

Seminar Report: “The Application of Partial Discharge and Ultrasonic Survey as HV Electrical Equipment Condition Monitoring Tool”

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The above seminar, organised by IEM Terengganu Kerteh Chapter, was held at the Ethylene-Polyethylene Malaysia Sdn. Bhd. training centre, on 5 December, 2006. It was attended by 33 participants, comprising IEM members, engineers and Plant maintenance personnel from the Oil and Gas industry in the Kerteh-Gebeng region.

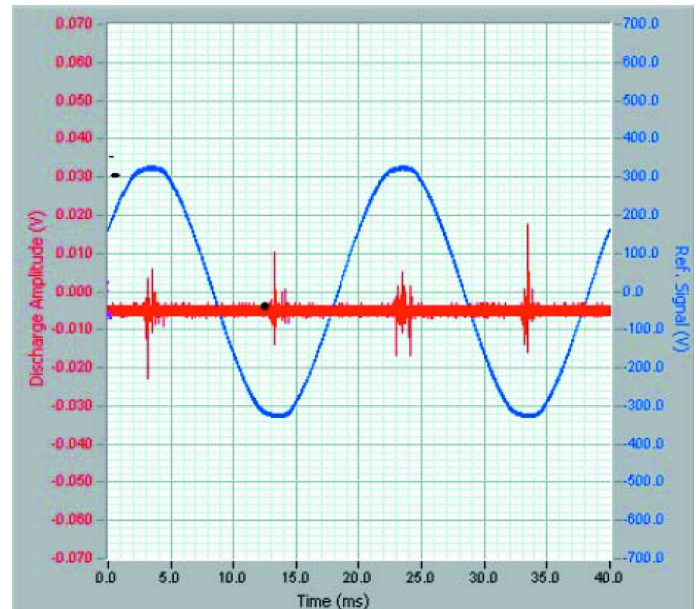
The seminar leader, Engr. Ching SJ, MIEM started his presentation by giving an introduction to electrical partial discharge (PD): definition of PD, graphical illustration of PD, typical PD waveform or pulses, and consequences of PD. The importance of PD detection to prevent human injury or fatality, equipment damage and production loss was emphasised via a short video clip showing a devastating power transformer failure. The audience were introduced to the PD detection methods, namely ultrasound, HFCT (or Rogowski Coil), capacitive coupler, transient earth voltage (TEV), and optical corona detections.

A 3D animation illustrates how TEV detector works, and how it is used to detect PD in a substation. It was interesting to know that in some countries, the safety standards are so

high that it is mandatory to ascertain that a substation is safe (free of PD) before one enters. A portable TEV cum ultrasound detector is used as an HSE tool in this context.

A demonstration set, a metal clad distribution box with 3.3kV circuit inside it was used to demonstrate the use of TEV, HFCT and ultrasonic detectors. The opportunity to see the actual PD spikes with respect to the 50 cycle waveform on the digital scope was indeed a memorable occasion to most participants. Participants were then given the opportunity to have a hands-on experience with the test equipment.

Engr. Ching then offered some tips on how to distinguish electrical noise from genuine discharges, and further tests that can be carried out to pinpoint the discharge source.



Typical PD spikes

A comparison chart was shown, comparing the effectiveness of PD, Megger, Hi-Pot, and Polarisation Index tests. The chart showed that each method has its own effectiveness or weaknesses at various stages of insulation deterioration or failure.

Engr. Ching ended the presentation by showing some PD detected at some industrial plants in the Kerteh-Gebeng area. ■



Signs of PD tracking on a HV cable insulation



A HFCT and a TEV detector used in the demonstration