New Horizons Opened up in Large Generator Stator Testing

Realized with TopCon TC.ACS

Keywords

TC.ACS programmable bidirectional AC power source, parallel monophase applications, magnetic core material testing, high induction test procedure, hydro- and turbo-generator stator core examination.

Application

Suppliers of heavy duty public grid generators have to furnish proof of perfect magnetic characteristics of the core material even at very high levels of induction. Until now, these tests were done mainly by high voltage excitation taken out from a neighbouring generator or from a high voltage distribution network. Apart from the high level of danger with respect to personnel working on high voltage circuitry, a very big amount of reactive power has to be handled due to the inductive character of the excitation coils.

Together with the customer, Regatron Field Application Engineering Staff developed a completely new approach to the given test task. Instead of the high voltage excitation method a tuned-circuit based procedure was developed and intensively tested offering the following advantages:

- Strictly low voltages used throughout the entire test circuitry
- Ability to compensate for the inductive part of the test load (magnetic core)
- Full flexibility either in test frequency, current/voltage levels and power
- Low and high induction test patterns including burst and user programmable slopes
- Only common 3 x 400VAC grid necessary for the alimentation of the TC.ACS units

Results

The new test method was successfully tested on-site of a very big 250 MW hydro-generator stator of roughly 128 t mass. A total of 275 kW excitation power was applied using 6 TC.ACS units running in single phase dual channel mode. Magnetic induction as high as 1.3 Tesla was reached, a run of 1 hour provided a temperature rise of several °C enabling the customer to take even thermo-graphic pictures! The ease of use was demonstrated by running the experiments in the middle of a full powered construction area without any impacts on the builder staff; a big step ahead compared to the former extensive and dangerous method!