

Report on the
IEC Young Professionals Programme 2017

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Electricity Engineers'
Association



**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HIKINA WHAKATUTUKI

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Key Learnings:

The International Electrotechnical Commission (IEC) Young Professionals Programme (YPP) has been designed to enable the IEC to reach out to the young engineers and standard users. This programme encourages them towards future involvement, sustained participation and nurtures emerging leadership in IEC.

The primary aim of this programme is to make young engineers aware of the functioning of the IEC. This 3-day programme focuses on how consensus is reached in IEC by agreement on clauses in standards between several National Committees. The stages involved in the development of an international standard (from new proposals to the final international standards) are demonstrated to young professionals.

From a national standpoint, participation in the IEC YPP and its associated events is of strategic importance. Notwithstanding geographical location and size, New Zealand expertise is recognized at the global platform. The YPP has the potential to harness young talent and mold it into effective leadership. I have summarized some of my learnings on this below:

1. YPP in New Zealand will ensure that there are future leaders/technical experts in IEC from New Zealand like Mr. Derek Johns who was the ex-Chair of TC61.
2. YPP in New Zealand will ensure that the “lobbying expertise” needed to succeed at the international stage is introduced to young professionals. The exercises around consensus building and the real experience of witnessing those are critical to develop leaders in the field.
3. YPP in New Zealand can help identify key areas in IEC where a technological change can be brought about by participating in IEC technical committees for the benefit of NZ industry.
4. YPP in New Zealand will help provide a greater industry participation in standardization activities. This is mutually beneficial for both the NZ IEC National Committee and the NZ industry to keep abreast of rapid technological advancements globally.
5. YPP in New Zealand has the potential to increase NZ’s global reach by changing its Observer (O) member status to Participating (P) member in different Technical Committees. Currently, NZ is a P-member in 18 of the 120 technical committees. A participation percentage of only 15% is not truly reflective of this highly innovative country.
6. YPP in New Zealand will also help in bridging the gap between industry and academia. It is a myth that only industry/working professionals can contribute to standards development. YPP and academia can identify ‘gaps’ in current standards. They can work together to plug these gaps by providing valuable theoretical/experimental evidence. This evidence can be subsequently used to deliberate at the IEC Technical Committee level.

Finally, IEC YPP provides the opportunity to meet with diverse young professionals from different countries. As engineers, we run the risk of losing sight of the social aspects of our work. Attending events like these, is akin to a window to newer vistas. Interactions with other professionals from all over the world at events like these, create the unique opportunity to learn, grow and deliver. Attending the programme at Vladivostok has been a life changing opportunity for me and I remain grateful to IEC, Standards NZ, MBIE and EEA for enabling me to represent New Zealand and its achievements at a global forum.

My Background

At the outset, let me thank EEA, Standards NZ and MBIE for providing me with the opportunity to attend the 8th edition of IEC YPP at the Far Eastern Federal University (FEFU) campus, Russky Island, Vladivostok, Russia in conjunction with the 81st IEC Annual General Meeting. I attended IEC YPP 2017 as the NZ YP representative, having received the EEA Young Engineer of the Year Award for 2017.

I completed my PhD in Electrical Engineering in December 2013 from University of Canterbury, Christchurch. Subsequently, I joined ETEL Ltd, a subsidiary of Unison Networks Ltd in January 2014 as the research engineer for the "*smart transformer*" project in close association with the Asset Intelligence team of Unison Networks Ltd. The smart transformer provides the following advantages over conventional transformers:

- Enhanced transformer capacity (rating)
- Knowledge of transformer life used
- Anticipate and avoid faults
- Faster restoration of supply post-fault
- Optimization of planned maintenance
- Improved planning and network design - understand impact of EVs

These transformers allow utilities to maximize the return on their investment, taking advantage of a transformer's loading capability to achieve financial savings by purchasing transformers not rated at peak load and by deferring the purchase of new transformers and reduce operating costs - this is the "smarter" way of operation in the future smart grid. Two of such transformers are in operation in Unison's network.

