

Chip Angus



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Reliability Account Manager
at SDMyers

Interview with **Chip Angus**

Alan Ross: Our next guest is Chip Angus. Chip is a dear friend. Thank you so much for joining me.

Chip and I work together in the reliability world. The reliability of Transformers is kind of where I got my feet wet in terms of electrical systems. And it's where you got your feet wet because you used to be into steel before. So, Chip, what we're talking about is advanced transformer testing and technologies. And one of the things that you and I have been talking about, all of the great testing and technologies in the world only work if they give you data that you can do something with. I know you and I have had some experience with presenting the reliability assessment. I loved your presentation, your discussion with them about how do you use data. So rather than talk about advanced testing, what I want to talk about is how do you use the testing and the technology?

We already have to make better data decisions for our transformer fleet. Explain a little bit about that.

Chip Angus: To start off, you must have a robust, CMMS system for all your electrical assets data. If the data is not funneled into that, oftentimes within the plant, it often gets forgotten or ignored. So that's the key to really kicking off a good, robust reliability program.

AR But are electrical systems in most CMMS systems for data management, or have they kind of been left out? They house data, but they don't make decisions on data.

CA Yeah, I agree, Alan. They've been left out. Historically, I think there's a move to get them in there so they can start generating work orders so the upper management and middle management can start understanding the reliability health of those electrical assets.

You asked me to talk a little bit about our reliability assessment. You must have a robust program that actually categorizes your assets based on the criticality of each line on the plants one line drawing, so your breakers, your relays, your cables, your transformers, they all have to be categorized, whether it's a one-to-four system, a mission-critical system, a system critical or a noncritical system. This is really the first step in starting a reliability program.

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breakers, your relays, your cables, your transformers, they all have to be categorized, whether it's a one-to-four system, a mission-critical system, a system critical or a noncritical system...

AR Talk about that. Mission critical, systems critical. What's the difference between those two?

CA Well, the mission critical designation would actually shut down the whole entire "mission" of a plant.

You want to put your dollars into mission critical assets to keep your plant running. When you have your shutdowns in September, October, whenever the plants have them, what are you going to focus on first? You want to focus on the mission critical assets and then move down to your system critical. The "System critical" designation would shut down a system of your plant. It might be shipping and receiving, or it might be a smelting line, something along those lines. There'll be some damage there, but it's not going to shut down the entire organization.

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AR I get it. The point being you can overcome it, but it's going to take time to overcome. Even that is damaging.

Let's say I have identified which are mission critical and which are systems critical transformers. Give me an idea of how do I put the right testing into the reliability assessment in order to make great decisions? What are the most important tests I should run?

Everybody says they test their transformers, but they don't. They do DGAs. It's obviously the most important, but what's next?

CA You have your liquid screen, which is your acid tests, your color, your





visuals, your dielectric strength, your furan compounds, infrared thermography, ultrasound, and online DGA monitoring. When you combine all those tests together with a good, robust mechanical inspection, that's going to paint a very clear picture as to what's going on with your transformer. A lot of people don't realize that when labs go to set up their Karl Fischer testing, temperature is important. A robust mechanical inspection to assess the gauges and their function is a must. If they're not functioning properly, they're not getting a good temperature reading from the transformer. You combine all that, and I also recommend doing infrared thermography at the time of your sampling. The reason is that if you get a DGA that comes back and you see high ethane ethylene, maybe some high hydrogen, maybe even the start of acetylene, IR scanning can pinpoint where the problem is. Infrared thermography can also detect low oil level on a transformer, and temperature differences between like bushings to name a few. It gives you an overall picture of what's going on with that transformer.

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AR One of the things that is critically important, the lead time on transformers as we speak in 2023 at the NETA conference is now going to from six months for regular power transformers to as much as three years. Every transformer manufacturer that I know of is sold out. I know that Virginia transformer is just opening a new plant in chihuahua, Mexico. They sold out the day they opened for two years.

People don't realize they can maintain their transformer. You are one of my heroes of helping people take care of the fleet they've got while they're waiting for new transformers to come. We can't solve the lead time, but we can take care of what we've got in order to extend the life of the transformer. How do you extend the life of a transformer through field service?

CA That's a great point. The lead times on buying new transformers and used transformers has really extended. You used to, ten years ago, get a transformer in a matter of a couple of weeks. Now it's months and maybe years, depending on the Kva and size. So that's really driving the market to maintain the equipment that they have and start implementing these

maintenance plans. Some of the things that you can do to maintain them is obviously if you start to see acid rising in a transformer, you can hot-oil clean them, reduce the acids, so you don't destroy the paper in the transformer. Again, going back to a robust inspection, if you're finding leaks on a transformer, you're better off to fix them rather than either taking in water, going to negative vacuum, pulling in moisture or atmosphere into the transformer. We're seeing a big shift: people want to maintain their transformers long term. That way they don't put themselves in a position to have to go out and find a replacement transformer, because there's companies out there right now that are suffering because they're trying to catch up on their maintenance and they're years behind.

AR That's pretty much the industry as a whole.

We are publishing this in an issue that is called Advanced Transformer Testing and Technologies. What I hear you say is the technology is the data management and the ability to put it into a CMMS. I know that SDMyers has a very robust data management system that is decision dependent. It helps people make wise decisions.

You and I have also had experience where we've told people to stop, they continue to run. And it's a \$50 million loss. I love what you're saying because it's the testing that we do, robust testing that we do using the technology of data management and eventually coming to the point where we're using not AI. We're talking about machine learning.

If I see this often enough, I can start to predict seeing that engineers love extrapolation and interpolation. We want to interpolate data to say what's happening. Give me one point, I can't tell you anything. Give me two, I got a straight line. Give me three, I can tell you where things are going. We want as many data points as we can, but the testing provides data points anyway.

Last comments. How are you doing?

CA Doing fantastic.

Doing good. Busier than ever. There's a lot of people out there that need transformer advice and help.

AR And that's what the reliability assessment is all about. It is advice, counsel, wise decision making. My friend, thank you so much for joining.