

ICCN Newsletter

Act now! Special offer to first-time utility attendees to the ICC Spring meeting – ten complimentary registrations! Please contact thomasarnold@pesicc.org.

From the ICC Chair

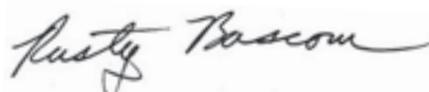


North American politics have impacted the electric power industry, as softened U.S. regulatory rules are allowing carbon-based energy sources to remain active while moderating support of renewable wind and solar power. Some of the recent transmission and distribution power cable activities were driven by FERC redundancy and reliability requirements and the changing landscape associated with the ballooning renewable energy industry.

Many states are taking control of electric energy locally by enacting regulations that had previously been enforced by the U.S. government, launching initiatives to modernize their respective electric systems impacting new power projects, including underground transmission and distribution. Solar and wind collection systems and local utility grid connections often require new cable systems, and while nuclear power trends are likely to remain flat, the aging electrical infrastructure in these facilities will continue to be important to the industry.

What does all this mean for the Insulated Conductors Committee (ICC)? Standards development and presentations will continue to have a great impact on the meaningful work we do. And, when it comes to standards, there is a LOT of work to be done. At the end of 2018, there were 13 standards under ICC responsibility due to expire, and a total of 26 standards – almost half of those currently under ICC custody – were due to expire by the end of 2021, with only a fraction having active Project Authorization Requests (“PAR” in standard-speak) for revisions. At its expiration date, a standard may remain available from the IEEE, but it immediately becomes inactive, restricting some organizations from using it. Beginning with the Fall 2016 meeting, the ICC increased the number of concurrent breakout sessions from five to six to accommodate the increasing demand, and we are considering options for more breakout sessions or shared time slots to provide more opportunities for standards work.

We have challenging work on an aggressive schedule ahead of us, and our meeting in Savannah, Georgia on April 7-10 will be a great place to start. I look forward to seeing you there – let’s get busy!



Earle C. (Rusty) Bascom, III
Electrical Consulting Engineers, P.C.

Spring 2019 Education Session – Is That Cable Fire-Rated?

By Rachel Mosier, Education Session Chair, PDC and Jared Jajack, Education Session Vice Chair, AEP

This is a question we may think we know the answer to, but do we really? At the Spring 2019 Education Session of the ICC, industry experts will discuss the difference between heat resistance, flame resistance and fire resistance as related to cables. We’ll learn about fire-rated cables, including where they are used, and how to select and install a fire-rated cable. Finally, we’ll learn about the very latest in fire-resistive testing.

Please join us at the Hyatt Regency in Savannah on Wednesday, April 10, from 1:00 – 5:00 p.m.

ICC Newsletter Team

Harry Orton,
ICC Communications Chair

Wim Boone,
ICC Communications Vice Chair

Ram Ramachandran,
AC Task Force Chair

ICC Awards

By Lauri Hiivala, ICC Awards Chair

Certificates of Appreciation (COAs) were awarded for the best presentation at a subcommittee, working group, discussion group or educational program meeting for the Spring 2018 meeting:

- Wayne Chatterton and Ben Lanz, Subcommittee A Meeting, *Fundamentals for Achieving Long Cable Life Series: Enhanced Overvoltage Protection for Reliability Beyond the First Decade*
- Eugene Weaver, Subcommittee B Meeting, *Progression of Faulted Circuit Indicators Technology*
- Sudhakar Cherukupalli and Karl Mai, Subcommittee C Meeting, *Trials and Tribulations with a Repair of a 230 kV SCFF Cable Damaged by a Dig-in*
- Shoji Mashio, Discussion Group C37 Meeting, *NEMO Link – Installation of World's First 400 kV DC XLPE Cable Link*
- Eric Rasmussen, Subcommittee D Meeting, *A Cable Manufacturer's Perspective of IAEA-TECDOC-1825*
- Ross Murphy, Subcommittee D Meeting, *A History and Comparison of Cable Tray Flame Tests in IEEE 383 and IEEE 1202*

- Stephen Halliwell, Arie Makovoz and Jade Wong, Subcommittee F Meeting, *Condition Assessment of Pipe-Type Joints Utilizing Limited-Angle Computed Tomography X-Ray Technology*.

COAs were also presented to all outgoing subcommittee, working group and discussion group chairs and vice chairs, or upon publication of their IEEE standard or guide:

- Frank Frentzas, Chair, Insulated Conductors Committee, Spring 2016 – Fall 2017
- Lonnie Martinez, Vice-Chair, Subcommittee C, *Cable Systems*, Fall 2016 – Spring 2018
- Art Maldonado, Chair, Subcommittee D, *Generating Station and Industrial Cable*, Spring 2014 – Spring 2018
- Joseph McAuliffe, Chair, Working Group A08, *Tests for Compatibility of Cable Pulling Lubricants with Wire & Cable (P1210)*
- Yuhsin Hawig, Vice-Chair, Discussion Group A20, *Low Voltage Cable Systems Rated up to 600 V*

- John Makal, Vice-Chair, Working Group B6, *Guide for the Connection of Surge Arresters to Protect Insulated Shielded Cable Systems (P1299)*.

