Managing the Reliability of an Industrial or Commercial Electrical Power System / E 03

by **Chuck Baker**

Chuck Baker is the President of PowerPro 360, a company offering power system reliability assessment and reliability maintenance programs for Industrial and commercial organizations. Chuck entered the world of Substation and Power System Maintenance 36 years ago and has spent a majority of that career on the operations side of power and distribution system maintenance and the development of power system maintenance programs.

Cast

Brian ..... Regional Vice President
(head person for this plant)

Andy ..... Reliability Manager of Electrical Power System
(recently hired by Brian, the Plant RVP)

Kevin ..... Director of Reliability

Tina ..... Maintenance Manager
(who reports to Brian also)

Tim ..... Electrical Engineer
(who reports to Andy)

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Hello and thanks for continuing to follow us through our experiences in the design and implementation of a Reliability Centered Maintenance (RCM) program into Smith Industries. I am Brian, the Regional Vice President / Plant Manager for the largest Smith Industries plant.

If you recall, in our first article [1] I had just hired Andy. He started out by reviewing the historic and current electrical system maintenance program. In the first meeting with the team, he presented areas of concern with our current power system and I was very pleased with both the presentation and how it was received by the team.

In the second article [2], Andy began to work with the team to introduce key components to the RCM program he was going to be implementing. The good news to me was the positive reaction from Kevin and Tina. If you recall, Tina was our Maintenance Manager and prior to Andy's arrival was responsible for the maintenance of the power distribution system. She knew she did not have the expertise to take the Power System into the world of Reliability Centered Maintenance and welcomed him on board.

Kevin, on the other hand, was a little more difficult of a challenge. Kevin, Director of Reliability, is a top Mechanical Engineer and is very experienced. From the time he came on board, he has significantly improved the RCM program for everything but the power system. I had been working with him for a couple of months before I brought Andy onboard and had laid the groundwork for the final piece of the puzzle, bringing our power system into the world of RCM.

I knew I was in trouble the first month I had arrived. I am not going to exaggerate, and I do think the world of Kevin, but when we walked into the distribution North Mill Sub in the North plant and I asked him about how RCM had been touching our power system, his response told me everything I needed to know. His key statements were:

1. With a chuckle, he pointed out that in that vault there was not a single moving part.
2. He continued pointing at the silicone filled transformer saying that it was 25 years old and has never been a problem. "Not a priority for us" was his final comment.
3. Not knowing my past RCM experience, he pointed out to me that a failed motor bearing was reality and was where the reliability attention needed to be spent.

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Again, he is excellent with most of the plant, just not the power system. And I will tell you, this is more common in the commercial and industrial market than we may think. The power system is an anomaly in the logic of a program. It is unique, not seen, has no sound and 98% of the employees never see it or hear about it.

With interest in our aging power maintenance program I continued learning with a plant walk through with Tina, the Maintenance Manager for the plant.

That was interesting as well. When we went past the North Mill Sub, I asked her if we could poke our heads in there. She said sure, and led us in. Now, this is the moment when everything I had suspected was verified. Tina is also an excellent Mechanical Engineer; in fact, she is a PE. When we were touring the plant, I was impressed with not just her technical expertise, but her understanding of our product flow, areas classified as JIT production zones and her reviewing the major changes she has made over the last couple of years. She has worked very well with Kevin on improving our safety and production rates – with every area except the Electric Distribution System.

As we entered the substation, she began to recite her maintenance SOP mentioning high current testing of the low voltage breakers every three years, full dielectric fluid analysis on all liquid filled equipment every year, cleaning/ torqueing and servicing the dry type transformers, etc. She updated me on some decisions for load management and protection that she and Tim (our Electrical Engineer) had made

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over the past couple of years. I was comfortable that Tina was good at her job, but her lack of expertise on RCM management on the electrical side has forced her to use standard maintenance protocol.

As I headed back to the front offices, I felt great that when I brought a power system reliability centered maintenance manager on board, the current system could absorb that, it would take a little pressure off of them and they would be able to see the value.

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The other problem I was thinking through, was how to use the changes created with the new position, to address some shortcomings in the balance of our Plant RCM program. Again, it is good, but it is lacking in certain areas. Being the new guy, I knew this was the best way to address it.

Let me share some of the general components and considerations that have to be made when starting an RCM program for your power system. The reason I wanted to talk to you in May was so that you understood what was behind the scenes before Andy walks you through implementation.

Here are some points you will need to consider:

1. As the "project leader", you are going to need to understand the fundamental outline of the program. You may not have the expertise, but you need to know enough to pick the right person to lead. Do some online learning, read, research, attend seminars… you get the idea, know the fundamentals.

