Asset Management & Inspections

Powertech

The Power of Trust. **The Future of Energy.**

EVALUATING ASSET CONDITION

NDT inspection on turbine

Checking internal condition of connectors

Utilities need to develop maintenance strategies for aging equipment, components, and structures. In an operating environment, machinery and equipment may be damaged over time by fatigue, creep, corrosion, erosion, or cracking. Condition assessment can identify defects and deterioration, allowing utilities to prioritize maintenance plans to mitigate risk of failure and extend service life.

Another priority for utilities is ensuring safety. This commitment requires electric generation and T&D systems be checked for evidence of damage.

Services to identify defects and determine remaining life

The Asset Management & Inspections Department meets this need through sampling, inspection, testing, and reliability analysis services that evaluate the condition of T&D assets such as wood poles, towers, crossarms, insulators, connectors, and anchor systems. Services include determination of asset remaining strength and life span, development of maintenance and risk-mitigation strategies, and evaluation of inspection methods and techniques for condition assessment.

Setting the department apart from competitors are its capabilities for multidisciplinary analyses. Supported by other in-house labs, investigators can go beyond sampling and inspection to conduct fitness-for-service analyses based on mechanical, materials, and electrical test results.

Powertech's Asset Management & Inspections Department conducts routine nondestructive testing (NDT) inspections and dielectric testing of aerial devices and insulated tools such as bucket trucks, hot-sticks, and linemen safety equipment to ensure the equipment is safe for use. Specialized inspections can be performed for generation systems such as turbine runners, penstocks, gates, pressure vessels, fuel tanks, and piping.

Powertech also offers field and laboratory testing services to measure the thermal resistivity of native soils or backfill materials required for underground transmission lines and oil and gas pipelines.

Powertech

CONTENTS

CAPABILITIES

Mobile dielectric testing of insulated tools

Full-scale wood pole bending test

The staff of the Asset Management & Inspections Department have 30 years of industrial experience, with backgrounds in structural, civil, electrical, materials, and mechanical engineering.

State-of-the-art facilities include various advanced NDT equipment such as phased array, radiographic lab (lab and mobile), high-end videoscope, magnetic flux station, dye penetrant bench, soil thermal resistivity testing system, full-scale pole testing facility, lab and field dielectric testing facility for FIV (fibre-insulated vehicles) and hot-sticks.

Staff includes a team of certified NDT and welding inspectors.

Asset Management staff is experienced with commercial software such as SolidWorks Simulation, PLS-Pole, PLS-Tower, and other in-house developed software to conduct finite element analysis of structures, components, and overhead lines. Powertech's Wood Pole Selection and Analysis Tool allows direct determination of a pole class to meet specified structural design requirements, and also serviceability analysis of an existing wood pole.

Powertech also has the in-house capability to conduct structural safety and reliability analysis to quantify probability of failure of a structure or a component for a given period of time while taking into account uncertainties in materials, loads, and other intervening conditions and parameters.

Asset Management staff has expertise in consulting and data analysis for equipment end-of-life decisions and life management strategies through life data analysis. Access is also available to the capabilities of other in-house Powertech labs for additional analyses from mechanical, materials, and electrical testing.

The department has conducted many research programs for CEATI and has capabilities for designing and managing investigative R&D projects.

SERVICES

NDT inspection of turbine inlet valve

Asset management of transmission line overhead components

Asset management services aim to determine end-of-life of assets and whether and how equipment life span can be extended.

Asset Management Services include:

- Structural testing and integrity assessment service—sampling, condition assessment, and reliability analysis of various aging T&D components.
- Condition-based serviceability and life extension of wood and steel pole structures—quantification of decay for wood structures and present condition of steel structures, assessing serviceability, and making life extension decisions.
- Finite-element analysis service—static and dynamic performance analysis of structures, components, and overhead lines.
- Asset management solutions for managing aging T&D assets—determination of asset remaining strength and life span, development of maintenance and risk-mitigation strategies, and evaluation of inspection methods and techniques for condition assessment.

