Electrical Insulation News in Asia

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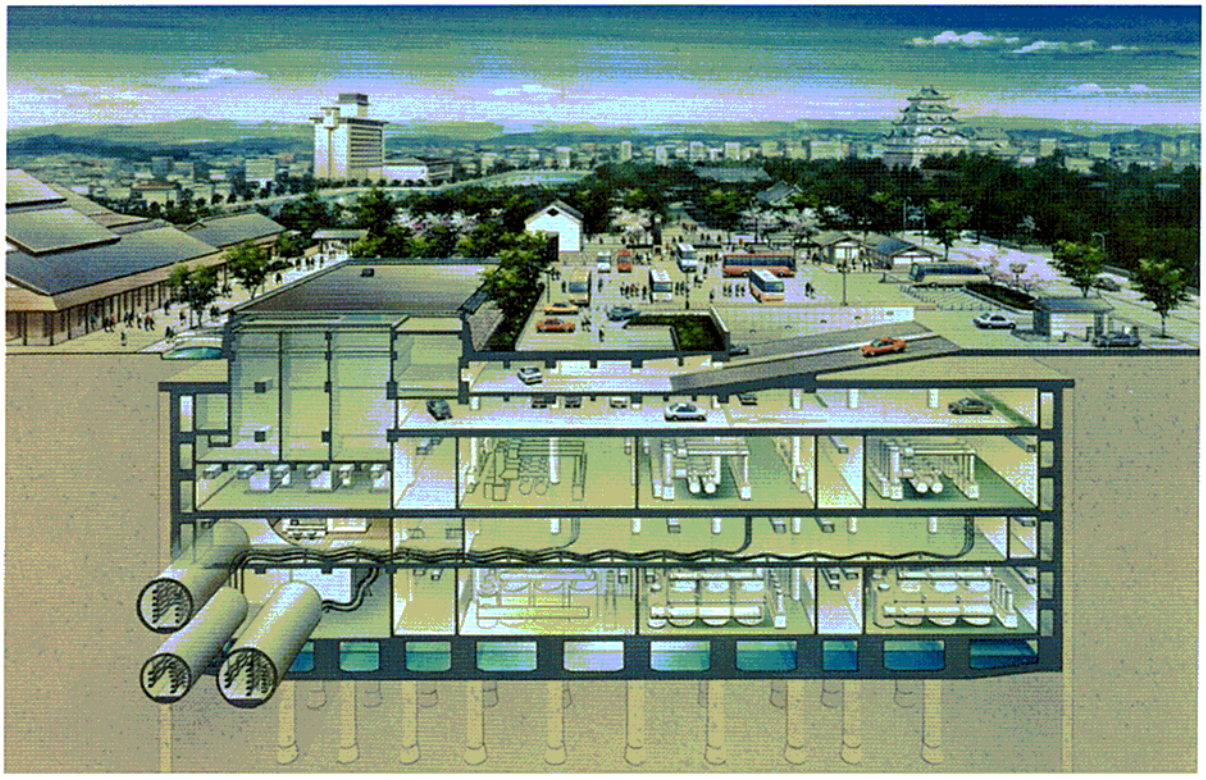

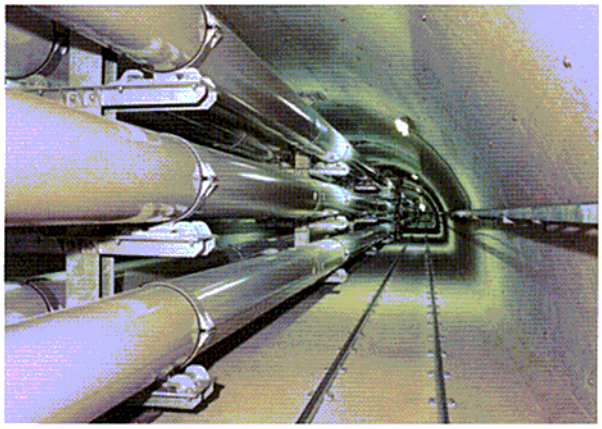

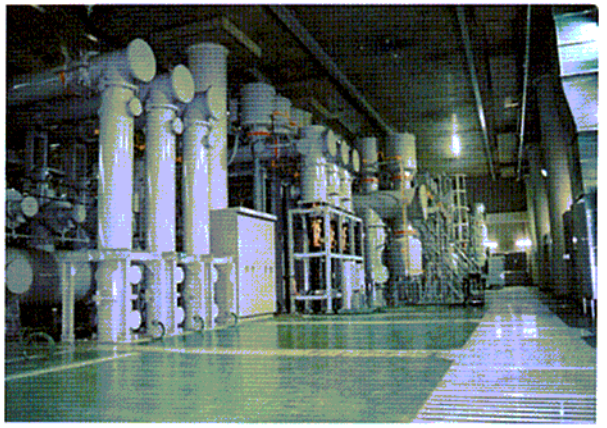

IEEJ

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PREFACE

Prof. M. Nagao

Internet makes the distance of our insulation community small

Since 1995 I have had many chances to visit several Indonesian universities as a short term expert on High Voltage and Electrical Insulation Technology under the framework of the JICA (Japan International Cooperation Agency) HEDS (Higher Education Development Support) project. On my first visit in 1995, although I was using e-mails in Japan, it is not so popular like now and most preparation works for my visit were done with normal letter and fax as usual at that time. During my stay in local cities in Indonesia I had to call the access points in Jakarta or sometimes directly to my university with long distance or overseas call to collect and to send e-mails. I had to struggle with low speed of data transfer and the resulting high cost of telephone charges. I was almost isolated from the news from my laboratory, university and Japan and felt being far away from Japan. Of course it brought me big advantage at the same time that I had a plenty of free time after my business and on the weekends.

Recently e-mails and Internet technology have become more and more popular. Even if it would be generally hard for me to go abroad due to a lot of work to do in my university, I got the benefit of this modern computer communication technology to go abroad more frequently than before and to do the work as if I were in Japan. During my visit to Indonesia in these years, I can connect my computer to the Internet even in a local city with the low charge of local phone call and with fairly convenient speed of data transfer. I got more than 30 e-mails everyday and even could correct many draft papers sent by my students as if I were in Japan. The advantage of staying abroad which I felt before disappeared and I became busier than before even far away from Japan in the physical distance. However this problem has a meaning that we can obtain another new advantage, that is, the virtual distance in our community has become smaller with e-mails and Internet technology. Compared with fax, being like an express letter, the characteristic of e-mails is something like a conversation and makes the barrier to contact someone lower.

Now the Internet and Broad Band technology spreads gradually even in local areas of under-developing countries. This is a good chance for our Electrical Insulation Community in Asia to take the benefit of the Internet and to develop together. Two years ago we opened the EINA (Electrical Insulation News in Asia) Web site (http://boss.eee.tut.ac.jp/eina/) to provide the information of previous issues of EINA magazine, which is full of the information about electrical insulation and related technologies in Japan and Asia. This is still at the first stage, but we want to strengthen the function of this Web site and we need active contribution from your side.

First please try to join our EINA community through visiting EINA Web site. Try to send us (E-mail: eina@boss.eee.tut.ac.jp) the information around you and your organization and to advertise yourself through the EINA Web site. Try to get a chance to communicate and to discuss on the common interest. Our EINA community wants to develop together with all Asian countries.

Prof. Masayuki NAGAO

(Toyohashi University of Technology)

OUTLINE OF TECHNICAL COMMITTEES ON DEI AND RELATED TC IN IEEJ

Technical Committee on Dielectrics and Electrical Insulation (DEI)

Chairperson:	K. Kimura (Kyushu Institute of Technology)
Secretaries:	T. Okamoto (CRIEPI)
	Y. Miyashita (Mitsubishi Cable)
Assistant Secretaries:	M. Okashita (Showa Electric Wire and Cable)
	H. Nishikawa (Shibaura Institute of Technology)

This Technical Committee (TC-DEI) was set up in 1979 succeeding the Permanent Committee on Electrical Insulating Materials upon the reorganization of IEEJ. The activities of the Committee have been covering mainly solid and composite dielectric materials and their technologies. The primary activity of TC-DEI is the annual Symposium of Electrical and Electronic Insulating Materials and Applications in Systems, formerly called Symposium on Electrical Insulating Materials.

The 32nd Symposium was held in Nagano on November 16 and 17, 2000. Prof. L. A. Dissado of Leicester University and Prof. M. Taylor of Wales University, both from U. K., gave invited lectures.

The 33rd Symposium in 2001 was held at the Hotel Sungarden, Himeji on November 19-22 jointly with IEEE DEIS, Chinese Electrotechnical Society, Korean Institute of Electrical and Himeji Institute of Technology. It was held as a joint international conference of the 2001 International Symposium of Electrical Insulating Materials (ISEIM 2001) and the 2001 Asian Conference on Electrical Insulation Diagnosis (ACEID 2001). More than 200 papers were presented.

The 34th Symposium is to be held at Niigata University on November 14-15, 2002. Prof. Gulski of Delft University of Technology and Dr. Weijun Yin from Phelips Dogde will make invited presentations on recent topics.

On June 1-5, 2003 the 7th International Conference on Properties and Applications of Dielectric Materials (ICPADM) will be held at Nagoya ICPADM is sponsored by IEEE DEIS and cosponsored by IEE Japan. The TC-DEI will cooprerate and contribute to the conference substantially.

The TC-DEI currently runs seven Investigating Committees (IC) which organize Technical Meetings and one Cooperative Research Committee (CRC) which edits and publishes this EINA.

Table 1 Investigation and Cooperative Research Committees in TC-DEI

Research Subject	Chairperson
Development of Dielectric and Electrical Insulation Technology to Organic Molecular Device Engineering (3 years from Jan. 2000)	M. Iwamoto (Tokyo Institute of Technology)
Functions of Organic Molecular Films and Organic / Inorganic Composites (3 years from July 2000)	F. Kaneko (Niigata University)
Advanced Measurement Methods on Partial Discharges in Electrical Apparatus (2 years from Jan. 2001)	K. Kimura (Kyushu Institute of Technology)
Environment-friendly Electrical/Electronics Materials and Systems (2 years from March 2002)	Y. Suzuoki (Nagoya University)
Degradation of Insulating Properties and Endurance of Impulse Surge for Printed Wiring Board (3 years from April 2002)	Y. Yamano (Chiba University)

Evaluation of Surface Discharges and Ageing of Polymer Insulating Materials (3 years from April 2002)	K. Gotoh (Consultant)
Charge Behavior and Interface under High Electric Field (3 years from July 2002)	M. Nagao (Toyohashi University of Technology)
EINA Magazine (2 years from Apr. 2002)	T. Tanaka (Waseda University)

Technical Committee on Electrical Discharge (ED)

Chairperson:	M. Yumoto (Musashi Institute of Technology)
Vice chairperson:	M. Nagao (Toyohashi University of Technology)
Secretaries:	M. Hikita (Kyushu Institute of Technology)
	T. Nakano (National Defense Academy)
Assistant Secretaries:	F. Tochikubo (Tokyo Metropolitan University)
	T. Murata (Toshiba Corporation)

The Technical Committee on Electrical Discharge (TC-ED) belongs to the Fundamentals and Materials Society (A-Society) of the IEE of Japan, and was established in 1980, but its root goes back to the start of Expert Committee on Electrical Discharge in 1954. The activities of the Committee have been covering mainly physics of electrical discharges in vacuum, gases, liquids and on surface of materials and their technologies.

In order to meet the objective, a few investigation committees are organized in the TC-ED every year to survey the up-to-date subject and their activities continue for three years normally. Now 4 investigation committees are running for survey of the subjects listed in Table2. On the other hand, the ad-hoc committee was organized on February 2001 to discuss the perspective for the future in the field of electrical discharges. After receiving the draft of a report from the ad-hoc committee, new investigation committees are planning to be organized on frontiers of physics and engineering or in the field concerned with the purification technology of environmental pollutants and with the nano- technology.

