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 Philips 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 cooperate 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

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

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<td>Lightning damages in the highly information-oriented society</td>
<td>S.Yokoyama (Kyushu University)</td>
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<tr>
<td>EMC issues in the electric power industry</td>
<td>Z.Kawasaki (Osaka University)</td>
</tr>
<tr>
<td>Precursor symptoms of earthquake observed from environmental electromagnetic field measurement</td>
<td>K.Horii (Daido University)</td>
</tr>
<tr>
<td>Home network EMC</td>
<td>M.Tokuda (Musashi Institute of Technology)</td>
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**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-
Industry), 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 Lighting 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

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

<table>
<thead>
<tr>
<th>Research Subject</th>
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<tbody>
<tr>
<td>Investigation Committee for Degradation and Corrosion of Wires for Overhead Power Transmission Lines</td>
<td>T. Kikuchi</td>
</tr>
<tr>
<td>Investigation Committee for Cables and Accessories for 20 kV Power Distribution Cable Lines</td>
<td>S. Nishimura</td>
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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 TC10 is responsible for standards of fluids (insulating liquid and SF₆) 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.)

IEC 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.

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 above-mentioned matters and new work items for standardization.