

Dear Readers,

As a reliability professional, I see things from a unique engineering perspective. Reliability is defined as *the ability of an asset* – and I would include a system – *to perform its designed function for its useful life*. We could also safely add: *If designed properly and with proper maintenance and operations, the lifecycle of that asset or assets in a system can extend the life of the asset or the system*. But that would be for another theme and another time. For this issue, we are focusing on the impact of current technology on the design of transformers.

When you consider the impact of the next generation of design, then when considering the design of assets like transformers you quickly realize that they are also greatly impacted by the design of the components that make up the asset. As components change to meet the needs of the asset, to meet the needs of the system, you can see how the next generation of design can actually take on a life much greater than originally anticipated.

When we originally came up with the idea for this issue of Transformer Technology, we did not anticipate how the unlimited ability for component design could impact overall transformer design. What we did find was that the component designs have to be considered, especially when those designs actually increase the reliability of either the component or the component within the asset structure. I know! Only a reliability geek would think this way, right?

Let's look for instance at the design of bushings and what's happening with the next generation of bushing design. Resin-impregnated bushings and new fluids within oil-filled bushings, and in general the whole idea of the design of bushings, is allowing for a more reliable transformer, which means that we have to decide how those changes in bushings will impact the overall reliability of the system. This also impacts the lifecycle of the transformer.

One of the things we did not expect was to be able to look at the design of fluids and the impact that that design has. For instance, Corné Dames in her article on natural esters highlights the changes that are taking place in the oils and fluids design as part of transformer reliability.

Further down the line, in our September/October issue we will delve even more deeply into oils and fluids, and then in the November/December issue we will look at bushings and other component parts. But for this issue we just wanted to focus on the plethora of component design changes that are changing transformer design.

I mentioned that I tend to view things through the lens of reliability, which starts with a high-level view of asset reliability:

Design for reliability

This means avoiding unplanned outages and operating in a way that is the normal operation of the asset in a system. For instance, we know that GSUs need to run at over-rating during highly demanding times.

Operational parameters

Same as above. Also, we know the abuse a furnace transformer takes in any industry like metals, glass, paper and food products and more.

Maintenance protocols

This might be one of the areas where changes need to be made. How do you maintain a transformer when it has already exceeded its planned life by decades? As I presented at the most recent IEEE-ESW event, preventive maintenance is often the cause of unplanned or lengthy shutdowns, as is predictive.

Lifecycle planning

It's not just transformers that have aged well beyond their planned life. Cable systems, bus-work, generators and so many more electrical system assets have lasted far longer than expected. Given that studies indicate that only 11% of failures are due to age, this means we have a lot of life left in billions of dollars of assets.





Coming in June is something all of us at APC Media are tremendously excited about, so expect our announcement soon. Not only is it the theme for a June issue - it is the basis for a New Community we will be starting and supporting.

So, enjoy this issue and once you enjoyed it, share the entire issue or just one article or interview with someone you know can benefit from it. A thousand do every month and for that we are grateful.

Coming up next for May is the theme: **From Specification to Commissioning: Better Practices for Better Outcomes.** We already have a great issue lined up but because it is a two-month issue, we might be able to squeeze in another article or an interview. If you have an idea, then connect with me at Alan.ross@transformer-technology.com. I'd love to hear from you.

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