My current and future involvement in IEC activities

As a transformer research engineer and person in charge of ETEL's R&D laboratory which I helped set up, I have to adhere to IEC standards from the concept design to the final test phase. There are 16 IEC transformer standards IEC 60076 series which I have to follow in addition to various related IEC standards. There are 2 main aspects of IEC which I adhere to:

1. Conformity assessment (CA) – CA results in determining whether our transformers correspond to the requirements contained in a standard. This is done by electrical testing of transformers in the R&D laboratory.
2. Standardization – Standardization ensures we manufacture safe, reliable transformers which we can market globally. This ensures a level playing field for all manufacturers.

In terms of standards, IEC 60076 standard has provided a thermal model to accurately determine temperature rises for outdoor transformers. However, with the ever increasing trend to use kiosk transformers with HV and LV compartments, the need for new indoor thermal models in the standards are justified. I and Prof. Zoran Radakovich from University of Serbia have developed the new indoor thermal model for kiosk transformers. The research has been published in Elsevier's International Journal of Electrical Power and Energy systems, Volume 92, November 2017. We plan to present the same to the IEC Technical Committee so that the

approximations in the current standards can be replaced with an accurate model. This would ensure transformer manufacturers can make savings in manufacturing as the current approximations are highly conservative.

Apart from this, I used IEC standards to establish the ETEL R&D laboratory as shown below.



ETEL R&D laboratory

There are now more than 10 YPs from New Zealand who have attended the IEC YPP since 2010. The formation of NZ YPP is a step in the right direction. The EEA Young Engineer of the Year (YEY) award is a wonderful initiative by EEA. It works towards introducing the world of IEC and intends to develop a long-term association with NZ YPP. The APEX Summit conducted by EEA should have a dedicated slot for the previous YEY to inform other NZ young engineers about IEC and standard development. To increase the number of YPs and their participation, Standards NZ and EEA can get involved with other professional bodies like Engineering New Zealand to select candidates other than the EEA YEY. Standards NZ should also identify key NZ stakeholders such as manufacturers and asset owners to select their young employees to be part of the NZ YPP. Outgoing YPs can mentor YPs based on their own experience.

I look forward to provide proactive leadership in NZ YPP and remain actively involved.

Workshop Overview

IEC YPP has been developed to enable the IEC to reach out to younger engineers and standard users and encourage future involvement, long- term participation and leadership in IEC

in future. The primary aim of this workshop is to help young engineers understand the functioning of the IEC through the following:

1. Lectures by experienced IEC experts and YP leaders from previous year.
2. Interactive sessions with IEC leaders.
3. Group activities such as mock Technical Committee simulation and breakout sessions.
4. Observing a chosen Technical Committee meeting and either the Conformance Assessment Board (CAB) or a Standardization Management Board (SMB) meeting.

This 3-day workshop focuses on how consensus is reached in IEC by agreement between several National Committees. The nature of “technical politics” was amply demonstrated and I was exposed to the concept of lobbying at an international level.

Prior to my departure for Vladivostok, Robert McLaren (IEC YP Coordinator) provided sufficient material about the IEC. This included questions for breakout sessions and mock Technical Committee simulation material. A mandatory online training course to ensure that all YPs were familiar with IEC was undertaken. The course was evaluated by 9 questions and the minimum pass criteria was at least 7 out of 9, with a maximum of 2 attempts allowed.

My schedule during the event is given below:

Day 1: Monday 9th October 2017

8.00 - 10.15	IEC President address, <i>J. Shannon</i> Welcome from IEC General Secretary & CEO, <i>F. Vreeswijk</i> Looking at the future, <i>K. Fraga</i> Message from the 2017 YP Leaders, <i>A. Sellers</i> What to expect at a technical meeting, <i>D. Chew</i> Q&A session on IEC operations, <i>Moderated by R. McLaren</i> , panelists: <i>M. Amos, D. Chew, K. Fraga, K. Higginbottom, M. Wood</i>
10.45 - 12.30	Breakout session - Part 1, <i>M. Wood</i> Morning wrap-up, <i>R. McLaren</i>
12.30 - 13.30	<i>Lunch with the Standardization Management Board (SMB) members</i>
13.30 - 15.15	Observe the SMB meeting
15.45 - 17.30	Breakout session – Part 2, <i>G. Fournet</i> IEC participation: strategic benefits for your company, <i>G. Idinger</i> Day one wrap-up, <i>R. McLaren, C-k. Park</i>
18:00	IEC General Meeting Opening Ceremony