The TC-ED is supporting more than ten domestic technical meetings on electrical discharges every year where researchers, engineers, university professors and students report more than 200 full papers from both academic and industrial sides. Some of these meetings are cooperated with the TCs on Dielectrics and Electrical Insulation, on High Voltage Engineering and on Switchgear and Protection.

The international conferences are also promoted by the TC-EC. “Japan-Korea Joint Symposium on Electrical Discharge and High Voltage Engineering” will be held on November 18-19, 2002 in Seoul, jointly with the 11th Asian Conference on Electrical Discharge. “2003 J-K Joint Symposium” will be held in Nagasaki. “International Workshop on High Voltage Engineering (IWHV) will be held at Fukuoka on January 23-24, 2003 in cooperation with the TCs on High Voltage Engineering and on Switchgear and Protection.

The TC-ED also promotes the young researchers seminar every year in cooperation with the Institute of Engineers on Electrical Discharges in Japan to encourage the young researchers in the field of electrical discharges. The seminar will be held at Morioka in November 4-5, 2002.

Table 2 Investigation Committees in TC-ED

Research Subject	Chairperson / Secretaries / Assistant Secretaries
Control Technology of Electrical Discharge in Vacuum Relevant to Generation of High Energy Density	M.Yumoto / Y.aSaito, O.Yamamoto / Y.Asuetsugu, Y.Yamano
Partial Discharge Phenomena in Gas Insulation Apparatus And their Diagnosis Technology	H.Fujii / N.Hayashi, T.Kato / T.Hoshino
Interaction Effect Between Charged/ Excited Particles And Atoms/ Molecules	Y.Nakamura / N.Sasaki, K.Tsuda / S.Suzuki
Electrical Discharge in Nitrogen Gas and its Application Technology to Plasma Processing	Y.Kondo / S.Ono, A.Sekiya /

Technical Committee on Electromagnetic Compatibility (EMC)

Chairperson: O. Fujiwara (Nagoya Institute of Technology)
Secretaries: Z. Kawasaki (Osaka University)
S. Tomita (Central Research Institute of Electric Power Industry)
Assistant Secretary: K. Miyajima (Central Research Institute of Electric Power Industry)

Electromagnetic environment is the electromagnetic phenomena in space, which consists of electromagnetic fields due to naturally-originated sources like lightning and earthquake, and artificial ones generated from electrical and electronic equipment as well as radiated from power lines or communication cables, and so on. Electromagnetic compatibility (EMC) is the capability of electrical and electronic systems, equipment and devices to operate in the above-mentioned electromagnetic environment, without suffering or causing unacceptable degradation as a result of electromagnetic interference (EMI).

Regarding this kind of EMC problems, an EMC technical committee, whose members come both from the Institute of Electronic, Information and Communication Engineers (IEICE) and the Institute of Electrical Engineers of Japan (IEEJ) was first established in 1977. With the reorganization of the Fundamental and Materials Society (A-Society) of IEEJ, however, the technical committee on EMC (TC-EMC) in the IEEJ was newly established in April 1999. The establishment was based on the increasing significance of the EMC field together with the fact that EMI sources in the EMC issues have a close relation with electrical engineers. The first chairperson was Prof. T. Takuma.

As shown in the table below, three Investigation Committees (ICs) have so far been organized by the TC-EMC. The first one, the IC on "Lightning damages in the highly information-oriented society" (chairperson: Dr. S. Yokoyama), began its activity in January 2000. It has examined various damage experiences caused by lightning, in particular, related to such low-voltage devices as in communication and information systems and equipment. The main task of the TC was completed in March 2002 and the activity report was published in June 2002. The second one is the IC on "EMC issues in the electric power industry" (chairperson: Prof. Z. Kawasaki). This IC began its activity in July 2000 and will continue until December 2002. The principal purpose of the IC is to extract such recently noticed or important items that have not fully been elaborated in the electric power industry. The third one is the IC on "Precursor symptoms of earthquake observed from environmental electromagnetic field measurement" (chairperson: emeritus Prof. Horii), which began its activity in October 2001 and will continue until September 2003. Its primary purpose is to investigate the present situation of earthquake prediction based on the symptoms observed in environmental electromagnetic fields and then to extract the points at issue. Moreover, a new TC on "Home network EMC" (chairperson: Prof. M. Tokuda) will begin its activity in September 2002. This IC will focus on the EMC problems regarding the home networks such as internet and digital broadcast and will extract the EMC sub-

jects for keeping the safety and reliability of our lives.

Regarding the EMF issue, that is to say, a possible effect of electromagnetic fields on human health, a special committee on “Human health effect of electromagnetic fields” (chairperson: emeritus Prof. Y. Sekine) was established in 1995 under the immediate control of the IEEJ President. Its details of activity can be found on http://www.iee.or.jp/emf/emfhp/emftop.htm. There is still an increasing public concern on this issue in the world, although the large-scale EMP-RAPID project in USA just finished. The IEC also established a new committee TC106 for the standardization of measurement method of human exposure to electromagnetic fields. The TC-EMC is, therefore, planning to start a new IC on “Calculation method of induced electric field and current density in human body exposed to electromagnetic fields” (chairperson: Prof. Takuma).

Regarding international conferences on EMC issues, the 5th international symposium on EMC (EMC04’/Sendai, chairperson: Prof. A. Sugiura), is planned by the Communication Society of the IEICE in cooperation with the TC-EMC, which will be held on June 1st – 4th 2004 at Sendai International Center (Aobayama, Aoba-ku, Sendai 980-0856).

Table 3 Investigation Committees in TC-EMC

Research Subject	Chairperson
Lightning damages in the highly information - oriented society	S.Yokoyama (Kyushu University)
EMC issues in the electric power industry	Z.Kawasaki(Osaka University)
Precursor symptoms of earthquake observed from environmental electromagnetic field measurement	K.Horii (Daido University)
Home network EMC	M.Tokuda (Musashi Institute of Technology)

Technical Committee on Pulsed Electromagnetic Energy (PEE)

Chairperson: Kiyoshi Yatsui (Nagaoka University of Technology)
Secretaries: Kazuhiko Horioka (Tokyo Institute of Technology)
Weihua Jiang (Nagaoka University of Technology)
Assistant Secretary: Hidekazu Tsuchida (Central Res. Inst. Electric Power Industry)

The Technical Committee on Pulsed Electromagnetic Energy (TC-PEE) was set up in July 1999, to offer the opportunities for the members of IEE of Japan in the fields of R & D on pulsed power technology and associated applications.

It has been successfully available to achieve extremely high energy-density state by the pulsed power technology, even for very short time duration. To study from various points of views is very important not only from a physical aspect, but also from a lot of applications. Such an extreme state achieved is closely correlated with many applications because it involves high temperature, high pressure, high electric filed, high density, high magnetic field strength, and so on. Regularly, Technical Committee Meetings will be held four times a year. Furthermore, once a year, the Meeting will be held outside of Japan. In Oct. 2000, it was held in Korean Electrophysics Research Institute (KERI) as “International Symposium on Pulsed Power and Plasma Applications” (ISPP-2000), where 44 papers were presented from 7 countries. In 2001, the second one (ISPP-2001) was also held in KERI, where representatives participated from China. In 2002, there was a Joint Technical Meeting on Plasma Science and Technology and Pulsed Power Technology in Kona, Hawaii, in August, 2002, in the collaboration with Technical Committee on Plasma Science and Technology. Next meeting will be held in China in Oct. 2002.

We have an investigation committee in TC-PEE, "Generation and Control of Pulsed Electromagnetic Energy". The chairman, secretary and assistant secretary are Weihua Jiang (Nagaoka University of Technology), Sunao Katsuki (Kumamoto University), and Hidekazu Tsuchida (Central Research Institute of Electric Power In-

dustry), respectively. Normally, we have four meetings a year.

The main themes/topics to be discussed in the research meetings (Pulsed Power Technology: PPT) are as follows: development of pulsed power technology (e.g., power supply, switches, insulation technology), energy transfer technology of pulsed power (e.g., electron beam, ion beam, neutral beam, laser beam, z-pinch, plasma focus), production, control, evaluation and diagnostics of high energy density, theoretical and computer simulation of extremely high energy-density state, applications of high energy density state (e.g., microwave, materials, environment, radiation, particle acceleration, flier acceleration, strong electromagnetic wave, free electron laser, X-ray or excimer laser, inertial confinement fusion, diagnostics, luminescence, ultrahigh pressure / density / temperature / magnetic field strength,), and so on.

Nowadays, main efforts have been directed for the following two movements: one is the development of pulsed power technology for highly repetitive pulsed power supply for the wider applications of the pulsed power. For this purpose, many kinds of pulsed power supplies have been developed using fast semiconductor switches (e.g., MOS-FET, IGBT or SI thyristors) instead of gap switches. Another is that the wider applications have been now available not only for the energy mostly developed in the past, but also for the materials, environmental, biochemical or medical sciences. For example, flue-gas treatment has been successfully demonstrated by use of high rep-rated pulsed power, either direct discharge or pulsed electron beam. Furthermore, soil stabilization has been attempted by pulsed power technology.

The regular research meetings (PPT) are open for everybody who is interested in the pulsed power technology and associated applications.

Technical Committee on High Voltage Engineering (HV)

Chairperson:	S. Yokoyama (Kyushu University / CRIEPI)
Secretaries:	I. Aono (Mitsubishi Electric Co.), T. Inoue (Toshiba Co.)
Assistant Secretary :	H. Goshima (CRIEPI)

This technical committee (TC) belongs to Power & Energy (P&E) Society of the IEE of Japan, and supervises activity of investigation on technical subjects related to high voltage engineering.

This TC jointly organized 3rd International Workshop on High Voltage Engineering (IWHV) in January 2003 in Fukuoka, Japan, with two other TCs of IEEJ, namely on Switchgear and Protection (SP), which also belongs to P&E Society, and on Electrical Discharge (ED). This workshop, chaired by the chairperson of the TC on High Voltage Engineering, is characterized by discussion on full-length papers in English, and selected papers make a special issue of Trans. IEEJ-B. The first workshop held in Naha, Okinawa collected 49 papers and its special issue of January 2000 comprised 15 papers from the workshop. The second workshop held in Tottori, Japan collected 44 papers, and 8 papers and one review are on the special issue of Trans. IEEJ, No.8 of 2001.

Six investigation committees listed in Table 1 are active in September 2002. “Selection of Lightning Parameters for Protection of Power System Apparatuses” committee began in April 2002. The object of this committee is to arrange the data including winter lightning and waveforms got in transmission lines for the better lightning protection design of power system apparatuses. Also the relation between outages in transmission lines and the data of lightning location systems will be clarified,

TC on High Voltage Engineering meets four times a year. One of the meetings is associated with a technical visit, and a visit to Okutataragi pumping hydro power station is planned by the committee this fiscal year. The members of the committee other than the chairpersons of the investigation committees are from universities (5), a research institute (2), electric power utilities (4) and manufacturers (7).

