

INSULATED CABLE ENGINEERS ASSOCIATION

PAST – PRESENT – FUTURE

1925 - 2000

Presented At The

75th ANNIVERSARY MEETING

CHARLESTON, SOUTH CAROLINA

September 11 – 14, 2000

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INSULATED CABLE ENGINEERS ASSOCIATION, INC.

PREFACE

Recognizing the increasing demands of the emerging communications and electric power industries in the early nineteen hundreds, and its impact on the insulated cable segment, this Association was established in 1925 as an independent, professional association for the development of insulated wire and cable standards that could be updated as new and better materials became available. With additional applications entering the scene in rapid succession, the cable engineering community was and will continue to be challenged to meet the needs. This publication covers this remarkable saga.

The events of the first 37 years were eloquently related by William A. Del Mar in his "Story of IPCEA", an abridged and edited copy of which constitutes Part I. This is followed by the developments and events of the second half of our 75 years in Parts II and III; then a "look" into the 21st century in Part IV.

The Editor

Edward E. McIlveen
September 2000

ICEA PRESIDENTS

1925 – 1929	W.S. Clark	1957 – 1961	G.J. Crowdes
1929 – 1931	G.M. Haskell	1961 – 1968	E.G. Driscoll
1931 – 1933	D.M. Simmons	1968 – 1970	W.I. Middleton
1933 – 1935	E.W. Davis	1970 – 1971	H.T. Knox
1935 – 1937	W.C. Hayman	1971 – 1972	R.C. Waldron
1937 – 1939	W.A. Del Mar	1972 – 1975	E.K. Duffy
1939 – 1941	R.J. Wiseman	1975 – 1978	J.G.C. Henderson
1941 – 1943	L.E. Fogg	1978 – 1981	J.V. Lipe
1943 – 1945	W.T. Pierce	1981 – 1984	M.L. Singer
1945 – 1947	G.W. Zink	1984 – 1987	J.G. Quinn
1947 – 1948	A. Bellis	1987 – 1990	M. Kopchik, Jr.
1948 – 1950	V.A. Sheals	1990 – 1993	V.B. Mascarenhas
1950 – 1951	G.W. Acock	1993 – 1996	J.N. Ware, Jr.
1951 – 1955	E.W. Davis	1996 – 1999	P.L. Cinquemani
1955 – 1957	S.J. Rosch	1999 –	D.K. Baker

SECRETARIES/ TREASURERS

1925 – 1928	G.M. Haskell	1935 – 1975	G.M. Haskell
1928 – 1931	H.G. Burd	1975 – 1978	W.I. Middleton
1931 – 1935	R.J. Wiseman	1978 –	E.E. McIlveen

Chronological List of Important Events and Decisions

- March 1925 First Constitution approved
- November 1926 Decision to write standards
- January 1932 Decided to form Sections
- May 1935 IPCEA Standard for Rubber Insulated Power Cables
- January 1946 1st Edition S-19-81 General Specifications, Rubber Insulation
- July 1959 1st Edition S-56-434 Std.- PE Insulated Communications Cable
- October 1962 AIEE – IPCEA Ampacity Tables published
- January 1976 New Constitution and Organization
- March 1982 Realignment of standards initiated
- May 1985 TWCS Technical Advisory Committee Concept
- June 1989 S-84-608 First Standard via TWCS TAC
- September 1992 1st Fiber Optic Standard S-87-640-1992
- April 1996 UPCS Technical Advisory Committee born
- October 1997 Concentric Neutral Cable Standard issued
- January 1998 Standards via Global Engineering Documents
- March 2000 Realignment becomes a reality

Note: The above list was intended to provide a quick overview of the Associations key decisions and landmark accomplishments. With a seventy-five year background to draw from, it turned-out to be more the luck-of-the-draw, but it's a start.

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INTRODUCTION

The Insulated Cable Engineers Association (ICEA) is a professional organization dedicated to developing cable standards for the electric power, control, and telecommunications industries. Since 1925, the objective has been to ensure safe, economical, and efficient cable systems utilizing proven state-of-the-art materials and concepts. Now with the proliferation of new materials and cable designs, this mission has gained in importance. ICEA documents are of interest to industry participants worldwide, i.e. cable manufacturers, architects and engineers, utility and manufacturing plant personnel, telecommunication engineers, consultants, and OEM's.

ICEA is a "Not-For-Profit" association of cable engineers who are sponsored by twenty-eight of North America's leading insulated cable manufacturers. The technical development work is performed in two major and distinct areas, one covering power, control and portable cables, the other dedicated to telecommunication cables including copper and optical fiber constructions.

In addition there are two very active Technical Advisory Committees, one for Telecommunications Wire and Cable Standards (TWCS TAC) and another for Utility Power Cable Standards (UPCS TAC). These committees are composed of ICEA members, qualified "expert" non-members who are direct users, and associates who have interests closely related to the use of cables.

