CIGRE Study Committee A1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

WG* N° A1.43	**Name of Convenor :** Ante Elez (Croatia)
Technical Issues # (2): None	**Strategic Directions # (3): 2**
The WG applies to distribution networks (4): No	
Title of the Group: State of the art of rotor temperature measurement	

Scope, deliverables and proposed time schedule of the Group:

Background :

Protecting key generators and large industrial motors against premature failure due to rotor overheating has always been a demanding task. This is particularly true in cases where the rotor windings are inaccessible in operation and the respective winding temperatures cannot be determined with accuracy, e.g. brushless excitation systems.

Unexpected component failure can result in forced outages and costly emergency repairs. In order to prevent unexpected component failure, some rotating machines today are equipped with temperature measurement instrumentation.

This topic is of high importance not just for machine monitoring and diagnostics purposes, but also for the purposes of machine design and construction improvements. There are a variety of different instrumentation and approaches on the market that provide users with insight into this crucial information.

Scope :

To conduct a survey on state of the art of rotor temperature measurement, with focus on:

- Measuring on rotor vs. measuring from stator
- Measuring sensor type (analog sensors vs. digital sensors)
- Power supply source types for powering of measuring equipment and equipment for signal transfer (from battery, from excitation, from vibration, Seebeck effect, from magnetic field ...)
- Wireless transfer signal type (radio, Wi-fi, bluetooth, Zigbee, ...)
- Measuring systems vs. expert systems (measuring vs. rotor temperature image)
- Number of measuring sensors required for quality rotor temperature image
- Typical sensor positions installation for salient pole machines and cylindrical rotors
- On-line vs. off-line measurement (sensors and instruments vs. measuring bands)
- Influence of multiple sensor installation on rotor temperature increase
- Proper sensor installation vs. measurement accuracy
- Prognostic approaches (Identification of weak components, criteria evaluation, ...)

Deliverables : Report to be published in Electra or Technical Brochure with summary in Electra

Main Tasks and Time Schedule: Start: December 2013 **Final report:** April 2017

- TOR approval – November 2013

- Forming of team – December 2013
- Draft questionnaire 1 – First Version - June 2014 (to be sent to WG members)
- Draft questionnaire 1 – August 2014 (to be discussed at Paris meeting)
- Additional comments by members and experts – November 2014
- Draft questionnaire 2 – Second Version - March 2015
- Comments by members and experts – up to June 2015
- Final questionnaire – August 2015 (to be presented at Madrid meeting)
- Survey – answers – December 2015
- Draft report 1 – March 2016
- Comments by members and experts - June 2016
- Draft report 2 – August 2016 (to be presented at Paris meeting)
- Additional comments by members and experts – November 2016
- Final report approval – January 2017

Document ready to be published in Electra – April 2017

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman : M. Wald
Date : 21/11/2013

(1) Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2
(4) Delete as appropriate

(5)

Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non technical audience