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Interview with **Jon Trout**





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Jon Trout is Manager of Transmission Operations Support for FirstEnergy, an electric utility headquartered in Akron, Ohio, and a contributing editor of Transformer Technology. Jon previously worked with transformer manufacturers to supply FirstEnergy with reliable electric power system equipment and has experienced many changes in the world of transformer technology over the years. For this issue dedicated to specifications, commissioning and transportation, Jon shared some of his experiential knowledge in a Tech Talk with our Editor in Chief, Alan Ross. This interview is an excerpt from that.

Alan Ross: I welcome my guest and a friend - Jon Trout of FirstEnergy, and a contributing editor of Transformer Technology.

Jon Trout: Thank you, Alan.

AR Jon, experiential knowledge is really something that Transformer Technology promotes, and you certainly have had a tremendous amount of that. One of the first things you did when you were at FirstEnergy is develop specifications for transformers. You had to look at the past, the present, and the future. In your past experience when you were developing specs, what were the most important aspects that you would look at?

JT You mentioned a little bit of it - looking back at the past to see what has worked well, and then looking forward to the future. I will break it down to two things.

The first is, if you are creating a specification, you want to set clear expectations. There are many manufacturers out there that make transformers for many different applications. You need to be able to define what you need the transformer to do, how you are going to apply it to your particular scenario, and what capabilities it needs to have, so that the manufacturer can understand your particular need and provide you with the best fit for your application. This also includes considerations like physical constraints: Do you have a limited space for this particular unit? Is it next to a building? Does it have to fit in a position where an old transformer came out?

I use the following analogy: if you go to a car dealer and tell them you need a vehicle, you could end up with anything. But if you tell them that you work construction, they are not


going to try to sell you a small economy vehicle. They are going to sell you a truck, which is what you need. So, you need to tell the manufacturer what you need the transformer to do, so that it meets your expectations.

The second thing is long term planning. When you purchase a transformer, you intend to keep it for quite a while. And that entails a lot of things including your capabilities, the warehousing, your spare parts inventory and everything that is required to maintain that transformer over the next 25 to 50 years. Also, you need to specify to the manufacturer the type of equipment you need on a transformer because you may already have spares for some of the equipment you plan to have on your transformer.

Another important consideration is the kind of maintenance you plan for the unit. For example, if you are planning to do routine full inspections that require draining the oil out, the manufacturer needs to know how the oil will be drained so that they can make sure you can do your inspection. Do you want valves on your radiators in case one starts leaking, so you can replace a single radiator as opposed to having to cut off the whole thing? These are the specifications you need to provide for your manufacturer when you think long term and how you intend to maintain the transformer over the course of its life.

AR Design, Operate, Maintain and then Lifecycle planning - they are the four stages of reliability and they fit right in with what you are talking about. The reliability of electrical systems starts at design, it all starts with specs.

You and I have been involved in a lot of situations at different points in our careers, and



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sometimes, we would help somebody develop specs, only for them to go out and take them to a marketplace and buy low bid. In the utility world, you are going to go out in a bid base.

JT Usually, there is a bid process that goes along with purchasing transformers. There is often an established vendor list, but you are most likely always going to bid the transformer purchase.

AR Chuck Baker, one of our authors and contributors, was on a recent EPRA Forum talking about services and maintenance. He mentioned the same thing you did - that you had to make sure you get the scope right.

As he said, many times the supplier that is going to bid on a transformer can look over your specifications and help you develop better ones. Was there a time, or a relationship, where you asked somebody to check if you were missing anything in the scope of your specs?

JT Yes, there are plenty of consultants who can provide that support and help you develop your specifications. I have done some of that in the past for companies. Also, there is feedback from manufacturers. They will ask questions about your specs and say: We do this slightly differently. Here is how we may handle this particular area of what you are requesting. Is that OK?

Specifications are not static documents. They are living and they need to change periodically to keep up with technology changes and material enhancements. So, the feedback from the manufacturer will provide insight into what they do and how they do it, and why they think it is an excellent way to do it. And then it is up to you as the purchaser to validate whether you can accept a deviation from your spec or not, which usually doesn't happen during the bidding process. That is usually because you can establish the relationship with the manufacturer.

As a specification writer, you ought to be reviewing your spec periodically to make sure that it is still what you want it to be and to see if there are any changes you need to make to keep up with enhancements in technology or processes.

AR I want to go to another thing that I know you are experienced in, and that is plant inspections. You have finally made the specs, the bid is out, you got the bid. Now the manufacturer is starting to build the transformers and you are doing the different stages of inspection. Tell me a little bit about that from the perspective of purchasing people and the procurement people - what should they do? What should they hold the manufacturer accountable for? And what has been your experience with plant inspections?


JT Plant inspections are a great opportunity to interact directly with the actual manufacturing capabilities of whoever you have

chosen in your bid process. But once you get into the manufacturing stage and you are doing a plant inspection, you get to see the individual manufacturing processes - how they wind the coils, how they do tank manufacturing, how they do installation, how they route the leads around the transformer, etc.

All of this is vital to understanding the real capacity of the manufacturer. And most manufacturers would love to tell you all about their quality control processes. They enjoy talking about their plant and this is also the opportunity to build the relationship with the manufacturer. So, when doing a plant inspection, ask them how they track material and different components as they come from different areas of the factory to eventually come together into the transformer. They will love to tell you about that.

