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## Failure Analysis...Seven Tips for Success

1. It is really important to have a full understanding of the system being tested. Especially important is a thorough understanding of the nominal mode of operation, nominal conditions, and nominal test results of the system being tested.
2. One very important consideration when analyzing test results is that you must first determine whether a nominal test result was obtained first. If there is any doubt in the test results, perform the test again and compare the two test results.
3. Once it is determined that a test result indicates an abnormality, it is important to utilize as many different methods and technologies as possible to understand what may be the root cause of the abnormal test result.
4. One of the first methods to use in root cause analysis is to segregate the system to potentially isolate the issue down to a single component or components of the system.
5. Once the component or components have been isolated, a Fishbone diagram cause and effect analysis may be a good tool to use in helping determine the root cause of a problem as it forces one to look in depth and ask questions in many different areas.
6. When performing the root cause analysis, it is imperative to understand why the component failed. For example, a motor driving a pump enters into a locked rotor condition and the motor catches on fire. It is obvious the motor has failed, but what caused the failure? In looking further into the failure, it was determined the pump seized which caused the motor to enter a locked rotor condition. Further investigation found that new, but very similar material was being pumped yet the pump wasn't designed to handle the new material type. Thus, in this situation, the cause of the motor failure was actually due to the change in material. Without further investigation, a pump and motor replacement would have created the same situation and another failure of that same system in the near future.
7. When utilizing different methods and technologies, one must understand what conditions each technology will provide test results for. For example, vibration analysis isn't a primary tool for insulation system condition analysis.

You are invited to submit an Electric Motor Testing Tip of your own and receive a free PdMA<sup>®</sup> mug or hat if we publish it! Contact Lou at 813-621-6463 ext. 126 or [lou@pdma.com](mailto:lou@pdma.com).