Table 4 Investigation Committees in TC-HV

Research Subject	Chairperson
Insulator Contamination (Application and Evaluation of Insulators under Variety of Environments)	K. Takasu (CRIEPI)
Common Electrical Insulation Technology in Power Apparatuses of Electric Power System	H. Okubo (Nagoya University)
Estimation of Lightning Performance of Distribution Line	M. Ishii (The University of Tokyo)
Analyzing Methods on Surges in Power Systems Incorporating New-Type Power Apparatuses	T. Hara (Kansai University)
Recent Trends and Tasks in Power System Insulation Coordination	K. Hidaka (The University of Tokyo)
Selection of Lightning Parameters for Protection of Power System Apparatuses	S. Yokoyama (Kyushu University/ CRIEPI)

Technical Committee on Electrical Wire and Cables (EWC)

Chairperson: Yasuo Sekii (Chiba Institute of Technology)
Secretaries: Toshihiro Nakagawa (J-Power Systems Corp.)
Assistant Secretary: Katsuji Nakaya (Exsym Corporation)

Technical Committee on Electrical Wire and Cables (TC–EWC) is a committee organized to support the IEEJ Power and Energy Society, and includes members from universities, power and communication utilities, the JR railway company and cable manufacturers. The technical committee hold technical meetings to promote R&D activities in this field and provides an opportunity to present the results of technical achievements. Three technical meetings are planned for this year. One of the meetings was held as the joint meeting with TC-DEI, on June 21, 2002, in Chiba, and focused on the subject of “Space Charges and Cable Insulation”. In addition to organizing such technical meetings, the technical committee supervises investigation committees dealing with subjects, which are related to electrical wire and cables. During the several years of activity, investigation committees such as the Investigation Committee for DC Cable Systems, the Investigation Committee for Technology of Wires and Associated Accessories for Overhead Transmission lines, and the Investigation Committee for Computer Software and Its Application for Power Cable Lines were organized. These investigation committees have published technical reports such as the report entitled “Recent Technical Trends in DC Cables” and “Recent Technical Trends in Overhead Power Transmission Lines”. Last year two investigation committees were organized. The names and chairpersons of the committees are listed in Table 1 The two committees are continuing their actions this year. The TC-EWC usually meets 4 times a year. Occasionally a technical visit by the committee members is made to encourage study on the advanced science and technology. This year, the committee members visited the Yokosuka Laboratory of CRIEPI (Central Research Institute of Electrical Power Industry) to observe the most advanced testing facilities including a 66 kV high-temperature super-conducting cable test circuit.

Table 5 Investigation Committees in TC-EWC

Research Subject	Chairperson
Investigation Committee for Degradation and Corrosion of Wires for Overhead Power Transmission Lines	T. Kikuchi
Investigation Committee for Cables and Accessories for 20 kV Power Distribution Cable Lines	S. Nishimura

IEC Japanese National Committees Related to Electrical Insulating Materials

IEC TC10 Japanese National Committee

Chairperson T. Ishii (Yuka Industries Co.,Ltd)
Secretary T. Takahashi (Fujikura Ltd)

IEC TC 10 is responsible for standards of fluids (insulating liquid and SF_6) for electrical equipments. Japanese National Committee consists of 19 experts from universities, manufacturers of power apparatus, cables and insulating oils and testing companies. Current main items under consideration are IEC60296 (specification for mineral insulating oil), IEC60480 (guide for the checking of SF6 from electrical equipments), IEC60422 (maintenance guide for mineral insulating guide) and IEC60567 (guide for dissolved gases analysis of oil-filled electrical equipments) etc. As for the relevant activity, the adjustment between JIS (Japanese Industrial Standard) and EIC is investigated in JPI (Japanese Petroleum Institute).

IEC SC15C Japanese National Committee

Chairperson Yoshiaki Yamano (Chiba University)
Secretary Yoshio Wakashima (Japan Electrical Safety & Environment Technology Lab.)

SC15C is under the influence of TC15(insulating materials), and takes charge of standardization for the specifications of insulating materials. Its working sphere is full of variety, involves the inorganic materials such as mica products and ceramics, the organic materials such as paper, film and varnish and their combinations such us laminated board and coated sleeving, and so on. Accordingly, there are particular much number of enacted standards and working projects. SC15C establishes 5 WGs and 4 MTs, and strives to synthesize the standards each other as far as possible and standardization for the newest material related to aerospace.

National committee of SC15C has been held the meeting 4 times in a year. The circular documents sent from Central Office during a period of last 1 year were 39 standard documents, 35 voting results or compiled comments, 38 maintenance cycle reports and 3 others, consequently 115 in total, they have been decreasing in order by the synthesis of related standards.

Since the meeting of Frankfurt in 2,000, national committee has been sending the delegates to each SC15C meeting of Bucharest and Boston. For the activities on the working groups, the expert cooperates with only WG5(flexible insulating sleeving) now, but, national committee is discussing to cooperate with WG7(reactive resinous compound and varnish) and MT10(flexible combined material).

IEC SC15E Japanese National Committee

Chairperson E. Watanabe (Tokyo Metropolitan University)

IEC SC15E deals with standards of testing methods for electrical insulating materials. SC15E is composed of four task groups, each of which manages some IEC documents concerning to designated standards and fields. SC15E Japanese National Committee consists of 24 experts from universities, laboratories and manufacturers and users of insulating materials. The committee recently contributes for the revision of IEC 60112 (Tracking test), IEC 60216 (Thermal endurance) and IEC 60544 (Radiation Endurance). And more, the committee often plays a role of the committee for enactment/ revision of JIS standards.

IEC TC98 Japanese National Committee

Chairperson S. Kobayashi (Niigata College of Technology)
Secretaries K. Kimura (Kyushu Institute of Technology),
T. Okamoto (Central Research Institute of Electric Power Industry)

IEC TC98 was established in 1994 after disbanded TC63 to prepare IEC documents on Electrical Insulation Systems (EIS). TC98 plays an important role as Horizontal Technical Committee. The international meeting of TC98 has been held once a year since 1995. The 7th meeting was held in London, Japan in Oct.2001. TC98 Japanese National Committee consists of experts from METI (Ministry of Economy, Trade and Industry), universities, laboratories and manufacturers of power apparatus, cables and instruments. The Japanese committee has large contribution to WG activities on thermal evaluation (WG6) and voltage endurance of EIS under repetitive impulses from power electronics (WG4) and Maintenance Team 7 and 8.

Progress Report of IEC SC36C

IEC Sub-Committee 36C (Secretariat: Japan) is working on establishment and revision of IEC standards on insulators for substations. In a past year, it has issued two committee drafts on hollow ceramic insulators and on composite station post insulators. The draft on hollow ceramic insulators has slightly been modified according to the comments provided by National Committees and will be finalized as an FDIS (Final Draft International Standard) shortly. The SC36C has decided to set up a maintenance team to revise the standard on composite hollow insulators and issued the document to invite the National Committees to nominate members for the maintenance team. The next meeting of the SC36C will be held in Beijing, China, in October 2002 to discuss abovementioned matters and new work items for standardization.

ACTIVITIES OF THE TECHNICAL COMMITTEE ON DEI IN IEEJ

Digest Reports of Investigation Committees in DEI

Investigating Committee on Development of Dielectric and Electrical Insulation Technology to Organic Molecular Device Engineering

Mitsumasa Iwamoto (Tokyo Institute of Technology)
Mitsuyoshi Onoda (Himeji Institute of Technology)
Akihiko Sugimura (Osaka Sangyo University)

Purpose of establishment

The committee started in January 2000 by 22 members to investigate and discuss the interfacial electronic phenomena and functional properties of organic thin films and will be continued until 2002.

As organic materials have excellent insulating and dielectric abilities, they play an important role as covering and insulating materials for power and communication cables and other electrical equipment. However, recently the techniques of constructing highly-ordered and super-structured organic films have developed rapidly and its achievements and also essential electronically and optically functionality of organic materials have become a center of attraction. In order to utilize their functions sufficiently, the understanding on the electronic phenomena and electronic energy states on the order of nanometer scale at the molecular films/electrode interface and between quite different molecular films interface is indispensable. It seems to be the most probable that highly-ordered organic thin films will be put to practical use as an intellectual films with learning effects, *etc*. from the completely new viewpoints in the electrical and electronic fields. In the present situation, we are under investigation mainly that what the electronic and optical properties at the interface of highly controlled organic thin films were clarified by what kind of techniques so far, what types of their intellectual functionality were studied so far from the viewpoints of the electronic and optical properties and then what are the subjects of this matter for a future study, *etc*. That is,

[1] Trends and topics on the nanometric interfacial controlled molecular devices.

[2] Control and electronically and optical functions on charge transfer at the nanometric molecular-interfaces and trends and topic on their evaluation techniques.

[3] Relationship between electronic states and injection mechanism at the nanometric molecular-interfaces and topics on the injection type organic devices.

[4] Trends and topics on the molecular dynamics and modification of organic materials.

[5] Trends and topic on the interfacial phenomena in the dielectric and electrical insulation technology.

[6] Trends and topics on the fabrication of the organic molecular devices and their application to information systems.

[7] Other trends and topics concerning the interfacial phenomena for organic materials.

Activity

Since the establishment of this committee, the study meeting was held 14 times up to August 2002. In April 20, 2001, this committee gave a course in trends and topics on the electrical and optical functionality and evaluating technique for highly-controlled organic alignment films sponsored by Tokyo chapter, IEEJ. Furthermore, the special issue entitled “Present Status and Future Scope of Organic Molecular and Material Electronics” had been published in the Transaction of IEEJ, part A in July, 2001, and also The 1st International Discussion & Conference on Nano-Interface Electronic (IDC-NICE) Devices had been held at KyongJu, Korea on July 16-20, 2001 (The papers presented there had been published in a special issue of KIEE International Transactions on Electrophysics and Applications on April, 2002, and The 2nd IDC-NICE Devices will be held at Busan, Korea on October 28-30, 2002. The three years activity of the committee will be published in Technical Report of IEEJ.

Investigation Committee on Functions of Organic Molecular Films and Organic/Inorganic Composite Films

Futao Kaneko (Niigata University)
Yasuo Suzuoki (Nagoya University)
Keizo Kato (Niigata University)
Kazunari Shinbo (Niigata University)

The committee was established in July 2000, with the term of three years. The investigation has focused attention on the functions of organic thin films, molecular ultrathin films and organic/inorganic composite films related to:

(1) fabrication techniques and functions of organic molecular ultrathin films,

(2) composite techniques and functions of organic/inorganic materials,

(3) evaluating techniques of ultrathin films, and

(4) properties of ultrathin film interfaces and device applications.

There were thirteen meetings up to September 2002 and four meetings of them were held for visiting distinguished laboratories in Japan, that is, Chiba University, Nagoya University, Tokyo Institute of Technology and so on. Some lectures were also given about the above subjects by non-member researchers at the laboratories. In other meetings, the committee members introduced their researches and the related papers, and earnest discussions were done.

The results of the investigation will be summarized at the end of the term as a technical report mainly for the fabrications, evaluations, functions and applications of organic thin films, molecular ultrathin films and organic/inorganic composite films.

Investigation Committee on Advanced Measurement Methods on Partial Discharges in Electrical Apparatus

Ken Kimura and Masayuki Hikita (Kyushu Institute of Technology)
Naohiro Hozumi (Toyohashi University of Technology)
Naoshi Hirai (Waseda University)

According to deregulation policies all over the world, electric utilities have to compete each other and against independent power producers (IPP) in price and quality of electricity. For cost reduction of power generation, availability of facilities in power stations (PS) should be improved using advanced technology. One of the approaches is so called condition-based maintenance (CBM) with multiple on-line monitors.

In the case of rotating machines too, on-line partial discharge (PD) monitors have been intensively developed and commercially available at present. Generally, newly developed monitors tend to adopt higher frequency in detecting circuits to avoid the noise in lower frequncy regions. On the other hand, rotaiting machines have large inductance and capacitance along windings, which cause the deformation of original wave form of PD pulse during propagation from PD source to detecting couplers. So more discussions and cautions are necessary for practical application of the monitors as CBM tools.

Recently IEEE Power Engineering Society has issued a new guide: IEEE Std 1434 -2000 “IEEE Trial Use Guide to the Measurement of Partial Discharges in Rotating Machinery”. The standard involves important and beneficial information especially for maintenance engineers.

Dielectric and Electrical Insulation Technical Committee, IEE Japan has also strong concerns on on-line PD measurements of rotating machines with above–mentioned reasons and started a new investigation committee. The new committee started January 16th, 2001 with 20 members from electric power utilities, universities and manufacters. Based upon the bibliography of IEEE Std 1434, original papers on PD monitoring including Japnese papers are investigated in detail. Final Technical Report will be issued from IEE Japan in 2003.

