Spring 2021, Volume 10, Issue 1

ICC Newsletter

From the ICC Chair

Henk Geene

I think most of us are happy to leave 2020 behind and look forward to a better 2021, the year that should give us our freedom back and allow us to catch up at our onsite ICC meetings.

Although it is amazing how quickly we switched to remote working, some work is difficult to continue online. For our ICC standardization activities, virtual meetings are a good way to move forward, but discussions and networking are more complex and require face-to-face meetings.

While the ICC Spring meeting is unlikely to happen, the situation for the ICC Fall 2021 meeting looks promising. It will be a great pleasure to meet you all in good health and to resume our meetings, chats and other things that make these events worthwhile.

Many businesses have suffered from the COVID crisis, but this doesn't seem to apply to the cable business. We might still see a slowdown in investments and some delay in ongoing cable projects, but if we look at the global trends, cable demand is likely to grow in the coming years.

In addition, energy demand is growing, driven in particular by the developing economies.

One of the most significant challenges facing the planet lies in the effects of greenhouse gases and climate change. While there are several gases that contribute to the greenhouse effect, carbon dioxide (CO2) is the largest contributor. The key element for future avoidance of CO2 emissions is the generation of electricity from wind, solar, wave, hydro and nuclear power.

Some of these sources are in remote areas or offshore and need to be connected, requiring long distance transmission connections. Additionally, the higher demand will require reinforcement of existing networks.

In conclusion, there is a lot of work to be done by our industry and the need for engineers to build and maintain the power networks is essential. One of the most important missions of ICC, aside from standardization, is the involvement of young engineers in our industry. Although the Internet is a powerful tool to gather information and remote working seems to be an unstoppable trend, obtaining experience is a matter of learning by doing and exchanging information with others in the same industry. To this end, ICC is bringing people together and at the same time utilizing an invaluable source of very useful information.

Stay safe and hope to see you soon.

Henk Geene

Service Experience Statistics of High Voltage Cable Systems

By Søren Damsgaard Mikkelsen, Energinet Eltransmission A/S and Rachel Mosier, Power Delivery Consultants, Inc.

The electric utility industry relies on accurate data to make informed decisions about underground, high-voltage cable installations. This includes decisions on the method of installation, choice of cable insulation and selection of accessories.

To support these decisions, CIGRE – the International Council on Large Electric Systems – has been gathering in-service statistics from cable systems since at least 1977.

In 2009, Technical Brochure (TB) 379 published the results of a survey covering land-based cable systems from 2001 to 2005 and submarine cable systems from 1991 to 2005. Since then, significant quantities of cables and accessories have been installed and the associated technology and laying techniques have matured and evolved. In particular, the quantity of submarine cables has grown, mainly as a consequence of offshore wind generation installations.

There are a number of interesting findings in the most recent CIGRE update, Technical Brochure TB815, which covers the period from 2006 to 2015. For instance, while it is commonly believed that accessories are more likely to fail than the cable itself, one very interesting conclusion shows that 56 percent of all faults on land-based AC cable systems were attributed to the cable, 16 percent were attributed to joints, 18 percent to terminations, and 9 percent to other components.

For more interesting statistics, download TB 815 by visiting *www.cigre.org*.

ICC Newsletter Team

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2021

IEEE Standard 2740® Selection and Installation Guide Is Approved

By Mick Bayer, PE, STV Houston

IEEE Standard 2740®, *Guide for Selection and Installation of Electrical Cables and Cable Systems in Hazardous (Classified) Locations on Oil and Gas Land Drilling Rigs*, was developed jointly by ICC and PCIC and was approved at the December 2020 RevCom meeting. As the technical issues for land drilling rigs are unique, experts from several rig manufacturers were added to the working group. Their participation was vital to the development of 2740.

This guide presents practices which address gaps in the selection, performance and installation of cables and cable systems for Class I hazardous (classified) locations not adequately addressed in other standards, recommended practices and guides. The focus areas for the guide's practices are flexibility, portability, allowance for innovation, and expanded use of cables and systems utilized in other industries. These practices are commonly used for land drilling rigs and have been shown through experience to result in safe, reliable, efficient and maintainable operations; of course, as with any standard, sound engineering judgement is required.

In the case of oil and gas well land drilling rigs in the United States, there are no standards or governing codes that directly address cables and cable systems. Land drilling rig applications often combine hazardous (classified) locations, extreme ambient temperature ranges, vibration, temporary installations, flexibility, and ability to transport over various terrains.

