Predictive Maintenance for HV Systems

Effective electrical power system maintenance and testing is fundamental for **safe and reliable operation**, irrespective of size, type or industry. When high voltage equipment malfunctions, the consequences can be particularly catastrophic. Damage to the equipment itself can be very expensive, but is insignificant compared with the collateral damage and potential hazards to people and the environment.

An effective testing, inspection and maintenance programme is therefore essential for a **well-functioning** high voltage system. This will result in minimal operation failures and give asset managers and decision makers accurate information on how to prioritize operating system investment.

MULTI-DISCIPLINARY EXPERTISE

- **State-of-the-art analysis and measurement capability** including cable system, power quality, EMC, transformer, motor and generator assessment, at your location;

- **Expert knowledge and operational experience** in the field;

- **A wide range of material analyses**, including transformer oil analysis, carried out at our Linkebeek laboratories, as well as ground analysis and heat dissipation calculations arising from root cause analysis (RCA).

With **expertise in every aspect of electrical power**, ENGIE Laborelec guarantees the **independence and objectivity** of its solutions and recommendations.

BENEFITS

- Maximum **SAFETY** for people and equipment;

- Maximum **OPERATION**, with no unplanned impact on operations, using both online and offline measurement;

- Optimum **INVESTMENT** planning through identification of weak points in the HV system

All high voltage equipment is covered: cables, motors, generators, switchgear and transformers.

Predictive maintenance of high voltage equipment through condition measurement

PREDICTIVE MAINTENANCE CAPABILITY

ENGIE Laborelec has a broad range of state-of-the-art measurement expertise capable of **assessing all high voltage systems**:

- Measurement of partial discharge activity, localization, trending, and interpretation through signal analysis;
- HV system component monitoring, (continuous or ad hoc), including:
  - Cable systems (cables, joints and terminations), underground cables and overhead lines up to 250 kV;
  - Switchgear, open and closed cells, air or gas insulated switchgear (AIS and GIS) installations;
  - Current and voltage transformers (VT and CT), connections and bushings;
  - Motors and generators.

PREDICTIVE MAINTENANCE TECHNIQUES

Online (in service) predictive maintenance services

For HV system component monitoring (continuous or ad hoc), measurement and analysis of partial discharge (PD), localization, trending and interpretation using multiple techniques.

- Acoustic emission (AE):
  - Airborne – ultrasonic parabolic microphone detection at 40 kHz CF
  - Contact probe for examination of closed cells
- Electromagnetic:
  - Transient earth voltage (TEV) 100 kHz - 80 MHz
  - Ultra high frequency (UHF) 150 MHz - 1000 MHz
  - Radio or high frequency current transformers (RFCT and HFCT)
- Ultra-violet (UV) cameras:
  - Corona detection, discharge to air
  - Tracking (surface discharge) at bushings and insulators
- Oil analysis for ageing and moisture ingress
- Infra-red (IR) cameras for heat detection

Offline (out of service) predictive maintenance services for HV systems

Condition measurement of cables, motors, generators, switchgear and transformers, including partial discharge, dissipation factor, insulating resistance and voltage withstand testing.

STRATEGY FOR PREDICTIVE MAINTENANCE

The Engie Laborelec strategy is to apply multiple measurements techniques and methods onsite in combination with visual analysis. Through specific measurement procedures and return on experience, **we can pinpoint weak spots in an HV system at an early stage. This ensures maximum safety, maximum operation and optimum investment**.

REFERENCES

ENGIE Laborelec works every day on predictive maintenance measurement **for a wide range of customers in industry, and in energy production, distribution and transmission**. We deliver services at home and abroad complying with international standards and recommendations (IEEE, IEC and CIGRE).

Predictive maintenance of high voltage equipment is essential for safe and reliable operation

Would you like to know more?

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