NDT and welding inspection services determine whether equipment and components are in safe operating condition

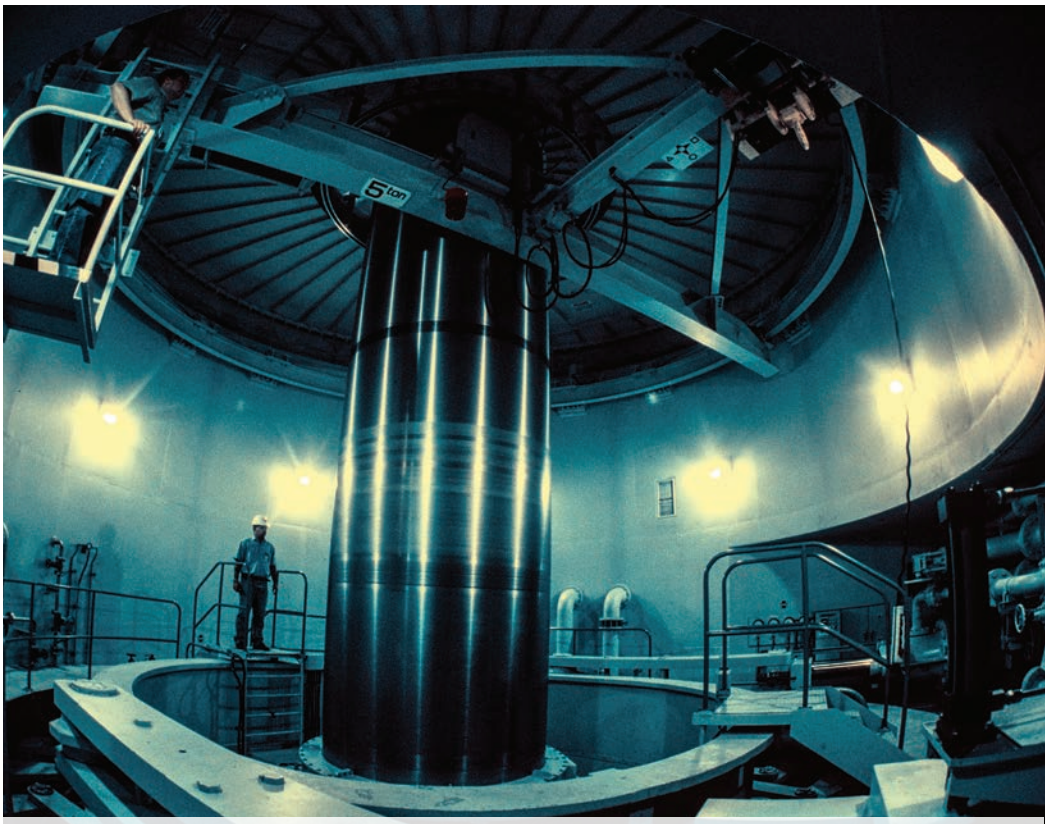
NDT and Welding Inspection Services include:

- Visual inspection (videoscope)
- Magnetic particle inspection
- Dye penetrant inspection
- Ultrasonic inspection
- Eddy current inspection
- Acoustic emission inspection
- Radiography
- In-situ harness testing
- Welding inspection

ON-SITE INSPECTION

Test vehicles for onsite services

Field radiography testing



Field inspection at a generation station

Powertech operates a fleet of testing vehicles to conduct on-site services throughout British Columbia for NDT and dielectric testing. Among the sites are electric power generation stations, substations, and regional offices and line rooms.

Specific testing services include:

- Annual combined nondestructive testing and dielectric testing of aerial lifting vehicles
- Dielectric testing of insulated line tools
- Nondestructive testing inspection of turbine runners, pressure vessels, penstocks, lifting devices, cranes, gates/valves, steel poles, and piping
- Thermal resistivity of soils and rocks

These services determine whether equipment is fit for service. The inspections identify defects to be addressed by owners, or if no defects are found, result in safe-to-operate certifications. The timing and resolution of inspections are often critical to avoid prolonged and costly outages of equipment.