2. Be realistic with what will be required. This starts with outlining the knowledge your power reliability team will need. This includes understanding the base power system, but more importantly, the fundamental steps to a reliability program. Many organizations do not have this expertise in house. Your choices are simply to hire or train.

3. When you have selected the reliability leader, begin to look at the impact on your organization. The first issue to look at is true resources within your core team. Operations, Engineering, and Maintenance will all be a part of the eventual reliability program. Who in each key group will be a lead, and how much time do they really have available? Many positions are filled with experienced and talented people, but many times they are reactionary, which is required for their normal day to day responsibilities, but not good with this challenge. You need to pick staff that can support and participate in the program and that have time to contribute to your team. Be realistic.

4. When you have qualified your core team and confirmed their abilities and how their responsibilities can be organized to include the time requirements of this new program, educate them. There are many great programs that can take a team and walk them through the fundamentals of a reliability program. The key is to spend enough time to get everybody up to speed, speaking the same language with key terms, and to let them contribute in the actual building of the program. If you do not take these steps, the individuals will drift back to their normal habits which they are comfortable with and have been at for many years.

5. Now that you have your team; you must plan. This sounds obvious but let us make sure we have detailed the "procedures" that everyone on the team truly understands. Your team will have different learning styles and different levels of expertise on the program, your job is to keep everybody together. In June, Andy and implementation of the key steps to a solid program will be back. But before you start your plan you need to have these fundamentals in place.

6. Make sure your Reliability Leader has detailed the procedures of the plan, has the data collection and management system laid out and

The key to having your reliability program succeed is giving everyone the appropriate understanding, having a clear procedure, making sure everyone understands their role and has the time and resources to accomplish it. If you do not take these steps, the individuals will drift back to their normal habits which they are comfortable with and have been at for many years.

has identified the required labor for each phase. As you walk through the first phase of data gathering, you will face both issues. Is the data gathering in a format that regardless of who is performing the tasks, the right information will be collected, in a common format and the data will be stored in the proper program?

7. After you have outlined the requirements of implementation of the tasks, be realistic on required labor again. You went through this with your reliability team, now you must look at the secondary and tertiary levels of impact. What are the tasks, who will be doing them and will the people who received the assignments have the time and understanding to do it?

8. When you write up instructions for the tasks, be consistent and clear on the key steps, sequence, timing and data management. It needs to be simple, clear and easy to understand and implement. One of the components of the program will be an outline of the expected timing. Be sure and be realistic on this, if the person assigned does not have the time, it will not get done. Like so many new programs, it is better to go slow with solid retention and understanding versus fast – which will always fade out.

9. You have trained and educated your Reliability Team, now spend some time providing this same understanding to those front-line workers who will be implementing the fundamentals. Share with them their value. When they are gathering nameplate information, make sure they understand the importance of that; the fact that it is a key component to the master plan, an understanding that the program is only as good as the quality of their work. Let them know that you are relying on them.

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10. And lastly, a critical component that is difficult but necessary; inform the masses. Take time to think out the most fundamental steps of the program, and the expected benefit. Define common terms that will be used going forward. One of the more common programs says to tell them seven times before they really understand and accept. This is true for your core team, your extended team, and the employees. Educate them on the fact that this will be a new way of life; what they can expect to see; who the champions of the program are and how it may affect them along the way. This creates an environment that will be more successful than what happens if you do not.

The bottom line that you must understand is that you are going to attempt to change a culture, not a procedure. Your expertise has been gained over many years, remember that theirs has not. This is new to them. So many of these programs fizzle out and employees return to the way they have always done it. That is human nature and will always be the temptation. Through giving everyone the appropriate understanding, having a clear procedure, making sure everyone understands their role and has the time and resources to accomplish it; your reliability program can succeed.

As I mentioned, in June Andy will roll up his sleeves and take the first tangible steps in the implementation of his power system reliability plan. The reason for this communication was to share that when we are successful, the foundation of that success is the education, understanding and clarity of the program with the participants having the time and resources to do it. Most will never know what I did before and behind the scenes, but that is what comes with being the leader and the ultimate implementer: good luck and turn the team to Reliability.

References

[1] Chuck Baker, "Managing the Reliability of an Industrial or Commercial Electrical Power System," in *Transformer Technology*, Issue 4, pp. 52-57, 2019

[2] Chuck Baker, "Managing the Reliability of an Industrial or Commercial Electrical Power System: Episode #2," in *Transformer Technology*, Issue 5, pp. 48-53, 2020

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