A Conversation with the Incoming ICC Chair

Henk Geene, the new Chair of the ICC, is the first person from outside North America to serve in this role. He discusses this and other facets of his new position with Wim Boone, outgoing ICC Communications Vice Chair.

What are your thoughts about being named ICC Chair?

I consider the ICC as an excellent place for standardization, for exchange of information and for networking. I feel great that, after 25 years of active ICC membership, I may now serve as Chair for two years. My role is an indication that the ICC, while US-based, is increasingly becoming international in scope.

Will you extend ICC's growth as an international organization?

One of my goals is coordination with international standardization bodies like IEC, which is required to avoid conflicts between different standards. I also will try to promote the combination of CIGRE Working Group (WG) meetings with visits to ICC Conferences. Often, the first contact with ICC happens in such a coincidence.

What will be your main policy measures?

According to my view, we should work to increase the participation of utilities in the ICC. Standardization has to take place in a necessary combination of different disciplines that are typically present at the ICC: utilities, manufacturers, consultants and academia. When visiting utilities, I try to raise awareness of the benefits of the ICC. I also want to draw the attention of other ICC members to make their own modest propaganda for more utility participants!

What won’t you do?

I don’t like rules for the sake of rules. They are there to give guidance to our work, but they shouldn’t become an obstacle to it. I also want to avoid a very strict regimen for Working Groups. Preparing standards is a complicated thing based on voluntary work; therefore, we should give the WGs some freedom to do it their way. Finally, I won’t locate ICC meetings at expensive resorts: first, because we come together to get work done; and second, because utility engineers may be restricted in participation by the expense of staying at a luxury venue.

How challenging will it be to combine your ICC work with your job?

It won’t be easy, but I have the full support of my company and my family. I learned from my parents, both farmers, that when a challenge arises, do not complain, do not refer to fate, but just do what must be done. That’s my guideline for the next two years!

Engineering Ethics Course

By Rachel Mosier, Education Session Chair, PDC

This past Fall, the ICC introduced a new session on Engineering Ethics, and it was a great success. Over 50 people attended the session, and 23 of those people received CEUs for their attendance.

The course was presented by the ICC’s very own Charles Darnell. In 2018, Mr. Darnell began researching engineering rule violations and ethics infractions to present to engineering colleagues around the world. The case studies he presented offered constructive insights to guide engineers toward the ethical high ground and were used to lead a lively discussion.

One representative case study involves a registered professional engineer, Beth, who provided engineering services during a marine emergency that posed a clear and present danger to life and property. However, she was not registered in the jurisdiction where the vessel was currently working. After she completed the emergency assignment, Beth petitioned the state board for temporary registration status. However, the state board was only authorized to grant temporary registration prior to initiating any engineering services. Another registrant with the state board filed a written complaint and Beth was found negligent in providing engineering services by an unregistered party. In addition, the consent decree required her to report the infraction to all other state boards where she was registered. In this case, the need for timely and competent engineering services to address a hazard was hindered by the same laws that are designed to protect the public.

In addition to the thought-provoking cases and discussion, those interested were able to receive CEUs for the session. And if you hold a P.E. in either New York or Florida, it may be of interest to you that IEEE is considered a New York sponsor as well as a Continuing Education Provider in Florida.
Using Forensic Diagnostics to Manage Water-Treeing in MV Cables
By Nigel Hampton, Josh Perkel, Thomas Parker and Dean Williams, Georgia Tech

The underground power system makes up a significant portion of the U.S. distribution infrastructure. Most of the reported failures in the system are associated with accessories. However, the larger concern are the cables, which, as distributed devices, are more difficult and costly to address. This concern is amplified by the fact that cable from earlier generations still make up a large portion of the utility system. The main mode of failure for EPR, HMWPE, WTRXLPE and XLPE cable is considered to be the conversion of water trees to electrical trees due to the modification of both the electrical strength and the electrical stress in the cable.