PART I

IN THE BEGINNING

This is an abridged version of the "History of IPCEA" by William A. Del Mar, one of the founders of IPCEA and President, September 1937 to 1939.

Strange as it may seem, the history of IPCEA begins several years before it came into being, but that is not unique, as neither man nor his organizations is born without a period of preparation before the final form is accomplished.

It is hard to settle upon a date when the events leading to the formation of IPCEA began to take shape. Perhaps the most practical date is the year 1920, when the National Electric Light Association issued a specification for impregnated paper insulated cables which covered what we now designate as cables of the "Solid-Type," that being the only type of impregnated paper insulated cable then extant.

This specification was probably the best that could have been written at the time, but several outstanding engineers in the larger utility companies had been carrying on the investigations which indicated that the NELA specification could and should be revised to include requirements for higher quality cables.

The First World War, by greatly increasing industrial power loads and restricting cable production, had imposed unprecedented loads on existing cables with resultant increase of thermal failures. The high and uncontrolled dielectric loss in these cables was shown to be largely responsible for these failures, and a demand arose for a controlled lowering of this loss.

While the original NELA specification recognized the existence of dielectric loss, it merely required that it "shall not exceed the values submitted by the manufacturer with his proposal." Progressively minded engineers in the NELA accordingly set to work on a revision dated June 1922 which contained a number of clauses which manufacturers' engineers considered undesirable due to requirements of an impracticable or uneconomical nature. They accordingly apprised their respective managements of this situation and advised that appropriate action be taken to enable them to work in concert with the utility engineers responsible for revisions of the NELA specification. The Associated Manufacturers of

Electrical Supplies (AMES), predecessor of the present NEMA, had no section or committee dealing specifically with paper insulated cables, and it was proposed to create a section or committee for that purpose. Accordingly, on February 28, 1925, Mr. Frederic Nicholas, General Secretary of AMES, issued a call for a meeting to consider the formation of a paper Insulated Power Cable Section of AMES.

After a long discussion, at the first meeting on March 5, 1925, it was decided to form, instead of a section of AMES, an independent organization to be known as the Power Cable Engineers Association. The reason for this was that it was thought that utility engineers would prefer to cooperate with an engineering society.

In order to obtain a true perspective of happenings in the cable field at that time, it should be known that the years 1920-1922 marked a great improvement in cable quality. Dielectric loss was brought under control at comparatively low values, electric strength was greatly increased, mechanical uniformity improved, and factory test failures reduced to insignificance. It is important to note these dates, lest it be thought that these cable improvements were due to the new specifications, when, as a matter of fact, the new specifications reflected that a new quality of cables had become available. However, the pressure exerted by succeeding issues of the AEIC specifications has been helpful in improving and maintaining quality.

The second meeting, March 20, 1925, at the Engineers' Club, New York, approved the proposed Constitution and By-Laws. The first article gave the Association its name, "Insulated Power Cable Engineers Association." The second article defined its purpose, as follows:

The purpose of this Association shall be to advance the compilation, study and standardization of technical specifications for the manufacture and testing of cables for the transmission of electrical power; and for the consideration of engineering problems connected with their installation and use.

The third article provided that: Membership in this Association shall be individual and shall be limited to officers and members of the technical staffs of manufacturers of impregnated paper insulated cables.

Three more meetings were held in 1925.

The eighth meeting was held at the Yale Club, March 24, 1926. Here, for the first time, paper cable specifications by the Association of Edison Illuminating Companies (AEIC), issued November 1924, made their appearance. Proposed changes were prepared and the Secretary was instructed to communicate them to the Chairman of the AEIC Committee.

While the NELA specifications continued in use until the early 1930's they gradually went out of use, leaving the field to the AEIC. Revisions or the original 1924 AEIC specifications were made over the years, and continues to this day, all with IPCEA cooperation on the technical features.

The First Expansion

The early meetings of IPCEA were confined to paper insulated cables and their accessories and assisting other associations in the preparation of specifications. No thought of preparing specifications of its own or departing from the subject of paper cables is revealed by the minutes until the tenth meeting, which was in November 1926, when two revolutionary steps were proposed by two ambitious members, whose names are not enshrined in the minutes, but were probably W.I. Middleton, Sr., and R.J. Wiseman. It is doubtful whether these two members realized how revolutionary their proposal turned out to be. What they were proposing was in effect –

- 1st, that IPCEA expand its horizon beyond paper cables.*
- 2nd, that IPCEA become a specification writing organization, instead of only helping othersto write specifications.*

At that time there were several organizations writing wire and cable specifications, but they lacked the technical knowledge that could be obtained only by an organization able to call upon the full knowledge of qualified engineers from the cable industry. It was decided that such specifications would have to consist of recommended practices and that there would be no compulsion to abide by their requirements unless so specified by the purchaser.