The National Electrical Code (NEC) NFPA 70 standard does not adequately address these issues, although the new article 337 on Type P cable in the NEC-2020 edition is a good start. NEC's primary focus for hazardous locations is fixed installations. When users have tried to apply NEC requirements for fixed installations in hazardous (classified) locations, they have encountered conflicts between the permitted requirements and the need for portability and flexibility; therefore, users have relied on the API RP 14F and API RP 14FZ recommended practices for installation methods, but these are not specific to oil and gas land drilling rigs since they reference offshore facilities. IEEE Standard 2740 endeavors to eliminate this conflict for engineers and inspectors working in the land drilling service.

HELP WANTED

The ICC has two key vacancies that our leadership team is looking to fill ASAP:

- Vice Chair – Subcommittee F – Field Testing and Diagnostics
- Vice Chair (Assistant Standards Coordinator) – Subcommittee E – Standards

Vice Chair positions are excellent opportunities to learn directly from the Chair and prepare for potentially filling that Chair role someday. Please contact *henk.geene@prysmian.com* if you are interested in volunteering for either of these critical openings.

thank you

Remembering Bruce Bernstein • May 19, 1931 – November 29, 2020

By Yingli Wen, Consolidated Edison Company of New York

Bruce Bernstein passed away on November 29, 2020 at 89. A pioneer in the study of water treeing in polymeric insulation and among the most knowledgeable in the field of dielectrics, Bruce contributed greatly to the power engineering community.

I had the honor to work with Bruce on projects at UCONN as well as Con Edison and benefited greatly from Bruce's friendship, guidance and encouragement. Below are words from a few of his long-time friends and associates.

Dr. Nirmal Singh:"I was fortunate to know and work with Bruce Bernstein for years. He had a deep understanding of every aspect of polymers and made significant contributions to extruded cables. He was always sharing his vast knowledge with others. His wise advice will be missed."

Dr. Matthew S. Mashikian: "The passing of Bruce Bernstein is a profound loss to the power cable technology community. His background as a competent chemist who was not afraid to confront serious technical challenges was a rare but badly needed commodity in a sea of electrical engineers.

"Bruce was instrumental in initiating and managing research projects covering every critical aspect of cable dielectric materials. I am proud to have him as a co-inventor on US Patent 6,005,192 covering a 'Jacket for Insulated Electric Cable,' resulting from research projects in which Bruce collaborated with UCONN faculty and staff. Bruce was a dear friend. We will all miss him very much."

Carlos Katz: "I knew Bruce for almost 50 years. In the early years in our friendship, we both did research work at Phelps Dodge Cable and Wire and co-authored several pioneering technical papers on the subject of electro-chemical treeing.

"Underground power cables insulated with PE, XLPE and EPR were initially thought to last over forty years. But it became apparent in the 1970s that their life expectancy was closer to ten to fifteen years. Bruce initiated research projects focusing on improving the quality of cable insulation and lowering the failure rate. He personally oversaw much of the R&D effort at EPRI and, as a result, manufacturers were compelled to upgrade the quality of underground cables, bringing cable life expectancy close to forty years."

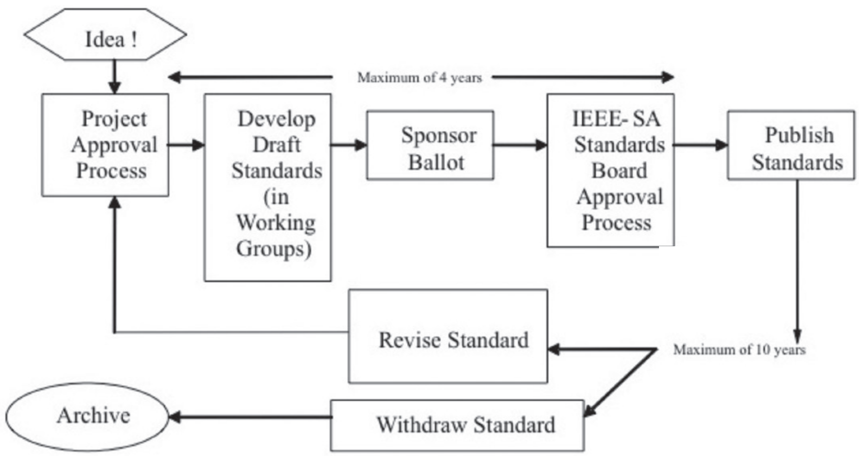
ICC Standards Corner

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

Since we have all missed the knowledge-sharing benefits of meeting in person for the past year, I'd like to recap the IEEE Standards Association (SA) process for developing a standard.

