

Hans Tropper Memorial Lecture 2017

Title:

Kerr Electro-optic Electric Field Measurement and Electrical Insulation Performance in HVDC Liquid Dielectric Systems

Abstract:

A Kerr electro-optic electric field measurement technique was introduced for the direct measurement of electric field distributions and charging activities for a pressboard (PB) arrangement in oil/PB composite insulation systems, under HVDC and DC polarity reversal conditions. Next, under different PB arrangements in oil, the time dependent behavior of electric field stress was measured under both DC voltage and DC polarity reversal (DC-PR) conditions. The physical mechanisms of the movement and accumulation of charge carriers in the insulation systems were also clarified. Moreover, the breakdown discharge initiation by accumulated charges on PB was investigated and analyzed. FEM based electric field analysis techniques were also applied for liquid dielectric insulation systems, especially for the DC converter transformer structure. Finally, the electrical insulation performance for HVDC applications was discussed.

Speaker: Prof. Hitoshi Okubo, Aichi Institute of Technology, Japan



Hitoshi Okubo received a Ph.D. degree in Electrical Engineering from Nagoya University, Japan, in 1984. He joined Heavy Apparatus Engineering Laboratory of Toshiba Corporation, Japan in 1973 and was a manager of High Voltage Laboratory of Toshiba. He specialized in the development of high voltage transformers and gas insulated switchgears (GIS) and in the related high voltage engineering to enhance the electrical insulating performance. From 1976 to 1978, he was at Technical University Aachen and Technical University Munich, Germany, as a guest researcher to extend his research in the field of high voltage engineering, discharge physics and measurement, and electromagnetic field analyses.

Since 1989, he was an Associate Professor, and since 1991, he was a Professor at the Department of Electrical Engineering and Computer Science in Nagoya University. He is presently a Professor at the Department of Electrical and Electronics Engineering in Aichi Institute of Technology, Japan.

His research subjects are specializing in the field of oil-immersed composite electrical insulation, electric field calculation and measurement, development of new high voltage power equipment, the diagnostic techniques for electrical insulation performance, related phenomena including gas/liquid/vacuum/solid, partial discharges, functionally graded materials (FGM) and nano-dielectrics, as well as the power applications of high temperature superconductivity (HTS).

He is author or co-author of 14 books, 220 Transaction-papers and more than 390 Proceeding-papers for International Conference publications covering broad areas including high voltage engineering and electrical insulation techniques.

He is an active member of CIGRE SC A2, B3 and D1 and was a Chair of the WG D1.15 on the Material Development for HTS Power Applications. Since 1988, he has been a member of IEEE Dielectrics and Electrical Insulation Society (DEIS) and is presently a Life Member of IEEE. He was a President in 2011 and is a Fellow Member of IEE of Japan.