Period of Growth

Along with an expanding economy following World War II, the insulated wire and cable industry grew rapidly. This was reflected by an increased activity in the Association, and an ever-growing number of publications. In 1951 there was just one General Specification For Wire And Cable With Rubber, Rubber-Like And Thermoplastic Insulations, identified as Standard S-19-81. As more synthetic materials became readily available, this basic document was expanded until it became obvious that separate standards would be desirable. With the 3rd Edition of S-19-81 in 1959, NEMA became a partner in the publishing of this standard, and took over the responsibility for printing and distribution.

To cope with the increased activity it had become necessary to create new Sections to provide standards development capabilities in new areas. By 1958 there were six sections, and the Constitution had been revised five times to accommodate them.

In July 1961 the thermoplastic insulations were “spun-off” in their own Standard Publication For Thermoplastic-Insulated Wire and Cable, S-61-402. After three interim specifications starting in 1966, the Standards Publication Cross-Linked Thermosetting Polyethylene Insulated Wire and Cable was issued in May 1971 as S-66-524. Similarly, after seven interims, first appearing in 1971, Standards Publication Ethylene-Propylene Rubber Insulated Wire and Cable was issued in 1976 as S-68-516. Including S-19-81, these four major standards covering extrudable dielectrics, on a cumulative basis, have been issued in ten new editions and over forty six periodic revisions in the 1961–1976 growth era.

In the communications area, ICEA produced the ANSI Standard C8.47-1977, Polyethylene Insulated, Polyethylene Jacketed Communication Cable.

This gives some measure of the viability achieved by these standards. In no way can these documents be considered as “cast in concrete” so as to inhibit progress. In addition to the joint ICEA/NEMA standards, ICEA published 12 engineering documents, guides and test methods.

PART II

REACHING MATURITY

It was eighteen years before another “new” Constitution was adopted in 1976 which, in effect, established four autonomous Sections as far as technical activity was concerned, and eliminated the very cumbersome Joint Sections meeting. A series of amendments followed to facilitate the operation of a reorganized Association.

On March 7, 1979, three major steps were taken by the Association, (1) the name was changed to Insulated Cable Engineers Association to better reflect the true and broader scope of our activities, (2) the Association would be incorporated to provide liability protection and, (3) a Portable Cable Section was added to focus more directly on an important and growing area. Constitutional amendments were duly adopted at that time to achieve these significant changes.

At the September 24, 1980 Annual Meeting, five items were amended, perhaps the most important being a provision for amending the Constitution by letter ballot. It is obvious from the foregoing history that constitutions must be amended as technology and circumstances change if an Association is to remain viable.

COOPERATION WITH OTHER ORGANIZATIONS

ICEA and NEMA

For years, the Insulated Power Cable Engineers Association had been doing specification work, drawing up and publishing under its own name, standards describing the construction of products which were within the scope of the Wire and Cable Section of NEMA. Similarly, the NEMA Wire and Cable Section had been drawing up standards on the same products.

Recognizing this duplication of effort and after considerable negotiation, it agreed in 1955 to develop joint NEMA/IPCEA Standards on these products. It was understood that each organization would remain independent. To effect coordination, a joint NEMA/IPCEA Coordinating Committee was formed. The development of standards was then handled by the sponsored cable engineers in IPCEA.

Liaison Activities

The IPCEA policy which was established in 1925 of assisting other associations in the preparation of specifications was cited in Part I. Collaboration, both formal and informal with the Cable Engineering Section of the Association of Edison Illuminating Companies began one year after the formation of IPCEA and this relationship has grown and thrived over the past 74 years.

One of the Association's major projects culminated in the AIEE/IPCEA Power Cable Ampacities, a two volume set of much needed tables. Since the AIEE Insulated Conductors Committee was interested in the subject, a joint AIEE-IPCEA working group was formed to handle the technical aspects. The members of this working group were J.H. Neher, (Chair), F.H. Buller, R.W. Burrell, W.A. Del Mar, M.H. McGrath, E.J. Merrell, H.A. Schumacher and R.J. Wiseman. The financing of the computer programming and calculations was underwritten by IPCEA. The final arrangements were negotiated during 1961 with prominent industry leaders such as Messrs. W.H. Chase, G.J. Crowdes, C.T. Hatcher and L.F. Hickernell playing key rolls. The all important agreement was approved by the Board of Directors of AIEE on October 20, 1961, and publication was accomplished in 1963. These Tables were reprinted by IEEE in 1978, and were only recently replaced by a new computer generated set, IEEE 835-1994 (SH94232); also available on CD-ROM.

Another landmark achievement is the production of a nation-wide standard for URD/UD Cables. This was initiated in ICC/SC-2-14, Standards, as may be noted in their Minutes of November 1990. ICC agreed to provide performance criteria and periodic reviews of the document, and ICEA would provide the manpower for the standards development work. The ICC Task Force was "spear-headed" by Dan Ward of Virginia Electric Power, and Mike Kopchik of ICEA (Rome Cable). Submittals of the document to the Task Force, whose attendance had tripled, began in 1994. At the April 1996 Meeting, Nick Ware presented a flow chart titled *Process for Development of ICEA Utility Power Cable Standards* (With User Group Liaison) describing the relationship of activities by ICC, AEIC and NEMA. Thus UPCS Technical Advisory Committee (TAC) was born. The work continued accordingly, and the Standard ANSI/ICEA S-94-649 was published in 1997.

