

A technique for testing low inductance test object

A 220/11kV, 30MVA, Power Transformer from a Bangalore manufacture was tested for Lightning Impulse on the HT & LT windings for the first time. The Lightning Impulse test is a very important Di-electric type test which is conducted on all new designs of transformers. It is a proof test against lightning voltages that occur in the system as a consequence of thunder storms.

While testing high power transformers, to obtain a standard wave would be a taxing affair due to large capacitance of the windings or a low inductance of the same which is inherent of the design. In case of the transformer tested in our HV laboratory, obtaining the waveform on the HT side was achieved with little difficulty. However, on the LT side normal methods adopted were not good enough to obtain the desired waveform due to low inductance of the winding under test, the high transformer ratio and the short circuit of the untested winding on the other side (Presenting low impedance on the LT side).

When a Lightning Impulse Voltage is applied to a transformer winding, the initial voltage distribution would be highly non-linear, as the front of the waveform is built up by the charging of the series/shunt capacitance till the peak voltage value is reached. By that time, the inductance of the winding starts conducting and the voltage distribution changes to inductive, which would be more uniform. Due to small inductance of the specimen, the voltage after the peak collapses more rapidly reducing the tail time to below the necessary limit of 40µsec. Moreover, the transformer inductance oscillates with the generator capacitance, thereby producing an aperiodic damped oscillation on the tail.

In order to obtain the specified values within limits, a special circuit called the Glaninger Circuit is required

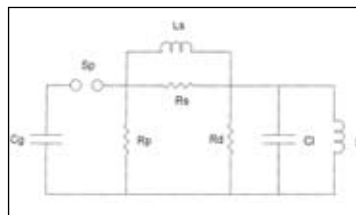


Fig 4 Glaninger Circuit

to be used. The Glaninger Circuit is shown in Figure 4, for obtaining correct tail time in low inductance test objects.

The final waveform on the LT side obtained for the testing of the specimen transformer is as per Figure 5. As seen, it satisfies the standard requirement. Lightning Impulse on both HT and LT windings were therefore completed satisfactorily.

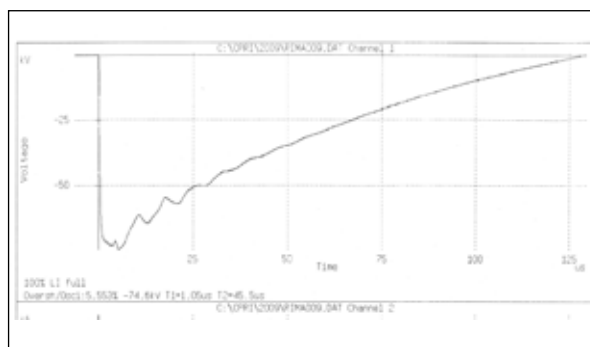


Fig 5 Voltage wave shape of LT side of the transformer

CPRI Participates in ELCA Power International 2009 Exhibition

The Institute participated in ELCA Power International (EPI) 2009 Exhibition held at Bangalore International Exhibition Centre, Bangalore from 5th to 8th June 2009. CPRI displayed its facilities and expertise. Major test facilities covering short circuit, high voltage, cables & capacitors, material characterization, expertise in power systems, tower testing, seismic qualification and other state-of-art facilities were displayed.

CPRI Research activities and services offered for field testing & diagnostics, third party inspection and distribution system management were also displayed.

The Exhibition witnessed large number of visitors from various fields of industries and utilities and they evinced keen interest in the activities of CPRI. Valuable business enquires were received during the exhibition.

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