated for testing. Load-breaking performance may be superior in some combinations.

PROVEN EXPERTISE AND EXPERIENCE

Kinectrics has supplied quality Distribution services to power utilities for over 30 years. Our experience includes numerous studies and component failure analysis for many utilities. Kinectrics has also performed extensive component testing through the Canadian Electrical Association.





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