In addition to the foregoing activities, liaison has been maintained with several dozen cable related organizations including ANSI, ASTM, IEEE/ICC, IEC, NFPA/NEC, UL, TIA and many government agencies such as RUS, NIOSH (Bureau of Mines) and the Department of Defense.

PART III

THE LAST TWO DECADES

The last two decades of the twentieth century, like the overall economy, have been remarkable to say the least. With the advent of many new dielectrics and jacketing materials, and the introduction of optical fibers, new and innovative machinery became a necessity. Old plants were retired and “state-of-the-art” facilities arose. This was orchestrated by an era of unparalleled producer mergers and realignments of the old line companies. The work load placed a heavy burden on the engineering staffs, and this resulted in less time being available for voluntary standards writing and the supporting research. However, at the sacrifice of personal time, much has been accomplished. By the end of the 20th Century 700 projects had been recorded. The organization that has achieved this is described next. The end product, the Publications are listed in the appendix. These Listings are periodically updated and issued separately.

THE ICEA ORGANIZATION

ICEA meetings are held quarterly, with the organization’s business being conducted in a General Meeting, and technical matters are handled in the Section whose scope covers the subjects under consideration.

Membership in ICEA and each of the Sections is confined to individual engineers who are on the technical staff of concerns engaged in the manufacture of the product involved, and who are qualified by technical training or experience to contribute to the purpose and activity of one or more Sections.

Note: It is propose that beginning January 1, 2000, these Sections will be in the Energy

Cables Devision. See Part IV

- (a) **The Power Cable Section’s** assignment includes standards for all cables with extruded or laminar insulation's and used for the transmission and distribution of electrical energy.

The UPCS TAC group is a technical advisory committee for this Section on matters relating to utility cables.

- (b) **The Control & Instrumentation Section** is responsible for providing standards, test procedures, and guides for all insulated cables used to control or monitor equipment or power systems, transportation signal systems, and alarms.

- (c) **The Portable Cable Section** was formed to provide standards for insulated electrical cables for all portable or movable equipment, especially for use in mines or other similar applications, and by the military.

Note: It is propose that beginning January 1, 2001, the Section following will be the Communications Cable Division. See Part IV.

The Communications Cable Section is responsible for providing cable standards, test procedures, and guides for the telecommunications industry. It is composed of ICEA members from sponsoring cable manufacturers in the USA, Canada and Mexico.

The TWCS TAC group is a technical advisory committee for this Section.

TECHNICAL ADVISORY COMMITTEES

The Technical Advisory Committees (TAC) have been organized to provide a broad background of industry expertise and knowledge for the purpose of developing wire and cable standards, establishing international consensus positions and providing a forum for discussion of industry technical problems. Members of the Technical Advisory Committee are qualified by technical involvement with the types of cables under consideration, and are committed to actively participate in and contribute to the committee. They may be:

- 1 - Manufacturer sponsored Members defined as those persons who are members of the Insulated Cable Engineers Association, Inc. (ICEA)
- 2 - Direct-User Members defined as those persons connected with organizations that directly specify requirements or actively use cables of the types under the Scope of an ICEA Section.
- 3- Associate Members defined as those persons connected with organizations other than ICEA or direct users, and who have interests closely related to the use of the cables under consideration.

Telecommunications Wire & Cable Standard Technical Advisory Committee:

In late 1984, representatives of the regional Bell operating companies, Bell Communications Research, the Independent telephone companies, the Rural Electrification Authority (REA) and other interested organizations were invited to meet with ICEA for discussions of their requirements and how the ICEA might develop standards for their use. The outcome of subsequent discussions resulted in their active participation in standards writing, and with it came vital user input with a broad spectrum of engineering expertise. This evolved into a permanent technical advisory committee. The concept of the Telecommunications Wire and Cable Standards Technical Advisory Committee (TWCS TAC) was formalized by the ICEA at a Communications Section Meeting on May 23, 1985. By-Laws were finally agreed upon July 22, 1987. TWCS TAC is an integral part of ICEA.

Utility Power Cable Standards Technical Advisory Committee:

This Committee (UPCS TAC) was the outgrowth of a long felt need for a comprehensive, nationwide standard for concentric neutral underground cable. Interest had developed in Institute of Electrical & Electronic Engineers/Insulated Conductors Committee. The sequence of events leading to it's establishment are related in an earlier paragraph (see page 7, 3rd para.) Their first project, S-94-649-1997 became an ANSI/ICEA approved Standard. Work on new documents continues.