Investigation Committee on Environmentally Friendly Materials for Electrical Engineering and Electronics and Systems

Yasuo Suzuoki (Nagoya University)
Ryozo Takeuchi (Hitachi, Ltd.)
Masayoshi Ishida (University of Tsukuba)

To cope with the increasing environmental problems, environmentally friendly technologies for materials, devices, apparatuses and systems have become increasingly important. Efforts have been made to develop measures against environmental problems, e.g. lead-free solder, alternative gas for SF_6, material recycling of home appliances and so on. They have, however, just started and in many cases remain within the framework of the existing present technologies. The objectives of this committee are to make systematic investigation on the state of the art and the trend of the measures against environmental problems and to clarify the guiding principle for the research and development of the environmentally friendly future technologies in the field of materials for electrical engineering and electronics and systems.

The committee is to investigate the following.

1. Trend of environmentally friendly technologies for material and apparatus production
2. Trend of environmentally friendly technologies for material development and apparatus design
3. Environmental impact of apparatus operation
4. Trend of environmentally friendly technologies for dismantling, disposal and recycling
5. Possibility of establishing new cooperative research projects

Through the systematic investigation, the committee is also expected to propose a new project to be carried out with the cooperation of industries, universities and the government.

The committee started in March, 2002 with the term of two years. The 17 members are from universities and industries. To begin with, the committee has started systematic survey of published papers and articles, and has planned investigation tours to recycling sites and so on.

The results of the investigation are to be reported not in the form of usual technical report but at a symposium during the annual convention of IEE of Japan and at a research meeting.

Investigation Committee on Degradation of Insulating Properties and Endurance of Impulse Surge for Printed Wiring Board

Yoshiaki Yamano (Chiba University)
Katsuhiko Shutoh (Tokyo Science University)
Shouzo Yoda (Hioki Electric Co. Ltd.)
Katsuhiro Okamoto (National Research Institute of Police Science, Japan)

Electronic equipment is becoming small in size, light in weight, and high in performance. The printed wiring boards for the equipment are designed in fine and high density with multi-layers, which result in small distance and high electric field strength between the foil conductors on the board. The insulating failures may occur on the board under such conditions mentioned above. Therefore, an insulating reliability comes up to an important problem for the design of electronic equipment and systems. However, the study on the insulating reliability for the printed wiring board has not yet been systematically carried out.

One of the reasons for this may come from a low operating voltage in the electronic circuit. Furthermore, it may be impossible to evaluate the long term reliability of the board, because the electronic products today must be designed within short-range term due to a request of market and high speed development of new devices.

From these viewpoints, a new investigation committee has started in April 2002 with 24 members. The main subjects of the committee are as follows.

(1) Systematical survey on the insulating failures due to the ionic migration for printed wiring boards, including test methods for the evaluation of the board and its mechanisms for the migration process.

(2) Study on the reliable data for insulating strength between the conductors at the high voltage surge application (surge endurance), including the round robin test by the members.

Now we are collecting the papers and reports on the ionic migration and planning the round robin test for the surge endurance of the board. The final technical report will be issued from IEE Japan in 2005.

Investigation Committee on the Evaluation of Discharge Property and Degradation Phenomenon on the Surface of Polymer Insulating Materials

Kazutoshi Goto (Consultant)
Tetsuro Tokoro (Gifu National College of Technology)
Hiroya Homma (Central Research Institute of Electric Power Industry)
Yoshihiko Hirano (Toshiba Corporation)

The application of polymer insulator has expanded in the filed of power supply and distribution system all over the world. But polymer insulator has been demanded to solve the challenging subjects on a long-term reliability and diagnosis techniques in the real application field.

The new investigation committee started April 1st 2002 with 23 members from electric power utilities, universities and manufactures. It was succeed former investigation committee, “Assessment and Improvement of the Interface in Composite Electrical Insulation” included two sub working groups. The one of WGs had investigated the fog chamber test method of CIGRE WG 15.04 and discharge properties of polymer insulator material. This WG had several useful results on the round robin test of the fog chamber test and measurement techniques of leakage current for polymer specimen.

The main subjects of the new committee are as follows.

1. Discharge mechanism and Recovery mechanism of hydrophobicity at the surface of polymer insulating materials.
2. Degradation mechanism of the target materials.
3. Leakage current measurement technique.
4. Evaluation technique of the degradation.
5. Accelerated ageing test and Exposure test.

The new committee is focusing to investigate the polymer’s long-term ability by the relation between the discharge amount and the degradation phenomenon of the material’s surface. The separative measurement of the leakage current and so on are also investigated to improve the diagnosis technique of polymer’s long-term reliability.

The final technical report will be issued from IEE Japan in 2005. This committee is also related to CIGRE WG15.14, “Material properties for non-ceramic outdoor insulation”.

Cooperative Research Committee on EINA Magazine

Chairperson T. Tanaka (Waseda University)
Secretary Y. Maruyama (Furukawa Electric Co. Ltd.)
M. Kozako (Waseda University)
H. Kaneiwa(Toshiba Corporation)

HISTRY OF COMMITTEE

Preceding committee (Cooperative Research Committee (CRC) of Asian Interlink on Dielectrics and Electrical Insulation) worked from Jan. 1991 to Dec. 1992. The committee reviewed the present status of scientific and technical cooperation in the field of
dielectrics and electrical insulation among Japan and Asian countries and sought the appropriate ways to promote it.

As an important activity discussed in the committee, "CRC of Electrical Insulation News in Asia" (the chairman of the committee was Prof. H. Yamashiya, Keio Univ.) was established in Apr. 1994 and edited and published "Electrical Insulation News in Asia (EINA)" No. 1 (Sept. 1994), and No. 2 (Sept. 1995). As the EINA magazine was hoped to continue to be published, Prof. Yamashita chaired the CRC from 1994 to 1999 and published EINA magazines to No. 6.

In 2000, Dr. T. Tanaka succeeded to the activity and established a new CRC of EINA Magazine".

ACTIVITY OF COMMITTEE

The present committee has a Chairman, 3 secretaries and 27 members. It has a general meeting and two or three secretary meetings a year and discusses the activity and contents for the next edition o

The committee published EINA No.8 in November,
2001 and opened an EINA WEB SITE (**http://boss.eee.tut.ac.jp/eina/**) in March, 2001.

The committee will publish EINA No.9 (this EINA) in November, 2002 and enrich the content of the WEB page.

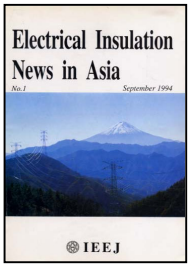
MAIN SUBJECTS OF EINA

Main subjects of EINA are as follows:

- Preface
- Outline of technical committees on Dielectric and Electric Insulation (DEI) and related TCs in IEEJ
- Activities of the Technical Committee on DEI
- Technologies for Tomorrow
- Technical Exchanges between Asian Countries
- Records and announcements of international conferences in Asia
- Introduction of laboratories in Asia
- Letters from readers
- Front and rear covers show color photos of the state of the art industrial products or experimental facilities and fundamental research achievements

This year International advisory committee was organized. Now the members are 10 persons in Asian countries. They are expected to give valuable
advice to EINA, and to initiate much more interaction in Asian activities for electrical insulation and related matters.

EINA Newsletter will be issued every two months to deliver fresh news that might attract many subscribers much more.



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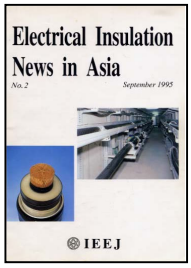

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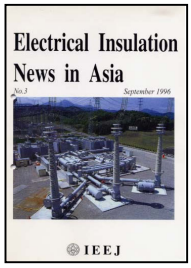

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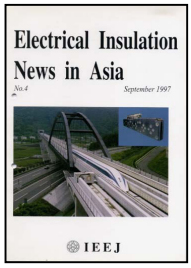

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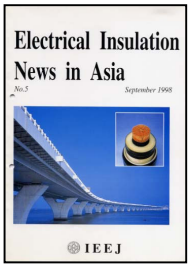

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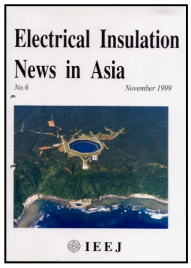

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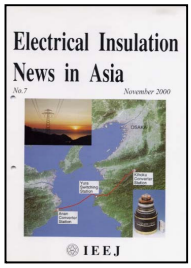

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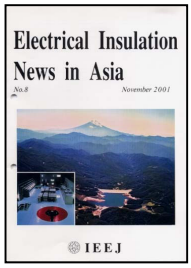

No.8 (2001)

Front Covers of Back Numbers

IEEJ Technical Reports Edited by TC-DEI and Related TCs

Technical reports listed here are made by investigation committees in the technical committee on DEI and related investigation committees since the publication of EINA No.8 (2001). They are described in Japanese.

No. 852 : "Environmental assessment and safety of gas insulated substation (GIS)",
(B), p.44, Nov., 2001, ¥2,200

No. 853 : "Low energy electron and ion dynamics and its simulation",
(A), p.84, Sept., 2001, ¥3,100

No. 854 : "Treeing deterioration mechanism and molecular morphology effect on it",
(A), p.50, Feb, 2002 , ¥2,700

No. 857 : "Recent status of engineering of the composite insulator",
(B), p.86, Oct, 2001, ¥2,500

No. 858: "High temperature performance and its main factor of oil-filled cable and XLPE cable",
(B), p.92, Oct., 2001, ¥2,500

No. 860: "Injection method of plasma ion and its application", (A), p.60, Oct., 2001, ¥2,300.

No. 871: "Performance test of impulse measuring system" (B), p.56, Mar, 2002, ¥2,300.

No. 882: "Life limit and its estimation for insulation material", (A), p.78, Apr, 2002, ¥2,700

N. B. : (A - E) after titles mean a Society in which Technical Committees work :

A : Fundamentals and Materials, in which the TC-DEI is included
B : Power and Energy
C : Electronics, Information and System
D : Industry Applications
E : Sensors

¥ : Japanese Yen

By Yoshio Maruyama (Furukawa Electric Co., Ltd.)

Semiconducting glaze (SCG) insulator – The countermeasure against contamination problem

For most utilities all over the world, insulator contamination has been the greatest concern in terms of flashover and corona problems on power supply system.

As a countermeasure against the contamination problem, extensive laboratory research and field tests on semiconducting glaze (SCG) insulators have been conducted during past a few decades. After years of successful service experience in more than 15 countries, the SCG insulator has been increasingly acknowledged by power utilities for its superior anti-contamination performance. In the last 5 years, hundreds of thousands of SCG insulators have been supplied to both domestic and overseas market.

Hereafter some basic characteristics and performance of the SCG insulator are presented.

Unique characteristics of SCG insulators

Basically, the SCG insulator has the same profile, the same mechanical design with the ordinary glaze insulator. The only difference is the surface glaze, which is semiconductive for the SCG insulator while non-conductive for the ordinary glaze insulator.

The semiconductive surface glaze gives the SCG insulator two unique technical features.

(1) Surface drying effect

Under voltage application, a very small leakage current (normally less than 1mA) will flow through the glaze layer and generate Joule's heat to keep the insulator surface dry. It is well known that contamination flashover normally occurs when insulator surface is moistened by fog or drizzle, but in case of the SCG insulator, comparatively dry surface can improve insulator performance against contamination.

(2) Stress grading effect

For the ordinary glaze insulator, electrical stress concentration will take place around the pin, thereby causing partial discharges. These partial discharges grow further and eventually lead to flashover. On the other hand, the resistance of surface glaze of the SCG insulator keeps the voltage distribution very uniform to effectively suppress partial discharges. In this way, contamination withstand voltage of the SCG insulator can be dramatically improved.

Superior performance of SCG insulator

(1) Higher withstand voltage

When the insulator surface is contaminated and moistened, leakage current will increase and consequently lead to flashover over the whole insulator string. For the SCG insulator, the surface is kept dry and highly resistive due to the above-mentioned unique characteristics. Therefore, contamination withstand voltage can be dramatically increased. Under heavy contamination conditions, contamination withstand voltage of the SCG insulator is about 2-3 times higher than ordinary glaze insulator, and even compared with a polymer insulator, it is about 1.5 times higher.