Another thing for you to think about is the layout of the facility, as this also contributes to getting quality products. Are messy, dirty manufacturing processes separate from the clean processes? For example, you would not want to have your winding room and your tank manufacturing areas right next to each other. Tank manufacturing, welding and cutting create a lot of debris, dust and dirt, and you want your windings as clean and crisp and pristine as possible. You will learn about their capacities from how they dry their coils, how they size them, etc.

Also, talk to the people in the factory and ask them about their experience - ask them how long they have been doing it, whether they love



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what they do and find out about their level of experience, specifically in three areas. First, the engineering group - you want to know how experienced they are in the design. Second, you want to know about the winding area. What is the experience level of the winders? This is really important as the winding area is one of the key areas of the transformer manufacturer. And thirdly, you want to know about the testing team. How experienced are they? Do they know the standards? Are they familiar with the standard that you are requiring the testing to be done to? Do they handle testing according to other standards, like IEC versus IEEE?

Once you have a good understanding of that, it will give you some confidence in the capabilities of the manufacturer, and help you grow that relationship.

AR You have just talked about that plant visit where you go out and do the inspection. There is now acceptance testing where you have to confirm that you accept the manufacturing process. The manufacturer has to transport the unit and you have to do commission testing before you install it. What goes on during acceptance testing?

JT That is a good question. It is important for the purchaser to understand what tests are relevant for them and they want to be present for. Not all tests are equally important. For example, for the wiring tests, you may be able to let the manufacturer handle them and just show you a test report of how they wired the control panel. On the other hand, lightning impulse and partial discharge tests are really valid and valuable to witness because that gives you an insight into how well the transformer is put together.

The key is to ask good questions about how the manufacturer set the test up. Make sure they understand what the testing standard is, whether it is IEEE or IEC, or whatever standard you are requiring. You want to make sure that they understand that standard and know how to set up the test. Also, you need to watch very carefully to make sure that the data they are getting matches the acceptance criteria in the standards that you have laid out.

This requires that you as the owner are familiar with what those standards say and how the results should come out. You have to be willing to push the manufacturer a little bit if things don't



look the way you expect, ask them to explain and have them show you how the results fit in with your expectations.

AR The last thing I want to talk about is the commissioning. What are some of the challenges that you have seen at the stage when the transformer comes in; when it is transported and commissioned? If the unit doesn't work or if it fails within a year, somebody is going to look at you as the final guy and ask what you did wrong. Whether it happens in the design, in the inspections, the testing, the transportation or the commissioning, you are going to get blamed for mistakes. In your experience, how did you address it? What kind of problems have you seen?

JT It goes back to the specs again. Because the transformer spends the vast majority of its life not moving, the time that it spends moving and is subject to damage is the transportation process. That is why you want to make sure that it is properly specified and is going to handle the voyage from the manufacturing facility to the designated site.

Depending on whether you as the owner take on the responsibility for the transportation

or you ask the manufacturer to assume that responsibility, they need to know if there are any constraints. For example, if you are in a very mountainous area, you may have a situation where the only way to get to your location is through a railroad tunnel. The manufacturer needs to be informed of that because you would hate to have the transformer come down the railroad and hit the top of the tunnel - that is not a good day for anybody.

I will tell you one story. We had a situation where we bought a transformer, the manufacturer did a route-study and everything looked good. But there was a minor mistake in the route-study - they checked bridge heights in the center-lane, closest to the center of the highway. But the bridge had an arch on it. So, the transformer would have cleared in the center, but on the right lane where the bridge is slightly lower, it didn't clear, and it snapped a bushing off.

These are some of the concerns you need to be careful about and make sure that your route is well planned.

AR I would like to go into something that I know you are heavily involved in, and that is preparing the next generation.

You are now that bridge generation between my generation and the next. It must be an enormous challenge for you and an enormous amount of fun for you to be able to make a difference in generations. What are you doing in that sense right now?





JT It is a great opportunity, Alan, as we look to the future. It is funny how quickly time passes when you feel like you are a brand-new engineer, and then all of a sudden, you blink and you realize you are mid-career. I see it as an opportunity to pass on knowledge to the next generation, helping them grow into whatever the next big revolution is going to be.

We have some ideas and thoughts about what that might be. But we want to prepare the people that come after us to be able to take on the challenges that they face, and the challenges that we face and help them learn from that. One of the things that I very much enjoy is trying to develop that next generation of engineers, commissioning people and all

the people involved with maintaining the utility industry to make sure that we are well suited for whatever the next big change is going to be.

AR Jon that is excellent! This has been an inside perspective from someone who has done it; experience from someone who has even made some of the mistakes that all of us make, and grown from that. As the editor in chief of Transformer Technology, I appreciate the knowledge and insight that you bring us. Thank you for sharing it with us.

JT As always, it has been really nice talking to you, Alan, and I appreciate it. Thank you very much for your time.

One of the things that I very much enjoy is trying to develop the next generation of engineers, commissioning people and all the people involved with maintaining the utility industry to make sure that we are well suited for whatever the next big change is going to be.



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