Often, samples of cable that fail and cables of similar vintage and installation type can be extracted for further study. Within these samples, the water trees in EPR and PE-based insulations can be observed and measured, thereby providing leading indicators to an asset management program so that appropriate actions may be taken.

This work has led to the development of a Health Index algorithm that can provide context to water tree studies. The algorithm uses information about size, density, location, age and installation type.

The work has shown a more definitive relationship by analyzing water tree growth in hundreds of samples and processing the results using machine learning. An example is the rate of growth for the longer vented trees (VT) and bowtie trees (BTT). Now, when utilities send aged underground cable samples for evaluation, the high-level data analytics can be used to make an informed decision about whether to replace the cable or to accept the risk of leaving it in service. This risk estimation is accomplished by seeing how closely the extracted cable sample resembles the cables that failed in-service and those that survived in-service.

This analysis of samples from the field is another tool, such as diagnostics, with which to manage the cable fleet. More information is available in a paper that was presented at the Jcable19 Conference in June 2019: http://www.neetrac.gatech.edu/publications/jcable19-19_Treeing_Asset_Management_Final.pdf
Technical activities are at the heart of IEEE. They benefit, guide, and educate more than 400,000 worldwide members. The IEEE has more than 1,250 active standards, with over 700 under development across its 39 technical societies. Half of these are maintained by the Power & Energy Society (PES). The ICC is one of the 17 Technical Committees (TC) of PES, where each TC sponsors a variety of working groups (WGs) that develop standards, recommended practices, and guides.

The ICC contributes approximately 8 percent of the active PES standards, as shown in the pie chart provided by the IEEE PES Standards Coordination Committee. These standards are developed, maintained and revised by volunteer technical experts. Much of this work is accomplished twice a year at the ICC Fall and Spring Meetings, supplemented by telephone and web conference meetings throughout the year as needed. In addition to the professional development benefits of working alongside industry experts, IEEE volunteers benefit by developing interpersonal skills, making lasting friendships, and expanding professional networks.

By reviewing the upcoming ICC Spring Meeting agenda and volunteering, you can contribute or become informed on many topics. These are exciting times for the cable industry, and every contribution is critical to keep our industry and society moving forward!

### Improving Diagnostic Test Interpretation Based on Dielectric Loss Measurements

By JF Drapeau, Hydro-Quebec Research Institute

As a testing approach for performing condition assessment of underground cable systems, dielectric loss measurement (e.g., VLF Tan Delta) poses a number of challenges, in terms of interpretation of the results data, related to the fact that it constitutes a “global” measurement. Overall, the dielectric loss measured on a whole cable system is the result of the summation of all the specific loss contributions of each individual component (cable segments, joints and terminations) averaged over the total direct capacitance of the cable system.

In that context, and considering the existing guidance provided by IEEE 400.2, the use of classical diagnostics such as VLF Tan Delta does not allow discrimination between the various types of degradation that may be present. However, research work carried out at the Hydro-Quebec Research Institute (IREQ) over the last decade has shown that the use of “advanced” VLF Tan Delta criteria has the potential to bring more interpretive information (CF. Pres. at ICC Sub F Fall 2017). Furthermore, investigations made with Time Domain Dielectric Spectroscopy (TDDS) over the same period (CF. Pres. at ICC Sub F Spring 2018) has shown a strong potential to bring even more relevant interpretive information.

Recent work has shown that an analysis strategy that combines these two sets of new diagnostic parameters can significantly improve the interpretive potential of the condition assessment. As a practical outcome, this work has allowed the formulation of a preliminary version of a new interpretive grid (Figure 1).

