

Seminar

Institute for Plasma Research

Talk 1 : High Voltage

Talk 2 : NDT; Alphonso Mango; Image Processing

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Date : 8th January, 2018 (Monday)

Time : 02.30 PM

Venue : Committee Room 3, (New Building), IPR

Abstract :

Section-I : High Voltage

Insulation is the heart of any high voltage system. Partial Discharge (PD) is the phenomena of discharges which are localized in nature and which take place due to charge transfer in voids/cracks present in the insulation. The magnitude of such discharges is usually small. It is essential to detect such discharges to evaluate the quality of insulation. A plot of voltage phase angle versus apparent charge (Q) is called as the Phase Resolved PD (PRPD). This is obtained from PD detectors. In a given machine, different types of insulations are used in different combinations and for various geometries. The discharges occurring at various locations in a machine are classified based on the characteristics and their locations using PRPD patterns. It is therefore essential to identify these discharges and their locations as a part of condition monitoring of the machine. This thesis revolves around the study, characterisation and identification of different types of discharges commonly occurring in rotating machines using the phase resolved measurement data on actual specimens. There are many types of discharges occurring in a machine at different locations and these are classified as delamination, slot discharge, void discharge, end winding discharge, surface discharge, gap discharge etc. Thus, the major contributions of the research work with respect to different discharge types are summarized as follows: 1) Use of the product of Q and N, quantified as Effective charge (Q_{eff}) of PD and by obtaining ϕ versus Q_{eff} plots for classification of type of discharges in rotating machines. This is termed as 'phase window analysis of PD'. An attempt has also been made to develop an automatic PD classification system with the preliminary results obtained using this phase window analysis. 2) Energy is estimated effective charge and quantified as Effective Energy (E_{eff}). This effective energy has been used to study, analyze and characterize different types of discharges occurring in rotating machine. 3) The effective energy (E_{eff}) has been correlated with the Tan δ measurements since both give information of the loss taking place in the insulation. 4) The work also investigates the application of Weibull Function (statistical method) to quantify the percentage contribution of one discharge over the other when more than one sources of PD occur simultaneously. A model for classification of types of discharges is proposed in this thesis.

Section-II :

NDT; Alphonso Mango; Image Processing Quality assurance in agri-products is being more crucial with the liberalized international trade system and globalization for capturing & retaining the market. In order to strengthen the export competitiveness, adoption of advanced post-harvest technology is essential. India is the second largest producer of fruits in the world. However, India's fruit production only contributes 1% to

the export earnings from agricultural products. Also, India is the largest producer of mango fruit in the world. Amongst mangoes, Alphonso mango is the leading commercial variety of Maharashtra state and one of the choicest varieties of the country as well as internationally. But in recent years this variety is facing problem due to the disorder named Spongy Tissue. The peculiarity of this disorder is that the external symptoms of spongy tissue affected fruits are not apparent either at the time of picking or at the ripe stage. The affected tissue is visible only when the ripe fruit is cut into two halves. The overall loss due this disorder is about 30 per cent, which amounts to a loss of nearly Rs 135 million. So, there is an immediate necessity to develop a system which can detect the presence of Spongy Tissue in the mango non-destructively, and this system can be used before export of the fruit. In this work, a brief study on external and internal quality components of the fruit is carried out along with non-destructive technologies for measurement of the same. After the comparative study of different techniques it has been decided to use soft x-ray imaging to perform nondestructive detection. On imaging, the infested mango shows dark areas in the spongy tissue affected part. Un-infected mangoes show a uniform light grey area. The deduction of defect using x-ray imaging was duly verified when the mango is cut open. An Image Processing algorithm which can detect the presence of spongy tissue from stored x-ray images was developed with MATLAB.