Comparative test between SCG and other types of insulators is shown in Photo 1.

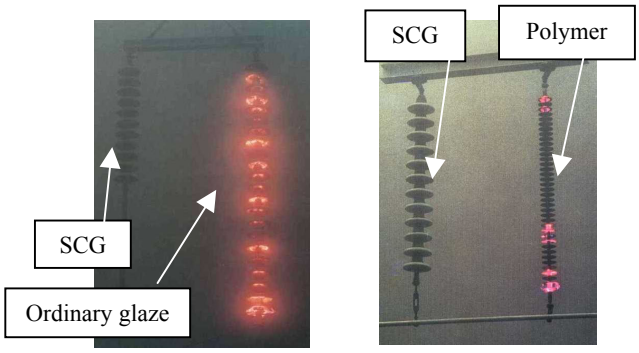

Photo 1. Comparative test on various insulators

(2) Less corona activities and RIV

Furthermore, the surface drying effect and stress grading effect also contributes to the reduction of corona activities and the RIV level. Corona activities of SCG and ordinary glaze insulators were compared on an actual 161kV transmission line. As is evident from Photo 2, no any corona discharge is observed on the SCG insulators while intense corona discharge is observed on ordinary glaze insulators.

Photo 2. Corona activities on actual transmission line

By Engineering Department, Insulator Division
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http://www.ngk.co.jp/index_e.htm

New Insulation Structure for Shell-Form Transformer

New insulation structure for shell-form transformers has been developed to optimize dielectric strength and cooling efficiency. Tapered joint of pressboard barriers in the oil/paper insulation structure enabled minimization of oil gap length and formation of uniform gap length between the barriers, which greatly enhanced dielectric strength of the barrier system. By use of nonwoven fiber, elimination of leakage oil flow was realized in the insulation space. This not only improves cooling efficiency but also reduces static electrification by oil flow. Excellent improvement in dielectric strength as well as static electrification was confirmed by the test results of the full-scale model transformers shown in Fig.1.

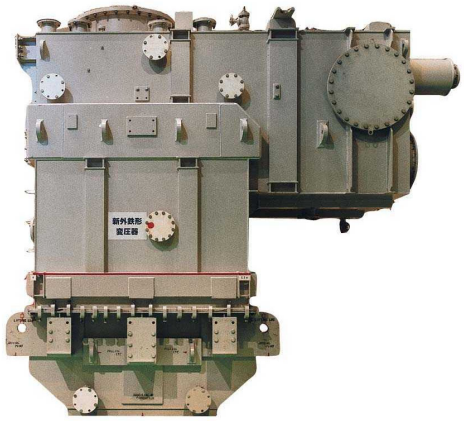

Fig.1 Full-scale model transformer (500kV).

Optimization of oil/paper compound insulation

Fig.2 (a) shows a cross-section of a conventional insulation structure around windings of shell-form transformer. Oil space is divided by pressboard barriers, which is generally aligned perpendicularly to the electric field. Each barrier structure is composed of several pressboard barriers, which is lapped with each other to avoid loose joints between the two pressboard barriers. Difference in oil gap length is created in each oil duct along the lapping structure. The electric field strength of partial discharge inception for longer oil gap is much lower than that for shorter gap. As the gap length nears pressboard thickness, the effect of the difference in gap length on discharge inception stress becomes larger and the difference in dielectric strength from place to place widens. Under these considerations, the ideal structure for barrier insulation was invented as shown in Fig.2 (b). The new insulation structure realized the uniform oil gap length between the pressboards by use of tapered joint at the lapping part of each pressboard. The superiority in insulation strength of the new structure was confirmed as shown in Fig.3.

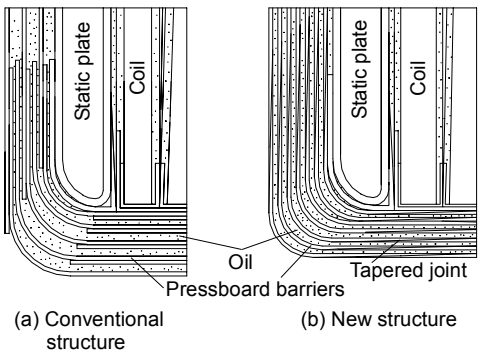

Fig. 2. Pressboard barrier structure around windings.

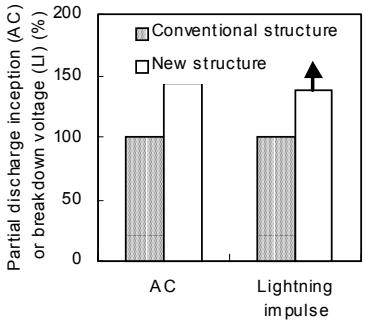

Fig. 3. Dielectric strength of the new insulation compared with conventional one, AC partial discharge inception and impulse breakdown.

Blockade of leakage oil flow in the insulation systems

Cooling of the shell-form transformer was realized by oil flow along the coil surface. In the conventional insulation system, unnecessary leakage oil flow has not been negligible compared with oil flow which contributes to cooling. The leakage oil flow was an additional source of static electrification of oil. Regarding improvement of static electrification, elimination of unnecessary oil flow was realized by use of nonwoven fiber as blockade as shown in Fig.4. Test results for a model transformer of the new structure showed drastically reduced static electrification of 1/4 that in the conventional transformer and also suggested design

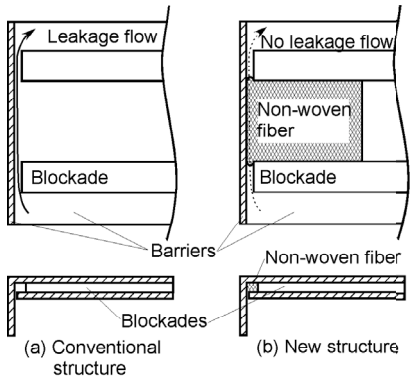

Fig. 4. Arrangement of nonwoven fiber form blockade in the oil flow path.

feasibility to increase cooling efficiency without endangering static electrification. Improvement of both cooling efficiency and static electrification was achieved by introduction of the new structure.

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RESEARCH ACTIVITIES AND TECHNICAL EXCHANGES IN ASIAN COUNTRIES

Conference Records

The 6th Korea-Japan Joint Symposium on Electrical Discharge and High Voltage Engineering (2001 J-K Symposium on ED & HVE)

The 6th Japan-korea Joint Symposium on Electrical Discharge and High Voltage Engineering was held on Nov.1-2, 2001, in Miyazaki Municipal University, Miyazaki, Japan. The first symposium was held in Kumi, Korea, in 1996, and since then it has been held every year in Japan and Korea by turns, organized by Electrical Discharge and High Voltage Society of KIEE and the Technical Committee on Electrical Discharge of IEEE, Japan. The chairperson of the symposium was served by Prof. C. Honda. The symposium has been planned to provide the opportunity for scientists and engineers, especially for the Master and Doctor course students as well as younger researchers in each countries, to mutually exchange and discuss the scientific and technological ideas, information, practical experiences on electrical discharge and high voltage engineering research field they are involved.

One hundred twenty four researchers (Japan: 89, Korea: 35) attended the symposium, and 80% of them are younger researchers. Eighty five papers (Japan: 60, Korea: 25) are finally accepted and published in *the proceedings of 2001 Japan - korea Joint Symposium on Electrical Discharge and*

Photograph of all participants in 2001 J-K Joint Symposium on ED & HVE

High Voltage Engineering.

A total of ten sessions involved papers covering the wide variety of topics such as the surge analysis, environmental and industrial application, fundamental of electrical discharge, detection of PD and AE, field measurement, lightning discharge, electrical breakdown in gas/liquid/solid insulators, polymer insulators, EMC, bio-electromagnetism, distribution technology, and so on. In particular many papers from both countries deal with the application of the plasma technology to the environmental treatment and thin film production, and diagnostics of the electrical insulation by using the PD detection technology. Some of the papers presented by Japanese researchers propose the introduction of functionally graded materials (FGM) as an insulation material, which lead to the new concept of solid insulation. This symposium is the first international conference for many Japanese students to attend, and provides the first and valuable experience to communicate with each other in English, which is exactly what this symposium aims at.

The next K-J Joint Symposium on ED & HVE will be held at Miyazaki Municipal University, Miyazaki, Japan, in 2001. It will be chaired by Prof. , Korea.

By Noriyuki HAYASHI（Kyushu University）

2001 International Symposium on Electrical Insulating Materials (ISEIM 2001) and 2001 Asian Conference on Electrical Insulation Diagnosis (ACEID 2001)

ISEIM 2001 and ACEID 2001 was held at Hotel Sungarden in Himeji, Japan on November 19-22, 2001, sponsored by IEE-Japan Technical Committee on Dielectrics and Electrical Insulation and technically co-sponsored by IEEE DEIS.

4th International Conference on Electronic Processes in Organic Materials (ICEPOM-4)

The conference was held in Lviv, Ukraine on June 3-8, 2002.

International Conference on Electrical Engineering 2002(ICEE2002)

The International Conference on Electrical Engineering (ICEE) 2002 was held at Lotte Hotel in Jeju Island, Korea, from July 7 to 11, 2002. ICEE aims at providing a forum for sharing knowledge, experiences and ideas among worldwide electrical engineers. ICEE is held every year, hosted in turn by the Institute of Electrical Engineers of Japan (IEEJ), the Korean Institute of Electrical Engineers (KIEE), the Chinese Society for Electrical Engineering (CSEE) and the Hong Kong Institute of Engineers (HKIE). ICEE2002 was organized by KIEE and co-organized by IEEJ, CSEE and HKIE. The ICEE papers cover the following wide topics.

*Power System Engineering
*High Voltage Technologies
*Materials
*Power Electronics
*Electrical Machines
*Control and Automation
*Communication and Information
*Applied Superconductivity
*Micro Machines
*Diagnosis and Sensing Systems
*Other Related Topics

Jeju Island is the biggest island in Korea, with a mild climate and subtropical environments. Many tourists from Japan visit there, since it takes only one-hour flight from Fukuoka. Some of the World Cup football gates took place in Jeju Island.

A total of 549 participants from eleven countries and regions (Japan: 151, Korea: 363, China: 22, Hong Kong: 6, others: 7) attended ICEE2002. At the Opening Ceremony, after the welcome address by Prof. Kawk, Hee-Ro, the President of KIEE, the keynote speeches were made by IEEJ, CSEE and HKIE. Mr. Takeshi Taneichi, the President of IEEJ made a presentation entitled “Japan’s Offered Technologies to Asia and the World”. The speech referred to how the R&D activities in electrical engineering are being promoted in Japan, and also mentioned some examples of advanced technologies that Japan can offer to Asia and the world.

713 abstracts were submitted, and 563 papers (Japan: 140, Korea: 375, China: 28, Hong Kong: 9, USA: 3, Spain, Sweden, Russia, Oman, Iran, Indonesia and Taiwan: 1 each) were finally accepted.

Thirty-eight oral, 4 poster and 3 panel sessions were organized, and active presentations and discussions were made. Twenty-five papers related to the high voltage technologies were presented.

Representatives of KIEE, IEEJ, CSEE and HKIE at ICEE2002 Opening Ceremony.

The Welcome Reception, Banquet, and Technical Tour were also organized. In the Tour, the participants visited the Hangwon Wind Power Station, where 15 windmills with a total installed capacity of 10MW are in operation. At the Banquet, some folk dances and songs were performed by dancers with traditional fascinating costumes. The audiences enjoyed the old culture of Jeju Island.

At the Representative Meeting, in which the representatives of the four institutes participated, it was agreed that ICEE2003 will be held in Hong Kong, from July 6 to 10, 2003, and ICEE2004 will be held in Sapporo, Japan, in July 2004. The dead line of submission of abstracts and full papers will be Dec.31, 2002 and Apr. 1, 2003 respectively.