Day 2: Tuesday 10th October 2017

7.30 - 8:30	Breakfast with NZ National Committee
9.00 - 10.15	IEC Conformity Assessment, <i>D. Hanlon, P. Selva</i>
10.45 - 12.30	Observe TC 99 meeting -
12.30 - 13.30	Lunch break
13.30 - 18.00	Simulation of an IEC technical meeting exercise, <i>R. McLaren, M. Wood</i> IEC participation: a personal perspective, <i>V. Mahendru</i> Plenary closing session Closing address, <i>J. Shannon</i> Day two wrap-up, <i>R. McLaren</i>
19.30 - 22.00	YP dinner

Day 3: Wednesday 11th October 2017

9.00 - 10.30	Interactive session - IEC Standards development processes, <i>P. Sebellin</i>
11.00 - 12.30	- YP Open breakout session, <i>G. Fournet, R. McLaren, C-k. Park, A. Sellers, P. Zahedi</i>
12:30 - 13:30	- Lunch

Workshop Learning Day 1:

The IEC YPP 2017 started with an opening address by the current IEC President, **Mr. James Shannon**. Mr. Shannon appreciated the demographic diversity of the 67 YPs attending. Mr. Shannon encouraged YPs to be actively engaged in IEC activities so that IEC continues to evolve and adapt itself with the pace at which electrical/electronic technology is progressing and developing. Mr. Frans Vreeswijk, the IEC General Secretary and CEO, delivered his welcome speech to the YPs. He touched upon various aspects of IEC by providing a glimpse of its 110 year old history, the structure and scope of IEC, IEC membership, voting rights etc, which have led the IEC to develop more than 10,000 international standards to date. He gave insights to the Standards Management Board (SMB), Conformity Assessment Board (CAB) and Market Strategy Board (MSB). Mr. Vreeswijk also encouraged YPs to enjoy and learn from this experience.

Ms. Katharine Fraga, the Head of Governance and Global Strategy of IEC, presented the IEC Masterplan which encompasses the vision, mission, values and strategic objectives of IEC. She also emphasized the importance of National Committees as they serve as the backbone of

IEC. We were then introduced to Mr. Allan Sellers from UK who spoke as the IEC YP Leader of 2016. Keeping it brief, he expressed his intent to inspire future YPs to shape the future of IEC. Other IEC YP Leaders of 2016 were also introduced namely Mr. Polad Zahedi from Canada and Mr. Chan-Keun Park of Korea. The final speaker of this session was Mr. Dennis Chew, the IEC Regional Director of Asia Pacific Regional Centre. Mr. Chew outlined the stages involved in the development of international standards ranging from New Proposal (NP), Committee Draft (CD) all the way to the final International Standards (IS). He also described the structure of the Technical Committees and Subcommittees within IEC alongside the Working Group (WG), Project Team (PT) and Maintenance Team (MT). He then walked the YPs through the agenda of an IEC technical meeting. The first session ended with Mr. Robert McLaren moderating a Q&A session between the YPs and the panelists. He also raised the questions that some YPs had provided earlier before the session. I utilised this opportunity to enquire about NZ participation in Technical Committee 14 as ETEL Ltd is the leading transformer manufacturer in NZ. After a short break, the workshop proceeded with the breakout session where all YPs were segregated into four groups to brainstorm on different questions. I was in the fourth group. The questions we had were -

a) To ensure that your company can develop your IS on time, should the way IEC Technical Committees are currently working change, and how?

