Cabel predictive maintenance

DESCRIPTION OF THE TECHNOLOGY

ITE has developed a fault detection system based on anomalous patterns identification. Analysis and interpretation methodologies of partial discharge measurements are applied to transmission and distribution networks.

The main purpose is recognizing fault patterns and identifying them in order to schedule the condition-based maintenance policy of facilities.

Developed tool is focused on the medium voltage network cables analysis, but it can also be adapted for other uses, such as low or high voltage cables, transformer measurements, electrical machines or electric motors. The core of the system is the recognition algorithm, which must be trained and tuned before being used.

MARKET APPLICATION SECTORS

Utilities, electric cooperatives, companies owning electricity network and renewable sources, companies with electrical machines looking for better condition-based maintenance based on partial discharges diagnostic.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

This tool facilitates predictive maintenance by the diagnosis of assets condition. Prediction of future performance can be done in order to schedule infrastructure replacements when needed or extend components life based on a continuous inspection and maintenance program. The challenge is related with the measurements interpretation. It must be done by comparison with the PRPD patterns used as condition identifiers. According to TB 358 of CIGRÉ, the use of these diagnostic and monitoring techniques entails the following benefits:

Regarding technical criteria, it is possible to:

) Monitor degradation changes by direct measurement.
) Reduce rise-tendency in number of faults and failures.
) Prevent failures on components of similar age.

Technical issues are related to degradation specifically using a rise-tendency faults model at the end of its useful life.

Regarding economic criteria is possible to:

) Reduce losses (differential versus new design or new materials).
) Reduce maintenance costs if new cables are rolled-out.
) Prevent increasing reactive maintenance in degraded components.
) Reduce the costs of repairs due to failures.
) Optimize line replacement costs.
) Reduce losses due to energy not supplied by preventing unexpected failures.
) Other penalizations.

Regarding strategic criteria is possible to:

) Schedule original designs replacement not reaching present operating conditions.
) Allow new strategies in networks (e.g. raising voltage levels).
) Reduce risk of failure in operation (explosions in accessories, leaks or fires).

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- Comply with new legal regulations (Prevention of water contamination due to oil leaks).
- Apply new technologies when replacing new cables.
- Avoid problems arising from end of support from the original provider.
- Overcome lack of knowledge of current personnel regarding maintenance activities.
- Comply with standards of supply quality.

CURRENT STATE OF DEVELOPMENT

At present, ITE has developed a tool for the analysis and interpretation of partial discharges to accurately detect the existence of faults in electrical assets and identify their typology. The tool is a result of a multidisciplinary collaboration that brings together the knowledge of experts in electrical technology as well as experts in machine-learning techniques and data analysis through probabilistic models. The ability of ITE to develop and implement the most advanced diagnostic and detection techniques is mainly focused on the area of automated monitoring of the status and condition of electrical assets. The fundamental premise of ITE is the continuous validation and improvement of techniques and products in this field.
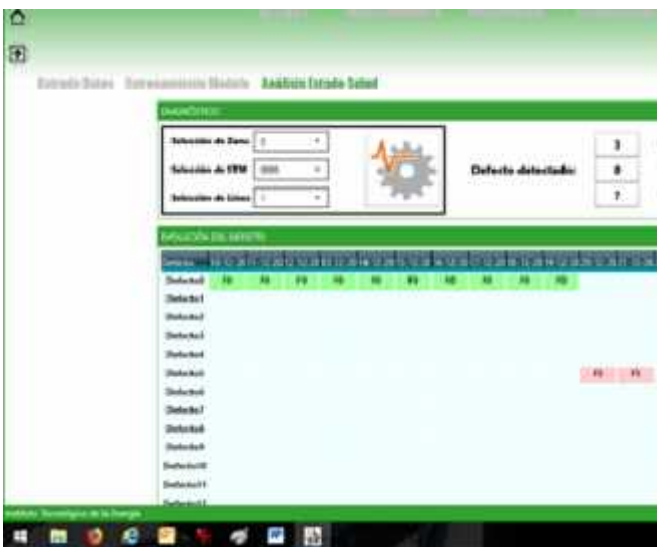
INTELLECTUAL PROPERTY RIGHTS

Exploitation license

COLABORATION SOUGHT

Companies interested in stablishing the following cooperation ways are sought;

- Patent license agreement to implement that technology in their processes.
- R&D agreement to jointly validate the technology into other processes/applications.
- R&D cooperation projects.

RELATED IMAGES

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