PART IV

BACK TO THE FUTURE

It was becoming evident during 1999 that once again the need for change in our organization was growing. Accordingly, our President at the time, Paul Cinquemani, set-up a special task force, unanimously agreed upon by the members, to draw up a proposal for re-aligning our organization to: (1) better utilize our time and manpower, (2) operate more efficiently in satisfying the needs of the manufacturers and the public, and (3) to take advantage of the challenges that are developing in our field of expertise. This could range from round-robin investigations to the active participation in other organizations projects, and provide liaison as well.

The Task Force meeting was held December 8, 1999 with N. Ware, B. Vaughn, F. LaGase and P. Cinquemani in attendance. The focus of the meeting evolved around the structure of the two proposed Divisions, the reporting sections, voting status and technical advisory panels. This is displayed on page 12.

While not all-inclusive the following proposal was agreed in order to begin "draft" changes to the ICEA Constitution and Policies.

Operations

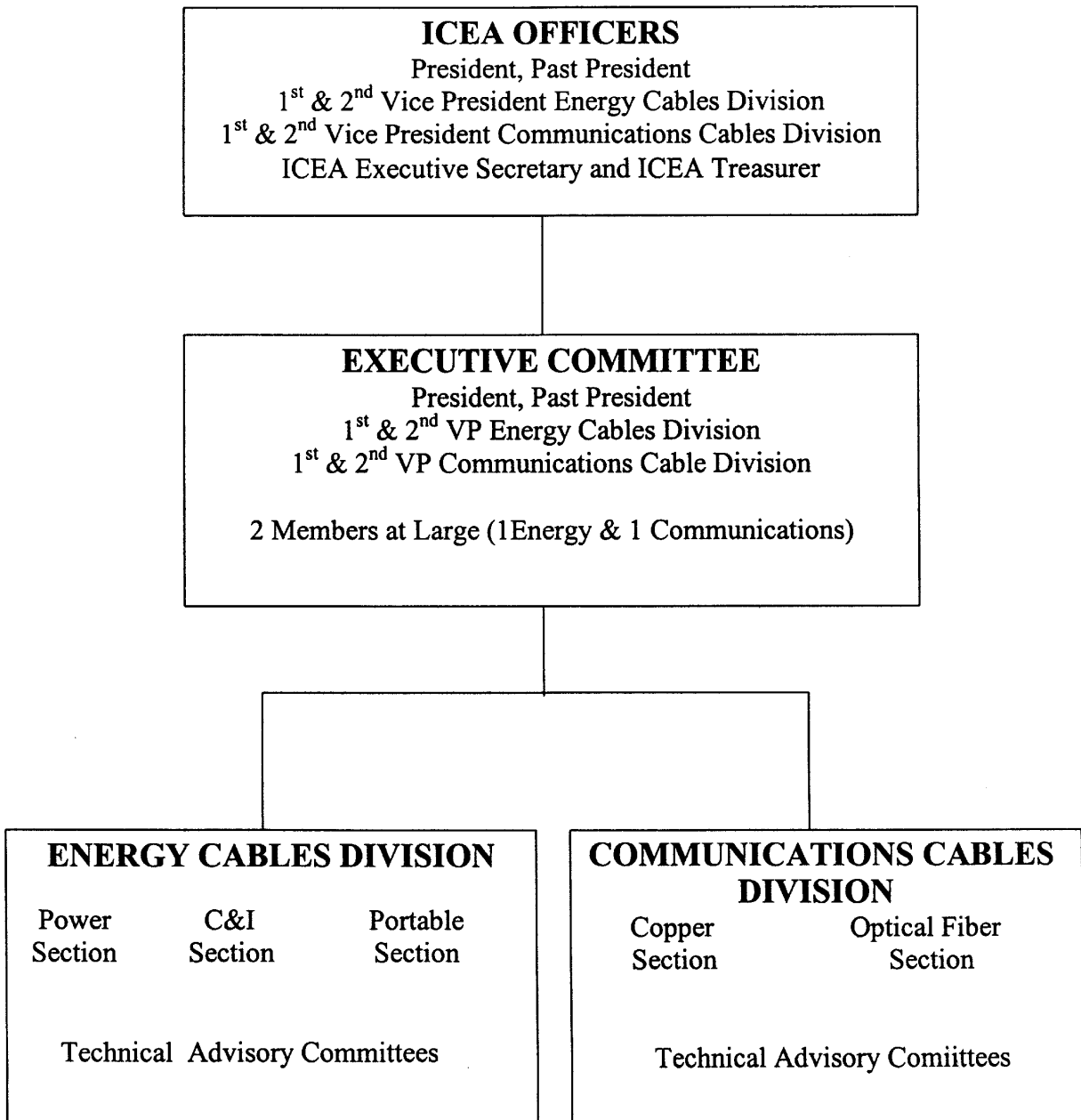
1. Two Divisions would be established, the Energy Cable Division and Communications Cable Division.
2. The Power Section, C&I Section and Portable Section would be combined under the Energy Cable Division.
3. The Communications Cable Division shall establish two Sections, the Copper Section and Optical Fiber Section.
4. Each Section shall maintain a separate voting member and alternate members.
5. The quarterly Joint Session Meeting will be discontinued.
6. Joint Projects and Liaison Groups among the Sections within one Division shall be addressed in the applicable Division Meeting.
7. Joint Projects and Liaison Groups involving both Divisions, will be addressed in the General Meeting.

