OUTLINE OF TECHNICAL COMMITTEES ON DEI AND RELATED TC IN IEEJ

Technical Committee on Dielectrics and Electrical Insulation (DEI)

Chairperson:	Y. Ohki (Waseda University)
Secretaries:	K. Kimura (Kyushu Institute of Technology)
	T. Okamoto (CRIEPI)
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. Special sessions on “Eco-friendly insulation technologies” and “International standards” were organized. Including these topical papers, 91 papers were heard.

The 33rd Symposium in 2001 will be held at the Hotel Sungarden, Himeji on November 19 –22 jointly with IEEE DEIS, Chinese Electrotechnical Society, Korean Institute of Electrical and Electronic Material Engineers, the Kansai Section of IEEJ, IEEJ Investigation Committee on Insulation Lifetime of Dielectric Materials and Electrical Apparatus, and Himeji Institute of Technology. It will be 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 are to be presented in this four-day symposium. The details of ISEIM 2001 can be seen on its web site:

http://www.waseda.ac.jp/conference/ISEIM2001/index.html

The TC-DEI currently runs seven Investigating Committees (IC) which organize Technical Meetings (95 papers in 2000) 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
Assessment and Improvement of the Interface in Composite Electrical Insulation (3 years from Jan. 1999)	T.Tanaka (Waseda University & CRIEPI)
Various Problems with High Reliability for Insulation of Electronic Equipment (3 years from Apr. 1999)	T. Tsukui (Tokai University)
Insulation Lifetime of Dielectric Materials and Electrical Apparatus (3 years from Apr. 1999)	T. Ito (Musashi Institute of Technology)
Development of Dielectric and Electrical Insulation Technology to Organic Molecular Device Engineering (3 years from Jan. 2000)	M. Iwamoto (Tokyo Institute of Technology)
Future Prospect of the Research and Development of Electrical and Electronics Insulation and its Systems (2 years from Apr. 2000)	T.Tanaka (Waseda University & CRIEPI)

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)
EINA Magazine (2 years from Apr. 2000)	T.Tanaka (Waseda University & CRIEPI)

Technical Committee on Electrical Discharge (ED)

Chairperson:	K. Hidaka (The University of Tokyo)
Secretaries:	M. Yumoto (Musashi Institute of Technology)
	M. Nagao (Toyohashi University of Technology)
Assistant Secretaries:	T. Nakano (National Defense Academy)
	T. Murata (Toshiba Corporation)

The Technical Committee on Electrical Discharge (TC-ED) has been charged with offering the opportunities for the members of IEE of Japan in the research field of electrical discharge to present their achievements, and studying and reporting on current status and future challenges in electrical discharge engineering. It was established formally in 1980, but its root goes back to the start of Expert Committee on Electrical Discharge in 1954. In order to meet the objective, a few subcommittees are organized in the TC-ED every year to survey the up-to-date subject and their activities continue for three years normally.

In the past, the following subcommittees were active and published the Technical Research Reports on a relevant subject: Discharge Simulation Methods, Surface Discharges in Diverged Fields, V-t Characteristics in SF6, Conduction and Breakdown in Dielectric Liquids, Plasma Processing, Fundamental Processes in Non-LTE Plasma, Simulation in Non-LTE Plasma, Field Measurements in Electrical Discharges, Breakdown Mechanism and Characteristics of Gas Mixtures, Modeling of Long Sparks, Interaction between Sparks and Laser, Space Charge Effects on Electrical Breakdown in Insulating Liquids, Effects of Interface and Foreign Matters on Electrical Breakdown in Insulating Liquids, High Stress Phenomena in Cryogenic Liquids, Plasma Reactors, Plasma Display, Database on Gas Discharges, Beam and Swarm Data for Gas Discharges and Plasma; Plasma Chemistry, Electrical Breakdown in Vacuum, and so on. The total number of the established subcommittees is 42 and the published technical reports reach 33 as of September 2001.

Now nine subcommittees are running for a survey of the listed subjects. Each subcommittee consists of 20-30 members who are the specialists in the relevant research subject or are interested in it.

The TC-ED is supporting more than ten domestic research meetings on electrical discharges every year where researchers, engineers, university professors and students report almost 250 full papers from both academic and industrial sides.