Year	venue	participants	paper
1994	Tokyo (Japan)	N/A	55
1995	Tejon (Korea)	217	148
1996	Beijing (China)	343	350
1997	Matsue (Japan)	288	182
1998	Kyongju (Korea)	441	476
1999	Hong Kong	340	328
2000	Kitakyushu (Japan)	379	288
2001	Xi’an (China)	378	419
2002	Jeju Island (Korea)	549	563
2003	Hong Kong		
2004	Sapporo (Japan)		

ICEE is getting more and more important as a venue to exchange information regarding electrical engineering in Asia. We, ICEE Japan National Committee, expect that much more researchers and engineers from many countries and regions will join and participate in ICEE to make a greater contribution to Asia and the world.

By Secretariat of ICEE Japan National Committee

IEEE/PES Transmission and Distribution Conference and Exhibition 2002: Asia Pacific

The conference and Exhibition was the 1st International Conference and Exhibition on Transmission and Distribution in the Asia Pacific region. The Conference theme, "New Wave of T&D Technology from Asia Pacific", focuses on powering advantages in worldwide T&D technology from the Asia Pacific region, in line with today's expanding, diversified and transfiguring power systems.

It was held at "Pacifico Yokohama", Pacific Convention Plaza Yokohama, Yokohama, Japan on October 6-10, 2002

Announcement of International Conference to be held in Asia

International Conference on Insulation Condition Monitoring of Electrical Plant (ICMEP'2003) and Asian Conference on Electrical Insulation Diagnosis (ACEID'2003)

The conference will be held in Chongqing, China on April 15-18, 2003.

Technically sponsored by: CIGRE SC12 (Transformer)
IEE (Institute of Electrical Engineers, UK)
IEEE (Institute of Electrical and Electronic Eng.)
CSEE (China Society of Electrical Engineering
Chongqing University

Inquiry to: Secretariat
College of Electrical Engineering, Chongqing University, Chongqing 400044, P.R. China
E-mail: secretariat@mails.cqu.edu.cn
Phone:86-23-65106818, Fax:86-23-65106588,
URL: http://www.cqu.edu.cn/qitaxinxi/huiyizhengwen/meeting/index.htm.

7th International Conference on Properties and Applications of Dielectric Materials (ICPADM 2003)

June 1 – 5, 2003 Meitetsu New Grand Hotel, Nagoya, Japan
Sponsored by: IEEE Dielectrics and Electrical Insulation Society (DEIS)
Cosponsored by: IEE Japan.

Invitation

The 7th International Conference on Properties and Applications of Dielectric Materials (ICPADM2003) will be held at Meitetsu New Grand Hotel in Nagoya, Japan on June 1 - 5, 2003. The previous three conferences were held in Brisbane, Australia (1994), Seoul, Korea (1997) and Xi'an, China (2000) and were successful with more than 250 participants and 250 papers. The purpose of this conference is to provide a forum for researchers, scientists and engineers from all over the world to exchange ideas and discuss recent progress in electrical insulation, dielectric materials, test and measurement techniques, and

related problems from basic properties to practical applications. The organizing committee cordially invites you to participate in the conference

Location

Nagoya is readily accessible within 30 minutes by shuttle bus from Nagoya International Airport that is served by 24 international airlines from and to 32 major overseas cities. Nagoya is located in the center of Japan, which means easy traveling all over the country. By Shinkansen (bullet train) it takes a mere 1 hour 40 minutes to Tokyo, 50 minutes to Osaka and only 40 minutes to the ancient capital of Kyoto. And you can also travel to Ise Grand Shrine within (grandest shrine in Japan) 1 hour 20 minutes, Ago Bay (world famous Mikimoto pearls) within 1 hour 30 minutes and Museum Meiji Mura (Park of Meiji period buildings) within 40 minutes by train.

Nagoya boasts many places of cultural, industrial, historic and aesthetic interests, such as Nagoya Castle, Atsuta Shrine, The Tokugawa Art Museum, Noritake Craft Center, Toyota Commemorative Museum of Industry and Technology, Toyota and NGK headquarters, Arimatu (tie-dyeing kimono fabric and rows of traditional houses and shops) etc. Public transportation within the city includes subway, bus and rail, all of which are easy and safe to use.

Main Topics

1. Electrical Insulation in Power Apparatus and Cables (GIS, Transformers, Rotating Machines, Cables, Capacitors, Insulators, Arresters, etc.)
2. Monitoring and Diagnosis of Insulation Degradation, Risk Management, Condition-Based Preventive Maintenance, etc.
3. Ageing and Lifetime Estimation
4. Partial Discharge, Treeing and Tracking
5. Dielectric Phenomena and Their Applications
6. Electrical Conduction and Breakdown in Dielectrics (Solid, Liquid and Gas)
7. Surface and Interfacial Phenomena
8. Space Charge
9. HV Power Electronics Device (Power Module) and Printed Circuit Board (PCB)
10. Eco-friendly Power Apparatus and Cables (Design, Materials, Recycling, etc.)
11. Dielectric Materials for Electronics and Photonics (Organic EL, Electronic Devices, Optical Devices, etc.)
12. New and Functional Dielectric Materials (Ceramics, Biological Materials, Soft-Materials, Nano-Materials, etc.)
13. Test and Measurement Techniques
14. Globalization of Insulation Technology (International Standards, etc.)

Language

The working language of the conference is English. All printed matter will appear in English.

Abstract Submission

You are invited to submit an abstract of not more than 200 words to the Conference Secretariat by November 1, 2002 preferably via e-mail (icpadm@nuee.nagoya-u.ac.jp). The abstract must include title, author's name(s), affiliation(s), mailing address, e-mail address, telephone and fax numbers. Acceptance or rejection notices will be mailed by late November 2002 to the corresponding author of submitted abstracts. The authors of accepted papers will be requested to submit camera-ready manuscripts by February 1, 2003. All accepted papers will be published in the Conference Proceedings.

Invited Lectures and Special Sessions

Invited lectures by distinguished researchers including Liu Ziyu Memorial Lecture are planned. Special sessions and keynote speeches on topics such as Insulation Diagnosis (GIS, XLPE cables, Transformers, Rotating Machines…), DC Insulation, Space Charge, Cryogenic Insulation, Organic Electronics, etc. are being planned.

Technical Tours

Technical tours to nearby industries such as Toyota Motor Corp., Chubu Electric Power Co. (275 kV GIL, 275 kV XLPE cables, Advanced Combined-cycle Power Plant, etc.) and NGK Insulators, Ltd. (High Voltage Laboratory and Insulator Plant) are being planned.

Sightseeing Tours

Optional sightseeing tours to Kyoto (Old Capital), Ise-Shima National Park (Ise Shrine and Mikimoto Pearl Island), Nagoya City (Nagoya Castle and Tokugawa Museum), etc. are being planned.

Registration Fees (In Japanese Yen)

	By April 1, 2003	After April 1, 2003
Member	¥ 45,000	¥ 50,000
Non-Member	¥ 57,000	¥ 63,000
Student	¥ 20,000	¥ 25,000
Accompanying person	¥ 10,000	¥ 10,000

Student Support A limited amount of financial support will be available for bona fide students. They must co-author and present at least one paper. They should submit a request for support to the Conference Secretariat by 1 February 2003, enclosing a letter of recommendation from their supervisor.

ICPADM 2003 WWW Site

More information about ICPADM 2003 is available at the following web site:

http://www.nagoya-u.ac.jp/ICPADM2003/index.html

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Important Dates

Abstract Due Date:	November 1, 2002
Manuscript Due Date:	February 1, 2003
Deadline for Pre-registration:	April 1, 2003
Conference:	June 1 - 5, 2003

Nagoya Castle with gold dolphins, traditional symbol of Nagoya

High Voltage Apparatus Laboratory in XIHARI, China

Xue Ye

Xi'an High Voltage Apparatus Research Institute (XIHARI), Xi'an, China

The high voltage apparatus laboratory, located within Xi'an High Voltage Apparatus Research Institute (XIHARI), Xi'an, China, is the largest high power, high voltage testing and research base in China. It has 118 staff members and 80 of them are technicians, occupying 70%. Among them, some are academic leaders with solid theoretical foundation and practical experience in the field of product testing of HV apparatus. Being designated by the nation as the competent authority for management of HV apparatus industry, the laboratory is mainly engaged in the product testing of HV apparatus and the relevant activities on development and research. In addition, it also undertakes responsibility for supervision, attestation and selective examination on the quality of HV apparatus products in cooperation with the government and the HV apparatus industry.

The laboratory consists of Business Office, High Power Laboratory, HV Laboratory, EMC Laboratory and Industrial Standard Department.

Besides doing management work for the laboratory, the Business Office is in charge of the reception and inspection of client commitments, the proposal of detailed items, parameters and requirements for the committed tests according to relevant methods, the organization, coordination and supervision of the testing work between labs., the status tracing of tested products, the analysis and summarization of test results, and the issuing of corresponding test reports. This office is the first window of the laboratory for providing relevant service to clients, such as the reservation for committed tests, the consultation, etc.

The High Power Laboratory is mainly engaged in the high-power testing of HV apparatus products and the research and development of new methods and techniques for high-power testing. This lab. has 2 sets of 12kV, 2500MVA and 1 set of 12kV, 500MVA short-circuit testing generators; large and small oscillating circuits with capacitor bank of 7.0 MJ; 3 sets of 154kV, 120GVA and 3 sets of 110kV, 90GVA short-circuit testing transformers and one whole set of equipment for temperature rising test, mechanic life test, peak withstand test and short-time withstand test. It possesses the ability to perform the 3-phase direct test for 12kV, 60kA circuit breakers and the 50kA breaking capability test for 1/2 pole of 550kV circuit breakers. While doing tests related with short-circuit breaking capability, electrical life, peak withstand test, short-time withstand test and mechanical life for HV switchgears, this lab. also performs tests, such as the short-circuit test for power transformers, the current flowing tests for reactors, line traps and enclosed bus-bars, the pressure release test for arresters, and the short-time thermal current withstanding test for HV brushings.

The HV Lab. is mainly engaged in the testing of HV insulating properties for HV apparatus and the study of related measuring and testing techniques. It has one set of 2250kV/1A cascade-connected power frequency transformer, one 4800kV, 480kJ impulse voltage generator, one 3-parameter (pressure, temperature and humidity) artificial-climate chamber with a diameter of 8m and a height of 8m, one large-sized, artificial pollution freezing test chamber, and one set of 100mA, 1500kV DC test equipment. This lab. possesses the ability to perform the HV dielectric test for HV apparatuses with a voltage level up to 750kV. In addition, it also carries out some researches on the long-term charging test and partial-discharge detection for 550kV HV apparatus, and the fault location for GIS.

The EMC Lab. has testing equipment, such as one combination wave generator with an open-circuit output voltage of 0.5-60kV, one fast, transient burst generator with an open-circuit output voltage of 0.25-4kV, one damped oscillatory wave generator with an open-circuit peak voltage of 250(-10%)-2.5(+10%)kV and one electrostatic discharge generator with an output discharge voltage of (20±5)%kV. It is able to perform the electromagnetic compatibility, immunity tests for HV apparatuses, such as the lightning surge tests, the fast, transient burst tests, the damped oscillatory wave tests and the electrostatic discharge tests.

The Industrial Standard Department is in charge of professional management for the HV apparatus industry in the planning of scientific and technical development, the evaluation of scientific achieve-

ments, the quality control of HV apparatuses, the type certification of products and the technical information, etc. It is also in charge of drafting the professional standards for HV apparatuses and responsible for the affairs related to IEC TC 17(High Voltage Switchgear and Control-gear), TC28(Insulation Coordination), TC42(High Voltage Test Techniques), SC17A(High Voltage Switchgear), SC17C(Metal-clad Enclosed Switchgear) and SC32A(High Voltage Fuses) in China. Meanwhile, this Dept. also participates in the activities related with the draft, revision and inspection of the relevant IEC standards in representative of Chinese National Committee.