Functions:

1. The officers of each Division will consist of a 1st and 2nd Vice President.
2. Each Section within a Division does not have a Chairman.
3. The duties of the 1st VP of each Division is expanded to approve the formal Section Ballots for each Section within the Division and to coordinate any oral ballots for each Section which may occur at a Division Meeting.
4. The 2nd VP duties are expanded to include recording the minutes of the respective Division Meeting and to tally all formal Section Ballots and advise the WG Chairman, 1st VP and ICEA Executive Secretary of the final outcome.
5. The ICEA Executive Secretary will continue to record the minutes of the Executive committee Meeting and the General Meeting as well as editing and distributing the Division's Minutes.
6. The Executive Secretary may also act as financial officer.

PROPOSED ICEA ORGANIZATION

(2001)



Realignment Of Standards Completed

At the 1993 Annual Meeting it was announced that our long-range plan (Project 588) involved a complete re-alignment of our standards “to get away from material specifications” and get over to application oriented standards. After seven years, this has now been achieved.

The new ICEA standards reflect a change in ICEA’s standards writing objective. They are written as “application standards” rather than the “insulation material-based standards” of the past. These new standards have been updated to reflect the latest conductor constructions, insulations and jacket materials being used to manufacture wires and cables. The advantage of having an application standard is that all insulations suitable for use on a specific product are contained in one document. With material-based standards, only one type of insulation and its requirements are defined. If a different insulation was to be considered, a separate standard would be required. Application oriented standards are designed to be user friendly.

The new ICEA/NEMA published standards are:

ICEA S-95-658/NEMA WC70 Nonshielded 0-2000 V. Cables

ICEA S-96-659/NEMA WC71 Nonshielded 2001-5000 V. Cables

ICEA S-93-639/NEMA WC74 Shielded Power Cable 5-46 kV

New ICEA standards for power cables used by the electric utility industry are:

ANSI/ICEA S-94-649 Concentric Neutral Cables Rated 5-46 kV

ICEA S-97-682 Utility Shielded Power Cable Rated 5-46 kV

ICEA S-105-692 600 Volt Single Layer Thermoset Insulated, Utility Underground Distribution Cable

ICEA S-81-570 Direct Burial, 600 Volt, Ruggedized Insulation

As a result of the new ICEA/NEMA application standards being issued, the older, more-familiar materials-based ICEA/NEMA standards are being withdrawn. This is necessary to eliminate duplication and because the materials-based standards are no longer being maintained. The withdrawn ICEA/NEMA standards are :

- ICEA S-66-524/NEMA WC7 Cross-Linked-Thermosetting-Polyethylene Insulated Wire and Cable
- ICEA S-68-516/NEMA WC8 Ethylene-Propylene-Rubber Insulated and Cable
- ICEA S-61-402/NEMA WC5 Thermoplastic-Insulated Wire and Cable
- ICEA S-19-81/NEMA WC3 Rubber-Insulated Wire and Cable

ICEA/NEMA recently issued several other application standards for wire and cable, a standard for test methods and for test frequency. The titles of these standards are:

- ICEA S-75-381/NEMA WC58 Portable and Power Feeder Cables for Use in Mines and Similar Applications
- ICEA T-26-465/NEMA WC54 Frequency of Sampling Extruded Dielectric Cables
- ICEA S-73-532/NEMA WC57 Control Cables Standard
- ICEA S-82-552/NEMA WC55 Instrumentation and Thermocouple Wire and Cable
- ICEA T-27-581/NEMA WC53 Standard Test Methods

A complete set of Listings of our publications may be found in the Appendix.

PART V

SERVICE AWARDS

The W. Irving Middleton Award

This is given in recognition of extraordinary and significant contributions to the Association over a period of ten or more years, and beyond the call of duty. It is generally presented when the candidate is close to retirement or leaving ICEA activities.

The President's Award

This may be presented annually to honor an individual who has advanced the purpose of the Association, or has made an outstanding contribution to the activities of a Section during the past year or more.

The Executive Committee Award

This may be presented to honor an active member who, during the past decade has provided Leadership and/or Outstanding Services to ICEA and the Executive Committee.

Note:

The W. Irving Middleton Award was established by the Executive Committee on September 19, 1978 to recognize outstanding contributions to the Association. The award was initiated to honor our retiring Secretary-Treasurer, Mr. W. Irving Middleton, who was also a Past President, for his exemplary service to ICEA as well as giving recognition to the contribution made by his father who was part of the nucleus responsible for the existence of the Association. This prestigious award is intended to encourage a similar level of professional service among the members of the Association.