As you can see in the IEEE process flow diagram, creating or revising a standard is a lengthy process that repeats every 10 years. This all starts with a Working Group (WG) developing a Project Authorization Request (PAR). WG officers oversee the standards development project in adherence to the ICC Policies & Procedures (P&P) approved by IEEE. Please visit the IEEE-SA website for additional details: *https://standards.ieee.org/develop/index.html*.

If you are new to the ICC and aren't sure how you can start contributing to standards development, I recommend visiting the ICC website to see what each Subcommittee and WG is focusing on *pesicc.org/ICCWP/subcommittees*. When the next ICC meeting agenda is posted online, please scroll through the "Agenda" column on the right side of this schedule in order to see which WGs are actively working on specific standards development activities. You can always reach out directly to specific Subcommittee Chairs if you'd like to find out if any WGs have any urgent support needs. We appreciate all of those that continue to participate in the standards development process and encourage ICC attendees to contribute to these working groups.



IEEE SA STANDARDS ASSOCIATION

A Tribute to Ron Halderman, P.E. • July 24, 1947 – May 29, 2020

"HDD was not created to fill a need. It was created to fill a desire to provide an alternative methodology. New innovations are sporadic and largely a surprise coming from innovative people. They will happen and the industry needs to be ready to use them... HDD was created by innovators. It still needs that attitude more than ever."

Ron Halderman, P.E.
Trenchless Technology HDD Guide Story, July 2014

Horizontal Directional Drilling (HDD) is almost synonymous with Ron Halderman. He, along with other innovators, paved the way for trenchless technology. With 36 years of design and project management experience in HDD projects, including design build and Engineering, Procurement and Construction delivery methods, Ron never ceased to find a better way to serve his clients in the industry. A registered professional engineer, he held degrees in Geological Engineering from the Colorado School of Mines and graduate studies from the University of Idaho.

Over the years Ron published many articles and presented numerous papers. He was involved in many firsts in this industry – first mile long drill, first drill under an airport runway, first mile-long drill in rock – and he managed a number of award-winning projects across the globe. He held two HDD related patents entitled "Apparatus and Method for Recirculating Mud When Drilling under an Obstacle" and "Drilling Fluid Recovery when Drilling under an Obstacle or Water Body," with a third patent pending "Pulling Product Lines Underground Under Obstacles Including Water Bodies." He was co-creator of thixotropic thermal grout (No-Set™) for high voltage electrical transmission systems (patent pending).

Ron was inducted into the North American Society for Trenchless Technology (NASTT) Hall of Fame in 2015 for his contributions to the advancement of both the trenchless technology industry and the NASTT organization. Ron served as Director of Special Projects for Mears Group. He was a pillar of integrity and accomplishments that was well earned over his 36-year career in the industry. He was also a beloved father, husband, son, and friend to many. His wife, Lynn, always present and supportive of his career, can attest to his quirky humor, but also of his grounded stability, and love for his family. Ron passed away Friday, May 29, in Billings, Montana after battling cancer.

Mears was privileged to have a person of Ron's stature in its ranks and is thankful for his innovativeness and passion for his work. He will always remain part of the Mears' family and is an integral part of the Company's history as a truly remarkable person. Donations in Ron's memory can be made to the Colorado School of Mines at *giving.mines.edu*.

International Events Calendar

Compiled by Harry Orton

The world situation has made it very difficult to provide accurate conference listings and dates as some conferences have gone virtual while others have been cancelled. Please refer to the respective website for up-to-date conference information.