For more than 40 years' development since its foundation in 1958, the laboratory has continued to improve its testing capability and the quality for testing. In 1990s, the laboratory took the technical renovation and reform as a major task in the laboratory construction. While doing research work for exploring new methods and circuits for large-scale testing, the laboratory, by introducing the latest digitized measuring techniques, computer-control techniques and circuit monitor techniques, has realized computerization and formed the network for the measuring systems, the control systems, the test-circuit simulation and calculation system, and the testing report management system.

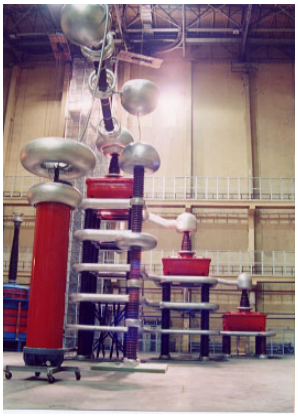
In the third-term project being under-constructed, 2 sets of 6500MVA extra-high power, short-circuit generators, and one set of double-circuit, synthetic testing system are being designed and developed. As a result of this project, the laboratory will possess the ability to perform the 63kA short-circuit breaking capability test for one whole (single) pole of 550kV circuit beakers, the 3-phase direct test for 12kV, 120kA circuit beakers, the short-circuit test for power transformers of 220 kV or less with a single capacity of 30-60 MVA and the operation tests for 500kV HVDC thyristor valve modules as well.

Being China National HV Apparatus Quality Supervision & Testing Center, the laboratory has frequent international technical exchanges and test cooperation with many foreign laboratories, such as KEMA, CESI and ABB. Many internationally famous electric-apparatus manufacturers, such as ABB, SIEMENS, VEI, Mitsubishi, etc, send their products, manufactured for sale in China, to the laboratory for testing. In recent years, the laboratory annually receives as many as 50 foreign-made or Sino-foreign cooperative products. On the other hand, some domestic large-demand users of HV apparatuses require the products that they ordered to be appended with the testing reports issued by this laboratory.

At the present, the testing service that the laboratory provides has covered more than 20 kinds of HV apparatus products. In the near future, the laboratory will continue to expand its testing range, for example, the product testing for power cables and cable accessories, and to expand its influence internationally. Meanwhile, the laboratory sincerely hopes to cooperate with HV apparatus manufacturers, users and laboratories, both domestic and abroad, to build itself toward an internationally oriented, large-sized and generalized HV apparatus laboratory.

Biography

Xue Ye was born in 1965. She is a senior engineer and is engaged in the development and research on testing techniques for HV electric apparatus products. She may be reached at No.30B, Northern Fenghui Road, Xi'an, Shaanxi 710077, China.
http: //www.xihari.com



2250kV, testing transformer

4800kV, 480kJ impulse generator

7.0MJ capacitor bank

Introduction to My Laboratory; Intelligent Material & Technology (http://imt.cbu.ac.kr)

Prof. Kee-Joe Lim, Ph.D.
School of Electrical and Computer Engineering
Chungbuk National University, Cheongju Chungbuk 361-763 Korea
kjlim@trut.chungbuk.ac.kr

Thank you for the opportunity to introduce my laboratory via the EINA magazine. Personally, it is my great pleasure to have a request from Dr. Toshikatsu Tanaka, Chairman of EINA Magazine Committee, to write an article on "Introduction to my Laboratory", which is a good chance for me to enhance cooperation activities with other laboratories in Asia.

Members

The laboratory, Intelligent Material & Technology (IMT) currently consists of a full professor, two cooperative professors, thirteen doctorial candidates, and eleven students in master programs. In IMT, fifteen undergraduate students are also working on their graduation projects.

Fig. 1. Seminar on HV research project.

Research activities

In IMT, there are three research teams: Diagnosis Technology in HV Apparatus, Piezoelectric Ceramics, and Flat Panel Display. IMT attracted USD 170 thousand in research funding from companies and government in this year. The research activities are described briefly as follows:

a. Diagnosis technology in HV apparatus

High voltage research at IMT Laboratory focuses on the fundamental research of material behavior in high electric fields and on the applications to electric power apparatus. A major concern is conduction, breakdown, dielectric, and degradation phenomena in solid, liquid, and gaseous dielectrics. Our works employ physical, mathematical, and computational modeling, as well as experimentation. Much of our current works are focused on the monitoring and diagnosis of degradation in transformer and GIS. For monitoring the apparatus, various sensors such as ultrasonic, EM wave, current, voltage sensors are under development. The figure 2 shows PD patterns detected by the developed ultrasonic sensor(right) and the commercial PD detector(left).

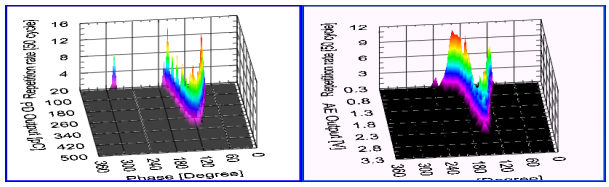


Fig. 2. n-ϕ -q pattern.

In the figure, the PD pattern detected by the developed sensor is similar to the pattern of commercial PD detector with the exception of weak signal level region. For identification of defects and evaluation of degradation, AI and fuzzy theory are also employed. The final goal of our works is to realize the reliable diagnosis system that can monitor and evaluate residual lifetime for the power apparatus.

b. Piezoelectric Ceramics

The Piezoelectric Ceramics Team's primary goal is to characterize and understand the electrical, microstructural, electromechanical properties of advanced piezoelectric ceramic materials. New piezoelectric devices are also designed and fabricated using the ceramics.

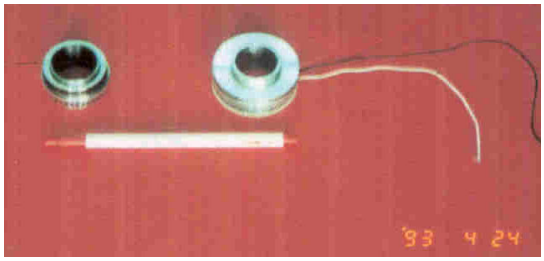


Fig. 3. Ring type piezoelectric motor.

As the results, various devices such as ring type piezoelectric(ultrasonic) motor, linear type piezoelectric motor, 1.5~40W piezoelectric transformers, and acceleration sensors have been developed during recent decades as shown in figures 3~5.

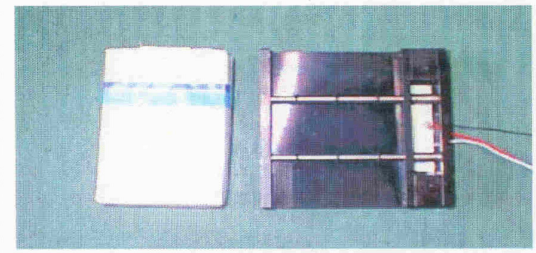


Fig. 4. Linear piezoelectric motor.

The disk type 40W transformer in figure 5 can be used the ballast of fluorescent lamp, which shows 95% in efficiency.

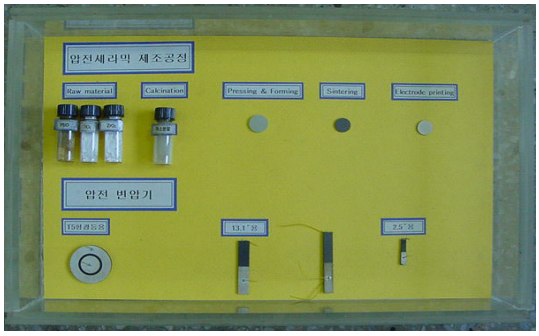


Fig. 5. Piezoelectric transformers (40, 8, 10, 1.5W).

At present, the piezoelectric vibrator for mobile phone and the step-down piezoelectric transformer for adaptor are developing. The ferroelectric thin film is also investigated for MEMS application.

c. Flat Panel Display

A few years ago, the Flat Panel Display team started and developed the flat type fluorescent lamp by using plasma technique for the application of backlight unit of large size LCDs, which has 1cm in thickness, 8,000nit in brightness as shown in the figure 6.

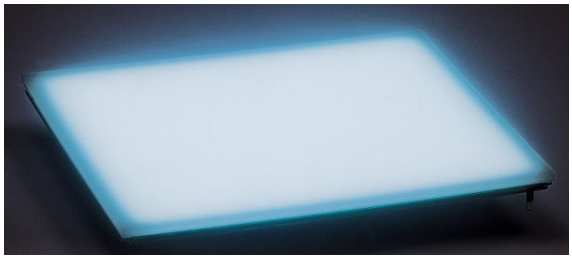


Fig. 6. Flat type fluorescent lamp(20inch).

At present the team is working for development of novel red organic electroluminescent devices that consisted of novel light emitting materials or dye.

International meetings held at Chungbuk National University

During recent decades several international conferences on material or high voltage technology were organized and held at Chungbuk National University in three times.

a. 1992 Korea-Japan Joint Conference on Electrical and Electronic Materials

The conference was held on 28~29 May, 1992 for the promotion of information exchange on the technologies in electrical and electronic materials and friendship between Korea and Japan, which chaired by Prof. Baek, President of KIEEME and Prof. Goro Sawa, Mie University. The conference consisted of 7 sessions covering diagnostic techniques, inorganic insulating materials, conduction and breakdown, interfaces, cable insulation, new dielectrics and functional materials. 38 papers including 11 papers from Japan were presented.

b. 1995 Korea-Japan Joint Conference on Prediction of Remnant Life and Insulation Diagnosis Technology on Power Apparatus and Systems

The conference was held on 26~27 May, 1995, which chaired by Prof. Bong-Heup Kim, Hanyang University and Prof. Kenji Matsuura, Osaka University. More than 50 people attended the conference with 21 papers and 2 invited papers by Prof. K. Matsuura and Prof. B. H. Kim.

c. Asian Conference on Electrical Insulation Diagnosis '99

The first ACEID was held on 18~23 November, 1999, which chaired by Dr. J. U. Lee, President of KIEEME, Prof. Kenji Matsuura, Osaka University, and Prof. Z. Yan, Xian Jiaotong University. More than 300 people from Japan, China, Germany, and Korea attended the conference with 99 papers including three invited papers by Prof. T. Hayami, Musashi Institute of Technology, Prof. Z. Yan, Xian Jiaotong University, and Prof. K.B.Cho, Hanseo University. The panel discussion on the problems of PD measurements and interpretation in power apparatus was also held at the conference. Three representatives from Japan, China, and Korea agreed to hold the conferences in Japan, China, and Korea alternatively in every two years.

The Introduction of the High Voltage and Insulation Technological Laboratory of Chongqing University

Sun Caixin
Chongqing University, Chongqing, China

The high voltage and insulation technological laboratory in Chongqing University carries scientific research and lab construction, developed special features, acrossing subject and durative innovation research direction, aiming at the electric power engineering and the important engineering item.

Experiment base:

(1) The experiment building of 1600m^2 area has main experiment equipments including YTDW-2000kVA/500kV/4A none partial discharge transformer for AC test and polluted environment, the short-circuit impedance of the test equipment is less than 6.0% under the rated voltage, 2400kV impulse voltage equipment, 100kA impulse current equipment, 10×8×5 grounding simulation pond and ϕ 5m impulse grounding sand pond, and the ϕ 8×11m large multi function manual weather room at domestic and international which can be used for studying exterior insulation characteristic of ultra-high voltage equipment under the higher-absolute altitude, the icing and polluted complex aerosphere environment.

(2) The high voltage experiment hall of an area of 600m^2 has the unique feature that it possesses the only AC test equipment YDL-900kVA(6A), whose Short circuit current is up to 30A ,and DC-600kV test device controlled by thyristors, ϕ 2×4 large multi function manual weather room which can be used for studying exterior insulation characteristic of electric equipment under the higher-absolute altitude, the icing and dirty complex aerosphere environment .

