



ermes

ELECTROTECHNICS AND MECHANICS OF STRUCTURES

R&D EXPERTISE AT THE SERVICE OF INDUSTRY

FIELD EXPERTISE

TESTING AND MEASUREMENTS

NUMERICAL SIMULATIONS

PROTOTYPED PRODUCT

MARKET-READY PRODUCT

OPERATIONS & MAINTENANCE SUPPORT

Solutions for operational monitoring of alternator rotors

YOUR STAKES

- Optimized maintenance operations
- Real-time performance update on alternator rotors

OUR SOLUTION

Called NYMFEA, this innovative tool allows for quick, automatic and low-cost rotor diagnosis.

Short-circuited coils in a rotor winding are a defect which, if not properly managed by the operator, can be costly. NYMFEA allows the operator to control this defect all the while leaving him sufficient time to procure and install a new rotor.

Short-circuited rotor coils can cause:

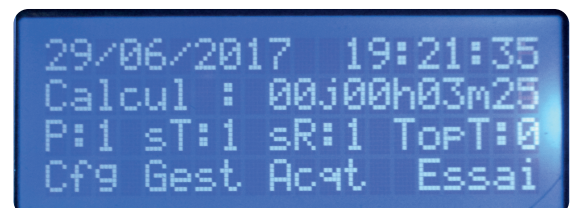
- Damage to the equipment: vibrations, damage to the electrical insulation or even its total loss.
- A reduction in efficiency resulting in: a loss of electricity production and less participation in system service (RTE penalizes plant owners operating such generators).

EDF developed the NYMFEA box thanks to its recognized skills as an operator of numerous energy production parks. This box allows you to:

- Monitor turbo-alternators in operation and detect rotor defects early by automatic analysis of flow sensor signals (not supplied)
- Diagnose the origin of a fault: mechanical (eccentricity) or electrical (short-circuited turns)



NYMFEA Box



Measurements

SECTORS OF APPLICATION

The NYMFEA case was developed for continuous monitoring of 1500 and 3000 rpm smooth pole alternators equipped with air gap flow sensors

- Thermal and nuclear power plants
- Variant tool for hydraulic power plant under development

Solutions for operational monitoring of alternator rotors

KEY FIGURES:

- Units deployed in the thermal fleet: 3 units in 2016, 8 units in 2017, 5 units in 2018
- Units currently being deployed in the nuclear fleet: 2 units in 2017

AN INNOVATIVE SOLUTION

AUTOMATIC AND SPEEDY DIAGNOSTICS

- Diagnostic result displayed on screen and indicator lights
- Automatic analysis or according to the request

EASY TO INSTALL AND CONFIGURE

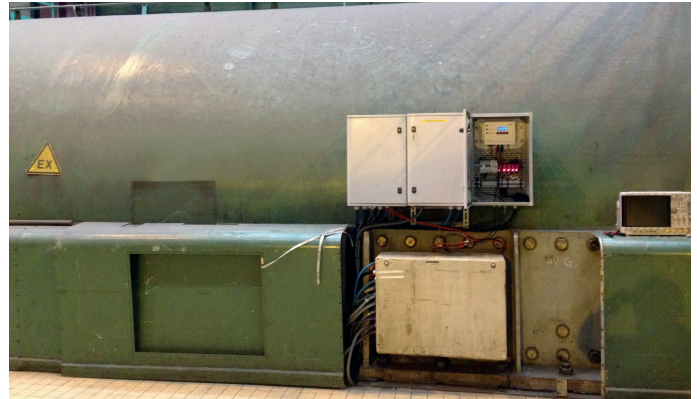
- Simple and easy connections of the radial and tangential coils of the flow sensor
- No structural and/or functional changes to the operator's installation
- Plug & Play option should probes already be in place

AUTONOME

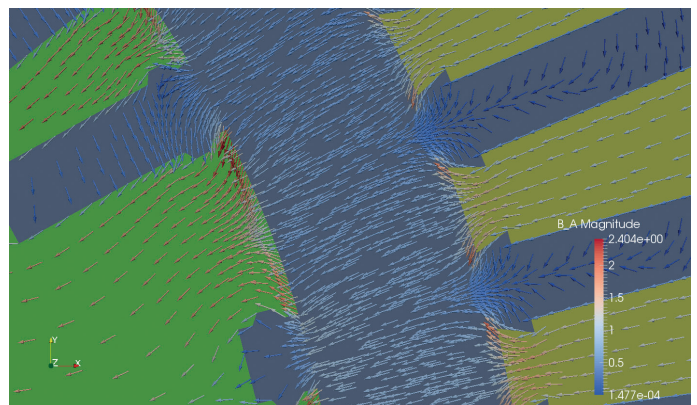
- Battery powered (autonomy: 18 months for data recovery at one measurement per hour)
- No maintenance needed

E-MONITORING

- 4-20mA current loops for fault index communication
- Self-test function ensures reliable measurement for the operator



Installed box



Simulated induction



NYMFEA

PATENTS

- This study was the subject of two European patent filings in 2013: EP 2965101 & EP2965102

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A RICH HISTORY

At the origin, a generic defect of the alternators observed by operators. The R&D's response:

- Electromagnetic modeling of the alternators completed with instrumentation of the air gap on site, then on model
- A first prototype of the solution kit was produced, then tested on site and finally validated on a real case in China