We agreed that achieving consensus amongst all stakeholders is the most time consuming and challenging stage. We in particular addressed question in the following fashion:

- Submit our proposal with our draft standard and then send it internationally without any restrictions - one international process not 170.
- Use the IEC network to contact all the experts, academia, governments and National Committees.
- Get all the private members to vote “yes”.

b) What technologies could be used to accelerate this IS development process but at the same time ensure global consensus?

This question was answered in the following manner:

- A new technology to be able to interact in online meetings the same way we do it in face to face meetings, allowing us to share information, comments with a multi-language platform.
- Live documents able to cope with formulas and technical data analysis.
- International online system.
- Instant messaging.
- Efficiency-based rewards.

c) What will this IS look like and how do you think it will be used (for example machine readable)?

Some of the ideas were -

- The IEC will have an open source cloud-based software which can be updated, set-up and configured as needed.
- A new system for testing and certification which will be done by machines.
- More links to social and technical networks.

d) The IEC is currently shifting the internal content format of its IS and their development from Microsoft Word to XML. What will we have?

- We will have live documents.
- XML can generate and edit the documents in a more efficient way than MS Office.
- We will use less space and resources in digital storage.
- We will be able to re-allocate more resources for standard development.

After this session, all YPs were granted the opportunity to observe either the CAB or SMB meeting. Sitting in the SMB meeting, I got to observe the presentation of reports of regional activities by AFRC, LARC, APRC and ReCNA, a progress update by the SEG's and ISO/IEC Joint Technical Committee and a report on the monitoring of Technical Committees. After the SMB meeting observation, YPs were briefed by Ms. Guilaine Fournet, Head of Sales & Business Development. The briefing was mainly centered on IEC products, services and new revenue generators. All YPs then proceeded to the next round of breakout sessions where we had to answer more questions on the new IEC business model. Our proposal included new IEC branches such as:

IEC CONSULTING

- To comply with the standards.
- To comply with national regulations.
- Terminology, concepts and testing topics.
- Requirements for a certain product in a certain market.
- For developing new products (design guidelines).
- IEC signatories (IEC AP).
- Selling CB accreditations to more labs.

IEC NEW TECHNOLOGY

- The system will be able to do the following:
- Show you all the test parameters from one standard for one destination.
- Submitting inquiries/questions and get a quick answer.
- Track the changes in the standard.
- See the full test including additional parts, references, updates, etc.
- Make calculations with the formulas coming from the standard.



My participation in the open breakout session

This session was followed by another session by Mr. Günter Idinger on the strategic benefits that IEC participation can bring to one's company. Day one ended with a brief wrap-up session by Mr. McLaren.

Workshop Learning Day 2:



With Mr. Peter Berry, President of IEC National Committee of New Zealand

Day 2 started with a breakfast session with the NZ National Committee led by Mr. Peter Berry, President of IEC National Committee along with Garry House of TC 31.

The morning session started with a presentation by Mr. David Hanlon, the Secretary of CAB on IEC Conformity Assessment (CA). He started the presentation with an interesting slide which highlighted the power of branding and influence of price on consumers' behavior. He then went on to articulate on the implications brought about by standards which include value creation as well as providing a level playing field for smaller industries by giving an example of refrigerators. He also explained how product conformity assessment can be done: a) First party CA issued by manufacturers and suppliers - sDOC. b) Second party CA by the customer c) Third party CA by an independent organization. There are four IEC CA systems namely IECEE, IECEX, IECQ and IECRE. CA is performed with safety, performance, interoperability and financial risk in mind. ISO/IEC 17000 is the main standard that governs CA activities. For products deemed as low risk, self-declaration of conformance of product may be sufficient. Type test certification is needed for products carrying moderate risk while full assessment with surveillance is required for high risk products.

Mr. Pierre Selva, from Siemens France, then presented the CA views of a manufacturer. To him, CA without market surveillance is only a loss while standards without CA is only a good idea. In a nutshell, standards and CA mutually complement each other. To a manufacturer, CA is important for business as it grants access to customers, adds value as well as allows the demonstration of compliance to regulation.