(3) The high voltage technology and system information monitoring research center of the area of 800m^2 has been built. Types of advanced test research system and devices in the center can be used for studying electric equipments on-line monitoring technology, steep pulse technology and its application. These devices include TEK-2467B/400MHz monopulse oscillograph, Hitach/100MHz digit storage oscilloscope, Octek/586 and GIS steep pulse simulation test system.

The laboratory depended on the unique test research base and undertook the 8 items of nationality nature funds including an important item, 10 items of national key technique, and a series of department and province key items, obtained some higher-level research fruits.

Present, the subject has formulated four sustain but stable research direction as following:

The high voltage insulation technique research under complicated air condition. A great lot of theory and test researches of exterior insulation and discharge characteristic in power system have been done under the lower-absolute altitude, the icing, poiiuted complex air conditions, and the achievements filled up the inland blank or are international to first in the level ,which is the specialists' opinion. These results were authorized to 8 awards including the third order award of national technology progresses and the technology progresses awards of department and province, and were adopted by nationality standard revision and quoted by the thesis of the domestic and international specialist. Remarkable technique economic benefit has been acquired since the advanced results were applied to 500kV alternating current(AC)and direct current(DC) transmission lines and power industry, including tian-gui line, ge-shang line , er-zi line, zi-rong line, and man-kun line. With the complete development of the west electricity east to send and the worsening of air pollution and acid rain inland, this field can be continuously developed and researched. The research equipments have the sharp superiority in the same subject inland, especially the ϕ 8×11m large multi function manual weather room.

The on-line intelligentized monitoring and fault diagnosis technique research of electric equipment. Our lab is one of the lab studying this direction foremost in China. The insulation monitoring and fault diagnosis technique as well as theory of the electric devices in substation keeps ahead inland, and on-line monitoring technique of various dissolved gas in oil of transformers filled up the inland blank. The something which are monitored and diagnosed are the dissolved gas in oil of transformers, partial discharge in transform-

ers, bushing of transformers, the grounding current of iron core of transformers, PT, CT, CVT, OY, MOA and high voltage switch. The sensitivity to the C_2H_2 is up to 1ppm, which is international to leading (the specialists' opinion). The synthesis monitoring and fault diagnosis technique has won second order award of nationality technology progresses, and 2 item invention patent has been published. Present, these products are commercial.

Overvoltage and grounding technology research in power system. Put forward the calculation method of the insulation lightning probability and insulation select of the transmission line, polluted flashover rate of the transmission line in the higher-absolute altitude region and the lightning fault rate , created the lightning shield model of transmission line. The new technology of optimized layout of grounding net and the grounding of the pole has been applied to the west power industry and the important engineering item of the west electricity east to send, and then remarkable economic benefit has been gained. The second order awards of technology progresses of national education commission and energy source department has been authorized to this technology.

High voltage new techniques research. We first came up with and long-term explored the mechanism, rule and criterion of the influence of the human body and surround environment of high voltage discharge and strong electromagnetic field, and the results filled up the inland blank. On the foundation of 863 item the exciter system of laser amplifier, we began to study using steep high voltage pulse to treat cancer, and obtained the created primary fruit, connected the electrical power geography information system (GIS) with on-line monitoring technology and power distribution administer. The cardinal research fruits in this field are international to leading at present. We will further study the influence of the west electricity east to send on the ecosystem environment, widen steep pulse appliance province on the foundation of principle of using steep pulse to treat cancer and practicability of its clinical application, integrate the GIS, on-line monitoring ,power distribution administer and energy administer together, and then extend the appliance of this achievements in the power system.

The introduction of academic headman professor Caixin sun

Professor Caixin sun was born in December 1944. He is a middle-aged expert who took a national-level outstanding contribution. Now he is a member of the group of Electrical Engineering subject of State Department Degree Committee, a director of Chinese Society for Electrical Engineering (CSEE) and a standing director of China Electrotechnical Society (CES), a member of Scientific & Technical consult tank for Chongqing government, and he is the director of the Key Laboratory of High Voltage Engineering and Electrical New Technology, Ministry of Education, the vice president of Chongqing University. Professor Sun has applied himself to the insulation of complex atmospheric environment and on-line intelligentized monitoring and diagnosis for running state of electric apparatus for a long period time. In recent years he has dealt with his research work to steep pulse and electrical GIS. In domestic he has taken the lead in studying the characteristics and properties of surface discharge under the surroundings of the effect of sleet covering, polluted, low pressure, rainning , and of the effect of acid humidity sedimentation. The achievements have been applied to West-East Electricity Transmitting Projects, power system and the related standards in China and abroad. He is one of the pioneers to research the technology of on-line monitoring and fault diagnosis for electric apparatus. The system of multi-parameter & function intelligent on-line monitoring and fault diagnosis has been researched successfully. The series equipments of single parameter on-line monitoring, especially the on-line monitoring and fault diagnosis of the dissolved gas in transformer oil has been on top of international level. Professor Sun has presided and studied the repetitive frequency 5Hz quasi- molecule laser amplifier main discharge excitation source system for China Academic of Engineering Physics and high voltage attenuator for Ministry of Aeronautics and Astronautics. These outcomes have filled up the domestic blank. The research of pulse power technology used in biomedicine has

Photograph of high voltage testing

acquired the first progress. He has taken charge of 8 National Natural Science Funds, 6 subjects of national large projects research, one 863 high technology and more than ten projects of ministry and province level, achieved 10 science & technology progress prizes of nation, ministry and province level, 3 public national patents of invention and gained one second prize for national science & technology progress and one first prize for national excellent teaching achievement, announced more than 160 thesis, published one monograph and one translation work. Professor Sun Caixin is the academic headman of this subject. His research domain is broad and wide and he can be timely to master the front line of the subject and be continuous to deepen and broaden the research direction.

MISCELLANEOUS

Photos on Front and Rear Covers

Front Cover: Meijo Substation
(Chubu Electric Power Company, Nagoya, Japan)

Meijo substation is under the surface of a parking lot across the street from the main gate of Nagoya Castle in Meijo Park. This is the first 275kV substation built of Chubu Electric Power Company under an urban park This started commercial operation in 1999.

Meijo substation is harmony with the surrounding environment. The buildings above ground at the substation are made in the traditional Japanese Style to harmonize with Nagoya Castle and surrounding environment. The small size of the equipments sealed in metal containers have made it possible to reduce the building volume and improve reliability.

The upper figure shows the cross sectional view of Meijo substation with Meijo park, Nagoya Castle and some buildings. The length of substation is 90m and the width is 86m and the depth is 32.5m. The B2F of the substation is parking lot for public. The B3F, B4F and B5F are the gas insulated switchgear (GIS) room, the cable laying room and the main transformer room (2 units) respectively. Gas insulated lines (GIL) are on B4F and B5F. Main transformer is a 275kV/154kV transformer with the capacity of 450MVA, enough to supply electricity for about 150,000 households. Instead of conventional oil, they are filled with SF_6 gas and perfluorocarbon fluid (PFC) both of which have superior performance for cooling and insulating.

The lower left photo shows the GIL (Shinmeika-Tokai Line) in south Nagoya. This is 3,250m in length. It is the longest record of large-capacity transmission over the world. It was being laid down in a tunnel throughout its length, with both ends connected to a gas insulated switch gear each. The lower right photo shows the GIS. This consists of bus conductors, circuit breakers and switches, enclosed in the metal container filled with SF6 Gas. Since GIS is adopted, the building scale became small, and the reliability of the machine could be improved.

(by Tsutomu Katase,
Chubu Electric Power Company,
Nagoya, Japan)

Rear Cover: 3-Dimesinal Image of Electrical Tree
(Nagoya University, Nagoya, Japan)

Electrical trees in insulating materials have been studied extensively for many years. Electrical trees have various shapes, for example, branch type, bush-branch type and bush type. Since the difference in tree shape is caused by many factors (e.g. aging time, material, electrical stress), it is important to analyze the tree shape exactly so as to clarify the mechanism of electrical treeing. The several methods have been used for visualizing the 3-dimensional structure of electrical trees. There are, for example, the sectioning method (serial sectioning method), the CT method, and the ultrasonic method. A laser scan microscope (LSM) provides another method to observe a tree 3-dimensionally.

The upper figure shows the 2-dimensional image of an electrical tree in an EAA block with an optical microscope. The tree channels propagate from the tip of needle electrode on the left-hand side to the right-hand side of the figure. The tree is a branch type tree.

The lower figure shows the 3-dimensional tree image with a LSM. The observed tree is the same as in the upper figure. The color of tree channels means the depth from the upper surface (near the objective lens) of the specimen. This figure gives new information on the tree shape, the direction of tree growth, and so on. It takes only a few minutes to construct the 3-dimensional image.

(by Yasuo Suzuoki, Nagoya University,
Nagoya, Japan)

Application for Membership of IEEJ

A member of IEEJ receives a monthly journal (The Journal of The Institute of Electrical Engineers of Japan) and one transaction out of five (A: Fundamentals and Materials in which the activity of DEI is included, B: Power and Energy, C: Electronics, Information and System, D: Industry Applications, E: Sensors). The journal gives interesting readings about the latest science and technology in the field of Power Energy, Power Apparatus, Electronics, Information Engineering, Materials and so on. The transaction gives review papers, research papers, letters and other information.

Total fee for joining IEEJ as a general member is ¥ 12,400 which consists of initiation fee ¥ 1,200, annual membership fee ¥ 10,000 and overseas postage of journal ¥ 1,200 (¥ : Japanese Yen).

When you need more information or an application form, you can request them from membership section of IEEJ.

Way for Purchasing Proceedings of IEEJ Technical Meetings and IEEJ Technical Reports

(1) Proceedings of Symposium on Electrical and Electronics Insulating Materials and Applications in Systems
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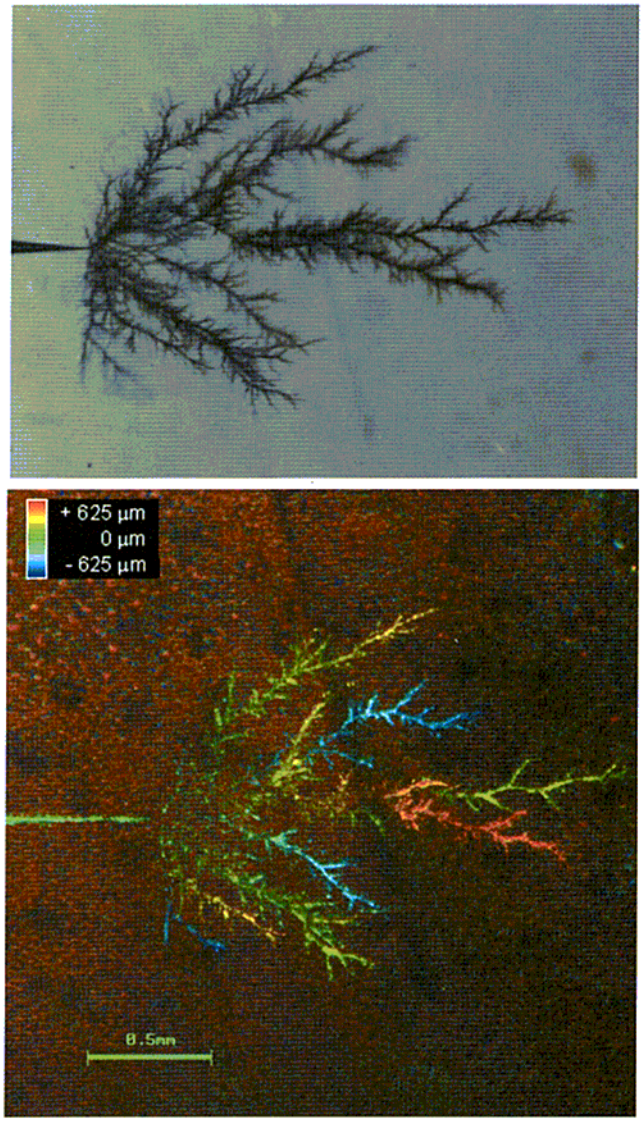

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