Pierre Argaut received the 2018 Technical Committee Distinguished Service Award for his strong leadership, for continuously fostering the close international cooperation between IEEE PES ICC and CIGRE Study Committee B1, and for his contribution as Chair and Vice Chair of C29W in preparing Standard P1727-2013.



Technical Committee Distinguished Service Award recipient Pierre Argaut.

Enhanced Overvoltage Protection for Reliability Beyond the First Decade

By Ben Lanz and Wayne Chatterton, PhD, Imcorp

Our industry has always known that adequate overvoltage protection is essential for long solid dielectric insulation service life. So what should we learn from data indicating many aged cable systems only have a fraction of their original AC breakdown (ACBD) strength after the first five to ten years, or from case studies indicating they could significantly benefit from better protection?

One utility-scale study indicates that, as part of a condition-based reliability program, moving from a 50 percent to 97 percent compliance with better overvoltage protection yields a correlated 36 percent improvement in reliability.

Overvoltage protection margin has traditionally been calculated on the basis of new cable basic impulse levels (BIL). In addition to aging effects, even newly installed cable systems can have installation and manufacturing defects which can give rise to BIL degradation. The authors of the study provide examples of meter-by-meter cable performance profiles to show the before-and-after effects of voltage transients on cable system degradation. Discrete cable degradation at the points of origin, including defects or age-induced stress enhancements, are significantly driven by operational switching transients, lightning and other voltage

events with typical durations in the micro- to milliseconds range. This means that a typical incident voltage transient and its associated voltage doubling at points of significant impedance change can negatively impact several miles of cable systems.

To address this aging problem, we suggest circuit owners consider the following:

- installing surge arresters at large impedance transition points including end points, switch, 'T' & 'Y' points, and shield interrupts, and at any system connections points with long lead lengths of more than three feet.

ICC Standards Corner

By Gary Clark, P.E., ICC Standards Coordinator

Since the Spring 2018 ICC meeting, standards activities have been ongoing to create, maintain and revise PARs and standards. Working Group (WG) chairs have led numerous webcast and teleconference meetings, with members contributing critical comments and votes.

Congratulations to WG F02W, led by Chair William Larzelere and Vice-Chair Ryan Tarring, for successfully completing a revision to IEEE 400.1, "Guide for Field Testing of Laminated Dielectric, Shielded AC Power Cable Systems Rated 5 kV to 500 kV Using High Voltage Direct Current (HVDC)."

The following WGs received PAR extension approvals ahead of their submission deadlines:

- WG A13W, chaired by Detlef Wald, P1407 – "Guide for Accelerated Aging Tests for 5 kV to 46 kV Extruded Electric Power Cables Using Water-Filled Tanks" (PAR extension to December 2020)
- WG B06W, chaired by Ben Lanz, PC62.22.1 – "Guide for Connection of Surge Arresters to Protect Insulated Shielded Electric Power Cable Systems Up to 46 kV" (PAR revision to December 2022)
- WG C05W, chaired by Dave Purnhagen, P1406 – "Guide for the Use of Gas-in-Fluid Analysis for Paper and Laminated Paper-Polypropylene Insulated Cable Systems" (PAR revision to December 2019)
- WG D15W, chaired by Herbert Stansberry, P1202 – "Standard for Testing Flame-Propagation and Smoke Generation of Cable or Splices/Connectors" (PAR extension to December 2022).

We hope these four recently approved PAR requests, and the six other pending PAR requests under review by IEEE, kick off a successful 2019 for ICC standards contributions. 2019 will be an especially active year for the ICC, as 16 standards are currently slated to be rendered inactive if not acted on by the end of the year. If you intend to keep a standard active, submit a PAR for the revision of the standard ASAP; March 22 is the next NesCom submittal deadline for consideration at the May 2019 meeting. Please note that if it is decided a standard should be withdrawn, a PAR for withdrawal must be submitted.

There are nine standards that expired in 2018, and must be revised or withdrawn immediately: 400.3, 495, 532, 1210, 1216, 1234, 1425, 1493 and 1617. Four standards are due for revision or else will expire at the end of 2019: 48, 82, 635 and 1142. Seven standards expire in 2020: 634, 1120, 1185, 1428, 1511, 1511.1 and 1637. Only two standards expire in 2021: 1300 and 1682. Finally, ten standards are currently slated to expire in 2022: 400, 404, 422, 835, 1143, 1202, 1235, 1717, 1718 and 1793. In accordance with IEEE Standards Association (SA) policies, no standard development or draft document writing shall be performed until a PAR is submitted and approved by the IEEE-SA Standards Board. It is imperative that the responsible chairs and vice-chairs update these documents before their expiration date.

These 35 documents represent nearly three-fourths of the 51 standards and guides that ICC sponsors, not including 12 new standards that are currently under development. Each has a technical and financial impact on our economy, environment and society. We are grateful to the dedicated engineers, technicians and marketing/sales personnel that volunteer their efforts to write, revise and maintain these documents, along with the corporations that support these activities. We appreciate all of those that continue to participate in the standards development process and encourage ICC attendees to contribute to these working groups.

