OVERCOMING THE CHALLENGE OF

DATA HANDLING

Frank Wang, Engineer at ATCO, speaks to us from Edmonton, Alberta, Canada about their electrical testing practices and how our primary test sets, combined with the Primary Test Manager™ (PTM) software, help his colleagues deal with the many challenges that they face at work.

ATCO is a large public company founded in 1947 in Calgary, Alberta, Canada. Over its history of more than 70 years, ATCO has grown to become a global corporation with $22 b in assets and nearly 7,000 employees. ATCO serves over 2 Million customers in more than 100 countries. The company has three vertically integrated global business units, including Structures & Logistics, Electricity, Pipelines & Liquids as well as a Retail Energy division. The Electricity Global Business Unit operates in the electricity generation, and the transmission and distribution (T&D) sectors. The Maintenance and Construction department of the regulated T&D division is a primary user of our products.

Frank Wang works in this department as an engineer for the Electrical Construction and Commissioning team.

«Regarding data handling, ***PTM provides us with one single solution*** *for capturing and managing critical electrical test data.»*

Frank Wang
Engineer, ATCO

Hi Frank, nice to meet you and thank you for giving us the chance to talk about this relevant topic. Please tell us a little bit about yourself and your role within the company – maybe start with how long you have been with ATCO?

Frank Wang: This is my 7th year with ATCO. Before joining the company, I received my Bachelor's and Master's degrees from Tsinghua University, Beijing and University of Alberta, Edmonton, both in electrical engineering. I have a mixed background in engineering design, power system study, renewable energy systems and electrical testing. I am a graduate from ATCO's Engineer-in-Training program, and my current job title is Engineer.

In general, how is asset testing performed at ATCO and what's the strategy behind it?

Asset testing is a shared responsibility at ATCO. Our Edmonton-based Electrical Construction and Commissioning team performs the pre-energization commissioning testing. That happens right after the construction or rebuild of substation assets and before they go into service. The district office-based Field Maintenance Services team performs the maintenance testing over the life cycle of assets. So far, our asset maintenance strategy has been centering around time-based approaches. ▸

Frank Wang and his colleague
Brandon Goy using TESTRANO 600.

*«OMICRON's primary test equipment **automates many critical electrical tests with prebuilt test plans.** This not only saves us a lot of time in test preparation, but also assists the standardization of testing practices across teams.»*

Frank Wang, Engineer, ATCO
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However, ATCO is currently accelerating the installation of online monitors and sensors and adjusting its practice towards condition-based performance maintenance over the next few years.

Could you elaborate on the responsibilities of your team?
We have a broad scope of responsibilities. I have to explain first that we commission three categories of substation equipment: primary (e. g., power transformers and regulators, instrument transformers, breakers, switches, capacitors and reactors, etc.), secondary (e. g., protective relays, controls and logics, statuses and alarms, etc.) and auxiliary equipment (e. g., control buildings, station services, grounding systems, cable trays, yard lighting, etc.). To give you a more quantified idea, on average we commission 15 new power transformers a year, typically at 72–240 kV levels. And so far this team has commissioned over 200 substation projects.

For the primary equipment, our work scope begins from receiving the assets at the site and ends with the final energization. Electrical testing is an important part of this process, but it is just one part of the full picture. Other equally important tasks our job duties include are inspections, test operations, equipment troubleshooting, drawing package as-built, and the final energization.

What is your motivation to perform commissioning and who is interested in the collected test results?
Commissioning ensures that substation equipment adheres to the specifications and functions as they are designed. Findings from the work can help our colleagues improve engineering design and project execution practices. The test results, collected and assessed in accordance with NETA (InterNational Electrical Testing Association) and other applicable standards (such as IEEE, IEC and CSA standards), serve as evidence of our operational excellence and compliance with the mandatory NERC (North American Electric Reliability Corporation) policy.