The international and domestic conferences and annual seminar for young researchers are also promoted by the TC-ED in cooperation with the Technical Committee on Dielectrics and Electrical Insulation, IEE of Japan, the Institute of Electrostatics of Japan and the Japan Research Group on Electrical Discharge which consists of about 400 members whose backgrounds covers a wide area of electrical properties of solids, liquids and gases. As hosted international conferences, “Japan-Korea Joint Symposium on Electrical Discharge and High Voltage Engineering” and “International Workshop on High Voltage Engineering (IWHV)” are held annually or every other year.

Table 2 Investigation Committees in TC-ED

Research Subject	Chairperson / Secretaries /Assistant Secretaries
Physical and Chemical Reaction of Electrons, Ions and Excited Particles in Discharge Plasma	H. Itoh / Y. Nakamura, Y. Saito / S. Suzuki
Ultra Long Discharge Characteristics	T. Shindo / S. Matsumoto, N. Takagi / M. Miki
Construction and Application of Database on Surface Discharge	M. Endo / M. Chiba, S. Matsumoto /
Behavior of Charged Particles in Liquid and its Simulation Technique	Y. Sakai / R. Hanaoka, Y. Nakagami / S. Mori
Technology of Material and Gas Treatment by Using Plasma Processing	M. Sugawara / M. Ouchi, S. Ono / A. Matsuoka
Control Technology of Electrical Discharge in Vacuum Relevant to Generation of High Energy Density	M. Yumoto / Y. Saito, O. Yamamoto /
Partial Discharge Phenomena in Gas Insulation Apparatus and their Diagnosis Technology	H. Fujii / N. Hayashi, T. Kato / T. Gouda
Interaction Effect between Charged / Excited Particles and Atoms / Molecules	Y. Nakamura (to be established in October, 2001)
Electrical Discharge in Nitrogen Gas and its Application Technology to Plasma Processing	Y. Kondo (to be established in October, 2001)

Technical Committee on Electromagnetic Compatibility (EMC)

Chairperson : T. Takuma (Kyoto University)
Secretaries : Z. Kawasaki (Osaka University)
S. Yokoyama (Central Research Institute of Electric Power Industry, Kyushu University)
Assistant Secretary : K. Miyajima (Central Research Institute of Electric Power Industry)

Our modern life today is full of electromagnetic fields due to naturally-originated sources like lightning as well as artificial ones in almost all ranges of frequency. The EMC (electromagnetic compatibility) issues are increasing their importance more and more with the recent development of the electricity-dependent life. The establishment of the TC-EMC in the Institute of Electrical Engineers of Japan (IEE, Japan) is based on the increasing significance of the field together with the fact that both sources and influences in the EMC issues have a close relation with electrical engineers. The TC-EMC started in April 1999 in the Fundamentals and Materials Society (A-Society), the IEE, Japan. It followed the breaking-up of the former Technical Committee on Applied Physics of Electricity (APE) into four TC's.

Two Investigation Committees (IC's) now belong to the TC-EMC. One of them, the IC on "Lightning Damages in the Highly Information-Oriented Society", began its activity in January 2000. The chairperson is Dr. S. Yokoyama, one of the TC secretaries. Until now, it has examined the Various damage experiences caused by lightning, in particular, related to such low-voltage devices as in communication, informatics, control and computers. It also intends to extract research items in order to establish efficient countermeasures against lightning damages.

The other is the IC on "EMC Issues in the Electric Power Industry", which Prof. Z. Kawasaki, the other TC secretary, chairs. Although there exist a number of EMC issues already examined by various organizations, the principal purpose of the new IC is to extract such recently noticed or important items as have been not fully elaborated in the electric power industry. Its examination

activity covers various related issues ranging from higher harmonics caused by power electronics devices to the connection between ionosphere phenomena and long-distance transmission lines.

As an important research topic related to the TC-EMC, the EMF issue, that is, the possible effect of electromagnetic fields on human health is investigated by a Special Committee on “Human Health Effect of Electromagnetic Fields”. The chairperson is emeritus Prof. Y. Sekine. The Committee started in December, 1995 and published its first-stage examination report in October, 1998. In February this year, it also published an elementary book for the general public entitled “Life with electricity and health fear - how far is the effect of electromagnetic fields made clear? (in Japanese)”. The price is only 900 yen with many colored illustration.