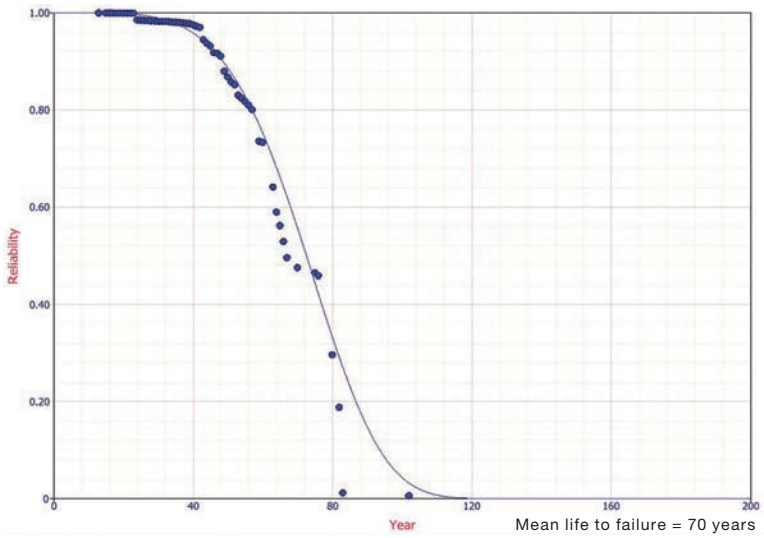
The findings help electric utility clients ensure the safe operation of their equipment and keep generation and T&D assets in healthy and reliable operation.

CONDITION OF T&D ASSETS

Powertech is coordinating an asset management program for overhead transmission components that utilizes a sampling protocol.

Unlike the costly assets in substations and power generation plants, where detailed and blanket condition assessments can be easily cost-justified, many T&D overhead components—such as insulators, cross-arms and through-bolts—are less expensive but massive in quantity and sparsely located. Thus, detailed on-site inspections would be labor-intensive, and inspections carried out from helicopters and from the ground have limitations.

To address these issues for BC Hydro, Powertech is utilizing a sampling protocol for asset management of overhead transmission components. As a cost-saving measure, Powertech works with utility field crews to take samples and collect asset data during routine utility line maintenance. This "sampling by opportunity" involves only an incremental additional cost and allows efficient data collection. Powertech uses the data compiled through sampling to determine correlations between condition, remaining strength, age, and geographic locations.



Mortality curve of a wood pole population

The program has also been extended to testing in-service transmission wood poles and cross-arms to determine remaining bending strength of the poles to evaluate whether the current replacement scope is adequate.

SELECTED CLIENTS

BC Hydro Power smart
Air Canada Jazz
Coast Mountain Bus Company
Altec
ASPLUNDH
AÉRO MAG
Vancouver Island Powerline
ATCO
AC Aerial Contractors Ltd. Power Line Systems
City of Victoria
FortisBC
ENMAX
CEATI International

Asset Management & Inspections

THE POWERTECH ADVANTAGE

Powertech Labs Inc. is one of the largest testing and research laboratories in North America, situated in beautiful British Columbia, Canada. Our 11-acre facility offers 15 different testing labs for a one-stop-shop approach to managing utility generation, transmission and distribution power systems.

Powertech is home to a broad range of scientists, engineers, and technical specialists, with capabilities in electrical testing, cable condition assessment, mechanical and materials engineering, software technologies, power system studies, chemical analysis, gas systems engineering, and smart utility services. These skilled researchers have decades of collective and real-world experience and often work in cross-departmental teams to investigate, diagnose and solve complex problems.

As an independent, third-party testing facility, we adhere to the **highest** laboratory **(ISO 17025)**, quality **(ISO 9001)** and environmental **(ISO 14001)** management standards. Many of our scientists and engineers chair or participate in various standards committees within their fields of expertise. Additionally we have the capabilities to derive and develop **non-standard testing** methods and setups required to test product prototypes and perform forensic analysis.

Outside of the utilities industry, Powertech provides routine **testing** capabilities, product **development**, research and **consulting** services to support an array of industrial-type operations, electrical equipment manufacturers and automotive original equipment manufacturers.

Powertech
The Power of Trust. **The Future of Energy.**

12388 - 88th Avenue
Surrey, British Columbia
Canada V3W 7R7

604.590.7500
info@powertechlabs.com
powertechlabs.com

81035-0015