The main user of our commissioning test results is the Performance Engineering team. They use the results as the baseline for comparisons with the subsequent maintenance test results. Several other engineering disciplines are also interested in our results.

Are there any major challenges you deal with during commissioning testing? Anything specific to test data handling?
Absolutely. First things first, we currently use a collection of test equipment from various vendors. Many of them are manually operated, each in a different way. Therefore, personal experience is critical and a lot of training is required to ensure efficiency and consistency. Secondly, the assessment of test results is also done manually. That requires the memorization of numerous testing standards. Last but not least, the test data obtained is either manually recorded, or captured by the test set in a certain proprietary format. This gap has made the retrieving, exchange and analysis of test data a labor intensive process.

Since you mentioned that electrical testing is performed by different teams, how is the data collectively managed and exchanged?
Currently test data is managed separately. Most commissioning test data is entered and stored in Microsoft® Excel® spreadsheets, while some other proprietary test data files are saved as is in internet drives. Maintenance test

data is entered manually via a software tool and stored in the relational database tables in our asset management system, IBM Maximo. Data exchange is pretty much a manual process and requires a great level of familiarity with both data repositories.

Has data management developed over the past few years? How?

There has been evolution in the last couple of years in enterprise data management, integration and interface for ATCO. But historically, commissioning and maintenance test data were never consolidated.

With this background, the recent decision to use Primary Test Manager™ (PTM) as the “single source of truth” for test data marks an important step in ATCO’s journey to streamline its data management process. The adoption of PTM will provide us with the opportunity to seamlessly merge all new test data captured by OMICRON primary test sets owned by both the commissioning and the maintenance crews. We are also looking into the possibility of importing existing test data into a PTM-centered solution.

Kevin Wan using the CPC 100.

The team of ATCO Electrical Construction and Commissioning.

How did you learn about our primary test equipment and Primary Test Manager™ (PTM) software? What do you think of them?

OMICRON is not unfamiliar to us. We have been using OMICRON's secondary test equipment, the CMC series, for quite a while. Since 2017, both the Electrical Construction and Commissioning team and the Field Maintenance Services team started purchasing OMICRON's primary test equipment. That's when we learned more about the PTM software.

Personally, I have used CPC 100, TESTRANO 600, FRANEO 800, DIRANA and CIBANO 500. I would say anyone who spends a few hours with them will be impressed by their quality and user-friendliness – it is clear to me that a lot of thought has been put into the design of these products.

Does OMICRON help you deal with the described challenges?

For sure. OMICRON's primary test equipment automates many critical electrical tests with prebuilt test plans. This not only saves us a lot of time in test preparation, but also assists the standardization of testing practices across teams. The provided wiring diagrams help our field personnel work as efficiently as possible and reduce human element errors. You will see what I mean if you know the winter days here in Alberta only have 7–8 hours of sunshine and the temperature can be −20 °C all day long.

Regarding data handling, PTM provides us with one single solution for capturing and managing critical electrical test data. The cloud-based service supports data storage, synchronization and exchange. The integrated solution bridges many gaps between different tests, asset classes, job crews and organizational units.

To better take advantage of the full potential of PTM, we have also started an initiative with OMICRON to develop an interface between PTM, our Maximo system, and other analytical tools. Once complete it will bring our asset management practice to the next level.

Where do you see the future of electrical testing and asset management?

Thanks for bringing up this question. I have been deliberating about this for a while. In my mind, the keystone in the future of electrical testing and asset management will be an open protocol with three defining features. These include vendor/customer independence, analytical scalability and process automation. In plain language, it means the protocol should be able to host asset information regardless of who makes or operates the assets and how they are tested. The information can be sliced and diced in all angles and at all levels and the data can flow through the asset life cycle with minimal human handling. The development of such a protocol will require a lot of synergy from vendors, users and standard organizations, but it will generally benefit us all in the transition towards a data-driven enterprise architecture.

Thank you for this interesting interview Frank.

Thank you… and *danke.*