Scenes from the Fall 2018 Conference



Paul Knapp of UL addresses his audience.



Coffee break among the table top displays.



Lively discussion at the Transnational Luncheon.



Frank Frentzas, ComEd, delivers a key point.

International Events Calendar

Compiled by Harry Orton & Wim Boone

Conference Spotlight – JICABLE 2019

June 23 - 27, Versailles, France

An international forum for the exchange of information in the fields of research, industrial development, installation, operation and diagnosis relating to insulated power cables and their accessories. Packed with presentations and exhibits, JICABLE '19 is a don't-miss event for researchers, engineers, decision-makers, raw materials suppliers, manufacturers, consultants, installers and users. Learn more at www.jicable19.fr.

International Conference on Electrical Materials and Power Equipment (ICEMPE 2019)

7-10 April, Guangzhou, China • icempe.org/

CIRED

3-6 June, Madrid, Spain • cired2019.org

US Offshore Wind 2019

10-11 June, Boston, Mass., USA
events.newenergyupdate.com

IEEE Electrical Insulation Conference (EIC)

16-19 June, Calgary, Canada • iee-eic.org/

ESMO 2019

24-27 June, Columbus, Ohio, USA
iee-esmo.com

Subsea EMEA 2019

9-10 July, Marseille, France • terrapin.com

International Symposium on HV-engineering (ISH 2019)

26-30 August, Budapest, Hungary • ish2019.org

Subsea Networks World 2019

17-19 September, Singapore • terrapin.com

CEIDP

20-23 October, Richland, Washington, USA
ieeedeis.org/ceidp2

International Cable & Wire Exhibition

6-8 November 2019, New Delhi, India
10times.com

Upcoming ICC Events

April 7-10, 2019 • Spring ICC - Savannah, Georgia

Visit pesicc.org/ICCWP/meetings/spring-2019 to view all Spring ICC presentations and activities or to register for the meeting, the Networking Luncheon and Transnational Lunch.

October 21-23, 2019 • Fall ICC, Scottsdale, Arizona

Tell Us What You Think!

ICC welcomes your feedback. If you'd like to suggest topics for upcoming issues of the ICC Newsletter or add a colleague to our email database, please contact Harry Orton at h.orton.1966@ieee.org.

Enhanced Protection, continued from page 2

- minimizing known/controllable sources of voltage transients (e.g., reclosing, thumping, regulators) to lessen their effects on the system.
- designing protection using established steady-state BIL levels with margin (a maximum of 2 - 2.5 U₀ is recommended).
- Shortening lead lengths to practical operable/clearance minimums with the goal of less than three feet (one meter).
- Making every effort to remove voids and stress enhancements (defects) active at or below the protection level of the system.
- For single-phase URD applications, using standoff arresters instead of basic standoffs during outage restoration.

While these ideas have been circulating for years, we hope the new data and case studies will provide clarity and impetus to improve legacy designs and cable system reliability.

Cable Tray Flame Tests Described in IEEE 383 and IEEE 1202

By Ross Murphy, RCSS Wire & Cable

Cable tray flame tests were developed as a benchmark for determining cable flame characteristics and how they propagate. IEEE 383 – 1974, *A Standard for Type Testing of Class 1E Electric Cables, Field Splices and Connection for Nuclear Power Generating Stations*, first introduced a method for cable tray flame tests. This method standardized a 70,000 BTU/hour 20-minute flame test to be performed on completed cables.

The standard, which addresses many other qualification requirements for Class 1E electrical cables, specifies a cable tray test method that could produce varying results. The original method did not specify an enclosure, allowed options for flame sources (including an "oil-soaked burlap sack") and suffered from a lack of detail concerning the method. In the years after IEEE 383's publication, standards bodies, cable users and manufacturers conducted round-robin testing of IEEE 383 tray tests.

In 1977, the Nuclear Regulatory Commission produced regulatory guide 1.131, which outlined a more defined test method for the cable tray test, but did not change the benchmark of a passing result or the amount of cables used within the tray for a test. A passing result was achieved if the cables extinguished themselves after the 20 minutes of flame exposure and if the flame propagation did not reach the top of the eight-foot tray.

Many standards bodies introduced new and improved methods for cable tray flame tests. Published in 1991, IEEE 1202 *Standard for Flame Testing of Cables for Use in Cable Tray in Industrial and Commercial Occupancies* described many of the details that were still missing from the original IEEE 383 cable tray test. Those details included the description of an enclosure as outlined in UL 1685 and the fact that the flame source was applied to the cable tray at a 20-degree angle (instead of a perpendicular angle).

IEEE 383 was revised in 2003, ultimately adopting the IEEE 1202 cable tray flame test method, and continues to be referenced in the most recent revision of IEEE 383 published in 2015. IEEE 1202 was revised in 2006, and in 2012 a corrigendum was issued to the 2006 revision to create a more repeatable test. IEEE 1202 is currently within a revision cycle, where the working group is considering adding splices to the cable tray flame test.



Cable tray flame testing