After this YPs were given another opportunity to observe a designated Technical Committee meeting. I chose to attend TC99/MT 4 which looks after the erection of electrical power apparatus in HV systems. One of the items of the agenda list which I managed to observe was the debate between various members on the proposal of comment addition put forward by Norwegian NC. After the meeting, I understood the true meaning of CONSENSUS - *"it's not the presence of agreement, rather the absence of disagreement"*.

In the post lunch session, the YPs broke out into several groups to simulate an IEC TC exercise. In each group, the YPs were further divided into five stakeholders: namely, national research centre, manufacturer, safety council, certification and testing body and users. Each stakeholder had a leader and I was chosen to represent the manufacturer and present our views on the development and refinement of standards for electronic baby robots. The manufacturers were instructed that certain clauses had to be opposed while certain clauses had to be bargained. I was able to achieve consensus and oppose some clauses and this was the most engaging session for me.

In my opinion this session should be accorded more time as this is critical to adopt the role of a Technical Committee stakeholder. This important process gives the opportunity to prepare the YPs for future involvement in standards.

Day two ended with a presentation by Mr. Vimal Mahendru as the IEC Ambassador and Chair of Systems Committee on LVDC. He shared his personal experience and journey in IEC and encouraged YPs to network, network and network. The voting and nomination of YP leaders for Asia, Europe and Africa, and America and Oceania regions ensued.



In Discussion with Mr. Shota Chiba, YP from Japan

Workshop Learning Day 3:

Day three, the final day of YPP 2017 kicked off with YPs proceeding to the interactive sessions for which they had pre-registered. I chose to attend the interactive session - "IEC standard development process" being presented by Mr. Pierre Sabelin, Technical Department Manager of IEC.



Mr. Pierre Sabelin's interactive session: "*IEC standard development process*"

The process of IEC standard development can be summed up as shown below -



Following this interactive session, there was an open breakout session. Again, there were 4 groups. I was part of the group that had to provide ideas to improve redline versions of IEC standards. Our group's suggestions were the following:

1. Working Groups – comments in excel, filter out relevant changes
2. Machine Learning – model development
3. Redline version in word to user
4. XML will reduce most of the non-relevant changes
5. Sub Working Groups – only for sorting non relevant changes

These ideas were presented to Ms. Guilaine Fournet, who appreciated our efforts. The workshop concluded with lunch and a group photo of the YPs.



IEC YPP 2017 participants

Workshop Summary

This 3 day programme provided valuable insights into the world of standardization. In the NZ context, the main beneficiaries will be manufacturers and asset owners. Standards are used by asset owners to specify new equipment and electrical components, which allow them to be compliant with NZ's legal regulations. Products which adhere to standards provide asset owners the confidence to optimize cost without compromising reliability. Standards allow asset owners to compare different manufactures (domestic/international) against a common benchmark.

In the manufacturing sector, standards allow a level playing field for small NZ manufacturers. Standards provide relevant references to research documents in specialized areas, allowing small manufacturers to design and develop commercial products at a much faster pace. This will be a great boost for NZ manufacturers and will allow them to compete on a global scale. This is of significant national importance.

This programme emphasizes that standardization is the way forward for a globalized world. Organizations that get involved in IEC standardization activities gain the advantage of representing their interests at the tables where technological developments are shaped. Active participation in IEC activities provides NZ electrotechnical industry with:

- The unique opportunity to influence domestic and international policy on electro-technology.
- The chance to benefit from networking opportunities and learn from international experts.
- A global forum for the presentation of NZ electrotechnical industry viewpoints.
- The opportunity to review proposals submitted by other National Committees while standards are developed.

Acknowledgement

I would like to thank the Electricity Engineers' Association (EEA) especially **Mr. Peter Berry** for awarding me the opportunity to represent New Zealand for the IEC YP workshop 2017. I am truly grateful for the privilege. I have learnt a lot during the workshop and been enriched by the experience in Russia.

I would like to thank **Mr. Steve Lowes** from Standards NZ for his assistance and for his timely responses to my many queries in the run up to the event.

Bhaba Priyo Das
Young Professional New Zealand 2017
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