MAJOR ICEA AWARDS

THE IRVING MIDDLETON AWARD

- 1979 - Samuel J. Rosch
- 1980 - W. Irving Middleton, Jr.
- 1981 - Edward G. Driscoll
- 1982 - Edward K. Duffy
- 1983 - Richard C. Waldron
- 1984 - James G. Henderson
- 1987 - Emerson D. Metcalf
- 1990 - Michael Kopchik, Jr.
- 1991 - John V. Lipe
- 1992 - H. Marvin McNeil
- 1993 - Lawrence J. Kelly
- 1994 - Vieney B. Mascarenhas
- 1998 - Eugene J. Hibbard

EXECUTIVE COMMITTEE AWARD

- 1997 - James S. Tyler
- 1999 - Edward E. Walcott
- 1999 - Thomas G. Hardin

THE PRESIDENT'S AWARD

- 1982 - Robert W. Blodgett
- 1982 - Bruce W. Tyrrell
- 1983 - Johnathan R. Learn
- 1984 - Emerson D. Metcalf
- 1984 - E. William Bennett, Jr.
- 1985 - Russell W. Higginbottom
- 1985 - George A. Straniero
- 1986 - John E. Conley
- 1986 - Gerald B. Tucker
- 1986 - Lawrence J. Kelly
- 1987 - H. Marvin McNeil
- 1989 - James S. Tyler
- 1990 - Vieney B. Mascarenhas
- 1992 - Eugene J. D'Aquanno
- 1993 - Carl C. Landinger
- 1995 - David K. Baker
- 1996 - Frank L. Kuchta
- 1997 - Eugene J. Hibbard
- 1998 - John R. Cancelosi
- 1999 - J.Nick Ware, Jr.



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LISTING #1
5/15/00

Power & Control Cable Documents

NUMBER	DESCRIPTION	PRICE
P-32-382-1999	Short-Circuit Characteristics of Insulated Cable	\$30
P-34-359-1973	AC/DC Resistance Ratios @ 60Hz - 1973 Reprint	\$40
P-43-457-1961	Conductor Resistance & Ampacities @ 400 and 800 Hz	\$30
P-45-482-1999	Short-Circuit Performance of Metallic Shielding & Sheaths	\$30
P-46-426	Power Cable Ampacities - Out of Print (See IEEE 835)	
P-48-426-1967	Paper Cable Ampacities at AEIC Temperatures	\$40
P-50-431-1970	Aluminum Conductors, Bare & Weather Resistant	\$30
P-51-432-1970	Copper Conductors, Bare & Weather Resistant	inc.
P-52-469-1970	Copper-Covered Steel & Copper Composite Conductors (Above 3 documents are properties for overhead lines)	inc.
P-56-520-1984	Cable Tray Fire Test Report (Round Robin Project)	\$30
P-57-653-1995	Metric Units, Guide for Implementation in ICEA Pub.	\$30
P-60-573	Guide for Tapes, Braids, Wraps & Serving Specifications	Draft
P-79-561-1985	Aerial Cable Messengers & Lashing Wires, Guide for Selecting	\$40
S-58-679-1996	Conductor Identification For Control Cables	\$30
T-22-294-1983	Test Procedures for Extended Time-Testing of Wire and Cable Insulations for Service in Wet Locations	\$30
T-24-380-1994	Partial-Discharge Test Procedure, Guide For	\$30
T-25-425-1981	Guide for Established Stability of Volume Resistivity for Conducting Polymeric Compounds of Power Cables	\$30
T-28-562-1995	Test Method for Measurement of Hot Creep of Polymeric Insulations	\$30
T-29-520-1986	Vertical Cable Tray Flame Tests @ 210,000 Btu	\$30
T-30-520-1986	Vertical Cable Tray Flame Tests @ 70,000 Btu	\$30
T-31-610-1994	Water Penetration Resistance Test, Sealed Conductor	\$30
T-32-645-1993	Compatibility of Sealed Conductor Filler Compounds	\$30
T-33-655-1994	Low Smoke, Halogen-Free Polymeric Jackets	\$30
T-34-664-1996	Conducting Longitudinal Water Penetration Resistance Tests on Cable	\$40

ANSI/ICEA POWER CABLE STANDARDS

ANSI/ICEA S-70-547-1992	Weather-Resistant Polyolefins-Covered Wire & Cable	\$40
ANSI/ICEA S-76-474-1991	Neutral-Supported Power Cable Assemblies With Weather-Resistant Extruded Insulation, 600 Volts	\$50
ANSI/ICEA S-81-570-1996	Direct Burial 600 Volt Cable With Ruggedized Extruded Insulation	\$70
ANSI/ICEA S-94-649-1997	Utility Concentric Neutral Cables, 5-46kV	\$98
ANSI/ICEA S-97-682	Utility Shielded Power Cables, 5-46kV	\$98



INSULATED CABLE ENGINEERS ASSOCIATION, INC.
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LISTING #2
5/15/00

Communication Cable Standards

These standards were developed by the Insulated Cable Engineers Association, Inc. (ICEA) and, jointly with the Telecommunications Wire & Cable Standards Technical Advisory Committee (TWCS TAC) where indicated with an asterisk*.