### Proposed Interpretive Grid

<table>
<thead>
<tr>
<th>Diagnostic Features</th>
<th>Value</th>
<th>Criterion(s)</th>
<th>Type group</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLF Tan Delta</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VLF TD : Mean @ 1 Hz</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>VLF TD : TUTU (High电缆 &gt; 2.5 kV)</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>VLF TD : Time Stability (Low)</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>VLF TD : Time Stability (Small)</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>VLF TD : Temporal Slope</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>VLF TD : Influence of Environment</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>VLF TD : Influence of Cable Type</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>

**VLF TD Time Evolution Graph**

**Time Domain Dielectric Spectroscopy**

**Combined TDSS & VLF TD results on the same graph (dielectric spectrum)**

**Figure 1**

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International Events Calendar
Compiled by Harry Orton

Interwire
13-16 May 2020
Atlanta, GA, USA
www.wirenet.org

EIC (Electrical Insulation Conference)
7-11 June 2020
Knoxville, TN, USA
www.ieeedeis.com

US Offshore Wind
18-19 June 2020
Boston, MA, USA
www.events.newenergyupdate.com

CIGRE General Meeting
23-27 August 2020
Paris, France
www.cigre.org

ISEIM (International Symposium on Electrical Insulating Materials)
13-17 September 2020
Waseda University, Tokyo, Japan
www2.iee.or.jp

AWEA Offshore Windpower
13-14 October 2020
Cleveland, Ohio, USA
www.AWEA.org

CEIDP (Conference on Electrical Insulation and Dielectric Phenomena)
17-21 October 2020
East Rutherford, NJ, USA
www.ceidp.org

CMD (Conference on Monitoring and Diagnostics)
25-28 October 2020
Phuket, Thailand
www.cmd2020.org

ICPADM (International Conference on the Properties and Applications of Dielectric Materials)
11-15 July 2021
Johor Bahru, Malaysia
www.ieeedeis.com

Upcoming ICC Events

May 3-6 2020, Spring ICC,
Palm Springs, CA
Visit pesicc.org/ICCW/meetings/spring-2020 to view all Spring ICC presentations and activities or to register for the meeting, the Networking Luncheon and Transnational Lunch.

October 25-28 2020 Fall ICC,
Bonita Springs, FL

April 18-21 2021, Spring ICC,
Denver, CO

International Events Calendar
Compiled by Harry Orton

Furthermore, the work has enabled the formulation of new diagnostic parameters for TDDS, ultimately leading to a proposed new visual interpretative tool (Figure 2) based on dielectric loss values (in polarization and depolarization) measured at 1 mHz (0.001 Hz).

![Figure 2: POL vs. DEPOL Interpretation Diagram](image)

At this stage, such interpretative tools are to be considered preliminary, due to the limited amount of statistical data. The purpose of this communication is to make these tools available to the scientific community and to the experts to enable more relevant data to be eventually added to the dataset, which would refine the new proposed diagnostic parameters and eventually determine more accurate interpretative criteria.

**5th Edition of AEIC CS8 Published**

The Association of Edison Illuminating Companies (AEIC) Cable Engineering Committee (CEC) has published the 5th edition of AEIC CS8 “Specification for Extruded Dielectric, Shielded Power Cables rated 5 through 46 kV”. This voluntary specification covers medium voltage power cable and is written as a supplement to ANSI/ICEA industry standards.

In this revision, updates were made to insulation requirements (physical and use of compound provided in boxes), production test procedures (partial discharge testing, cure testing, and diameter measurement), continuous vulcanizing (CV) extrusion qualification test requirements and minimum reporting requirements for Certified Production Test Reports (CTR’s). Other general revisions were made to various sections that further clarify AEIC’s expectations.

AEIC CS8 and eighteen other cable specifications and guides are available by visiting AEIC’s website, www.aeic.org, and clicking on the “Cable Specs” heading on the first page. Viewers will be taken to AEIC’s interactive store, where cable specifications and guides, as well as the AEIC Load Research Manual, may be purchased in either written form, digitally, or both.

“We are very pleased to offer this new edition of our CS8 specification. It and the other AEIC cable specifications and guides are used by practitioners across the United States and internationally,” said Arie Makovoz, Chair of AEIC’s Cable Engineering Committee.

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 y.wen@ieee.org.