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 the 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, for very short time duration, though. 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 extremely 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 per year. Furthermore, once a year, the Meeting will be held outside of Japan. In October 2000, it was held in Korean Electrophysics Research Institute (KERI) as “International Symposium on Pulsed Power and Plasma Applications” (ISPP-2000), in the collaboration with the Korean Institute of Electrical Engineers, where 44 papers were presented from 7 countries. In 2001, the second one (ISPP-2001) will also be held in KERI, where representatives will participate from China. From the next year, this series of Symposium will be held in Japan, Korea and China.

As of 2001, there is one investigation committee in TC-PEE, the name of which is "Generation and Control of Pulsed Electromagnetic Energy". The chairperson, secretary and assistant secretary are Weihua Jiang (Nagaoka University of Technology), Sunao Katsuki (Kumamoto University), and Hidekazu Tsuchida (Central Research Institute of Electric Power Industry), respectively. Regularly, there will be four meetings per year.

The main themes/topics to be discussed in the regular 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, pinch discharge, plasma focus), production, control, evaluation/diagnostics, theoretical and computer simulation of extremely high energy-density state, applications of extremely high energy density state (e.g., microwave, materials, environment, radiation source, particle acceleration, flier acceleration, strong electromagnetic wave, free electron laser, X-ray laser, excimer laser, ultrahigh pressure/ density/temperature/magnetic field strength, inertial confinement fusion, diagnostics, luminescence/ display), and others.

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: M. Ishii (The University of Tokyo)
Secretaries: A. Inui (Toshiba Co.), I. Aono (Mitsubishi Electric Co.)
Assistant Secretary: H. Motoyama (Central Research Institute of Electric Power Industry)

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. Five investigation committees listed in Table 1 are active in October 2001. The scope of this TC resembles that of the CIGRE Study Committee 33 (Power System Insulation Coordination).

This TC jointly organized 2nd International Workshop on High Voltage Engineering (IWHV) in November 2000 at Tottori, 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 collected 44 papers, and 8 papers and one review are on the special issue of Trans. IEEJ, No. 8 of 2001. The third workshop is planned in January 2003.

In September 2001, the TC sponsored another international meeting in Toyama, named International Symposium on Winter Lightning, co-sponsored by CRIEPIand Hokuriku Electric Power Co. This is a second meeting after 5 years, but is first sponsored by this TC and held as a technical meeting of IEEJ. Due to the crippled air traffic after the tragedy in the United States in the previous week of this symposium, 4 out of the 11 invited speakers from abroad could not attend. Nevertheless, the two-day symposium was actively held with about 300 attendees.

In November 2001, a joint technical meeting of IEEJ with TCs on ED and SP is planned in Yonago, and one of the sessions on lightning is held as an English session, with two papers from abroad.

TC on High Voltage Engineering meets four times a year. One of the meetings is associated with a technical visit, and a visit to Genkai Nuclear Power Plant is planned by the committee this fiscal year. The members of the committee other than the chairpersons of the investigation committees are from universities (2), a research institute (1), electric power utilities (4) and manufacturers (9).

Table 3 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)

Technical Committee on Electrical Wire and Cables (EWC)

Chairperson:	Yasuo Sekii (Chiba Institute of Technology)
Secretaries:	Kunio Iwasaki (The Furukawa Electric Co., Ltd.)
	Kazuhito Mizunami (Sumitomo Electric Industries, Ltd.)
Assistant Secretary:	Mikio Umezaki (Hitachi Cable, Ltd.)

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 on September 13, 2001, in Tokyo, and focused on the subject of monitoring and surveillance technology of power and communication transmission lines. In addition to organizing such technical meetings, the technical committee supervises investigation committees dealing with new 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 Examining International Technical Trends in Power 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 “International Technical Trends in Power Transmission Cable Systems”. This year two original investigation committees were organized and went into new actions. The names and chairpersons of the committees are listed in Table 4. The TC-EWC usually meets 4 times a year. Occasionally a technical visit by the committee members is made to encourage study on the most advanced science and technology. This year, the committee visited the Access Network Service Laboratories of the NTT Corp. and the Isogo Coal-fired Thermal Power Station of the EPDC (Electric Power Development Co.,Ltd., Japan).

Table 4 Investigation Committees in TC-EWC

Name of Investigation Committee	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