NUMBER	DESCRIPTION	PRICE
ICEA P-47-434-1965	Pressurization Characteristics, PE Communication Cable	\$30
ICEA P-61-694-1999*	Coding Guide for Copper Outside Plant & Riser Cable	\$30
ANSI/ICEA S-56-434-1983	Polyolefin Insulated Communications Cables For Outdoor Use, Reaffirmed October 18, 1991	\$60
ANSI/ICEA S-77-528-1983	Outside Plant Communications Cables, Specifying Metric Wire Sizes (Rev. 1990), Reaffirmed April 27, 1990	\$36
ANSI/ICEA S-80-576-1994	Communications Wire & Cable For Premises Wiring	\$80
ANSI/ICEA S-83-596-1994	Fiber Optic Premises Distribution Cable	\$80
ANSI/ICEA S-84-608-1994*	Telecommunications Cable, Filled Polyolefin Insulated Copper Conductor	\$80
ANSI/ICEA S-85-625-1996*	Aircore, Polyolefin Insulated, Copper Conductor Telecommunications Cable	\$80
ANSI/ICEA S-86-634-1996*	Buried Distribution & Service Wire, Filled Polyolefin Insulated, Copper Conductor	\$80
ANSI/ICEA S-87-640-1992	Fiber Optic Outside Plant Communications Cable	\$96
ANSI/ICEA S-88-626-1993	Telephone Cordage and Cord Sets	\$60
ANSI/ICEA S-89-648-1993*	Telecommunications Aerial Service Wire	\$80
ANSI/ICEA S-90-661-1997*	Individually Unshielded Twisted Pair Indoor Cable for Use In Communication Wiring Systems	\$80
ANSI/ICEA S-91-674-1997*	Coaxial & Coaxial/Twisted Pair Composite Buried Service Wires	\$96
ANSI/ICEA S-92-675-1997*	Coaxial & Coaxial/Twisted Pair Composite Aerial Service Wires	\$80
ANSI/ICEA S-98-688-1997*	Broadband Twisted Pair, Telecommunications Cable Aircore, Polyolefin Insulated Copper Conductors	\$80
ANSI/ICEA S-99-689-1997*	Broadband Twisted Pair Telecommunications Cable Filled, Polyolefin Insulated Copper Conductors	\$80
ANSI/ICEA S-100-685-1997*	TP Telecommunications, Station Wire, Indoor/Outdoor	\$60



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LISTING #3

5/15/00

NEMA/ICEA (Joint) Publications

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PRICE</u>
NEMA WC2-1980/ ICEA S-67-401	Steel Armor & Associated Coverings for Impregnated-Paper-Insulated Cables (Rev. 1, 1989)	\$20
NEMA WC3-1992/ ICEA S-19-81	Rubber Insulated Wire & Cable for the Transmission & Distribution of Electrical Energy. (Rev. 1, 1994)	\$53
NEMA WC4-1988/ ICEA S-65-375	Varnished Cloth Insulated Wire & Cable for the Transmission & Distribution (Rev. 1, 1993)	\$54
NEMA WC5-1992/ ICEA S-61-402	Thermoplastic Insulated Wire & Cable for the Transmission & Distribution (Rev. 2, 1996)	\$55
NEMA WC7-1988/ ICEA S-66-524	Cross-Linked Polyethylene Insulated Wire & Cable for Transmission & Distribution (Rev. 3, 1996)	\$75
NEMA WC8-1988/ ICEA S-68-516	Ethylene-Propylene Insulated Wire & Cable for the Transmission & Distribution (Rev. 3, 1996)	\$87
NEMA WC50-1988/ ICEA P-53-426	Ampacities, 15-69 kV 1/c Power Cable Including Effect of Shield Losses (Solid Dielectric)	\$63
NEMA WC51-1991/ ICEA P-54-440	Ampacities of Cables in Open-Top Trays	\$20
NEMA WC53-1990/ ICEA T-27-581	Test Methods for Extruded Dielectric Cables	\$37
NEMA WC54-1990/ ICEA T-26-465	Guide for Frequency of Sampling Ext. Dielectric Cables	\$20
NEMA WC55-1992/ ICEA S-82-552	Instrumentation Cables & T.C. Wire	\$50
NEMA WC57-1995/ ICEA S-73-532	Standard for Control Cables (Rev. 2, 1998)	\$57
NEMA WC58-1997/ ICEA S-75-381	Portable & Mine Power Feeder Cables	\$103
NEMA WC70-1999/ ICEA S-95-658	Non-Shielded Power Cables Rated 2000 V or Less	\$93
NEMA WC71-1999/ ICEA S-96-659	Non-Shielded Power Cables Rated 2001 - 5000 V	\$77
NEMA WC74-2000/ ICEA S-93-639	Shielded Power Cables 5,000 - 46,000 V (pending)	



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All ANSI/ICEA Approved Standards are also available from:

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