Offshore Wind Connections 2021
21-22 April 2021
Hessle, East Riding of Yorkshire, UK
Marygreen@thma.co.uk
offshorewindconnections.com/

Interwire
10-13 May 2021
Atlanta, GA, USA
www.wirenet.org

Clean Power 2021
7-10 June 2021, Indianapolis, IN, USA
AWEA.org

EIC (Electrical Insulation Conference)
June 2021, to be held as a virtual conference.
ieee-eic.org

ICPADM (International Conference on the Properties and Applications of Dielectric Materials)
11-15 July 2021, Johor Bahru, Malaysia
zulkurnain@utm.my
attend.ieee.org/icpadm-2021/

CIGRE General Session
21-25 August 2021, Paris, France
cigre.org

AWEA (American Wind Energy Association)
13-15 October 2021, Boston MA, USA
AWEA.org

CEIDP (Conference on Electrical Insulation and Dielectric Phenomena)
17-21 October 2021, Vancouver, Canada
ceidp.org

IEEE PES T&D Conference
25-28 April 2022, New Orleans LA, USA
TDGeneral@ieee.org
ieeet-d.org/IEEE20/public/enter.aspx

Calendar

Upcoming ICC Events

Spring 2021: Apr 18 - 21, Denver, CO
(depending on the COVID guidelines set by the authorities)

Fall 2021: Oct 31 - Nov 3, location to be confirmed

Spring 2022: 1-4 May 2022, Anaheim, CA

Fall 2022: 30 Oct - 2 Nov 2022, Orlando, FL
pesicc.org/ICCWP/

AEIC CS8-20 Publication

By Michael Smalley, WEC Energy Group

The Association of Edison Illuminating Companies (AEIC) was founded in 1885 by Thomas Edison and his associates. One of AEIC's standing committees is the Cable Engineering Committee (CEC). It continues to develop and improve underground electrical systems by publishing detailed cable specifications and guides that are followed by utilities, architects, engineers, and developers worldwide.

One of the CEC's recently published specifications is the fifth edition of CS8, *Specification for Extruded Dielectric, Shielded Power Cables Rated 5 Through 46 kV*. This specification is voluntary and is written as a supplement to the American National Standards Institute (ANSI) and Insulated Cable Engineers Association (ICEA) industry standards.

A key CEC goal is to ensure that the level of cable performance utilities have come to expect over many years of positive field experience is at least maintained or preferably improved at a reasonable cost. The CEC defines the present level of performance in terms of the physical and electrical properties of the cable that member companies receive from their cable manufacturers. These properties are determined via a review of production certified test reports (CTRs) and, for many members, by physical inspection and measurement of completed cable samples prior to cable acceptance.

Many of the revisions in the 2020 version of CS8 have been added based on the CEC's findings during the aforementioned review process. A few of the significant changes to this revision are described below.

Insulation Cure: The test sample elongation requirement shown in ANSI/ICEA standards defining adequate curing of some cross-linked polyethylene (XLPE)-based insulation was changed from 175 percent to 120 percent. In addition, three specimens from the inner 25 percent of the cable insulation must now be tested rather than just one. Furthermore, one of those specimens must be harvested from insulation adjacent to the conductor shield, where adequate curing is often harder to achieve, yet this is the area that experiences the highest operating temperatures.

Partial Discharge Test Procedure: Some CEC members and cable testing/commissioning service providers have reported new cables not passing field partial discharge commissioning tests. Some failures of this type can be attributed to inadequate degassing of the cable core prior to electrical production testing as this limits the effectiveness of these tests. The CEC has changed the requirements for degassing to ensure that no additional layers (such as metallic shield, except round wires, or jacket) are applied to the core during the wait period (normally seven full days). If certain conditions are met, wait times may be less than seven days depending on insulation wall thicknesses.

CTRs: The CEC has defined minimum reporting requirements for CTRs. The CEC has also required that any in-plant repairs or rework of cables be documented on the CTR.

Monthly Continuous Vulcanization (CV) Line Requalification: The monthly CV requalification process was put in place years ago as a way to extend the original manufacturer's CV qualification to other CV lines the manufacturer operates. The CEC has noticed that the testing and reporting associated with this requirement is often completed three to six months after samples are drawn. The requalification test is intended to be a real-time requalification and speedy evaluation of the test results to allow the manufacturer to notice negative manufacturing trends so that problems can be addressed before production test failures occur. In this revision, the CEC has initially limited the lag time for testing and reporting to three months. In addition, test limits have been revised, failure reporting requirements have been defined, and a means to requalify a failed CV line has been added.

AEIC CS8 is available by visiting AEIC's website (*www.aeic.org*) and clicking on the "Cable Specs" heading. The link takes users to AEIC's interactive store, where cable specifications and guides may be purchased in either a printed edition or digitally.

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 Rachel Mosier at r.mosier@pdc-cables.com or Yingli Wen at weny@coned.com.