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10 Components of a Successful VIBRATION PROGRAM

by Alan Friedman IMC Presenter

Understanding the 10 components of a condition monitoring (CM) program is the first step in making them work to support you and your organization's goals. The 10 main components comprising a condition monitoring program are shown in Figure 1. Each of the components relates to and affects all of the others. Like the supports of a structure, they all must be balanced for the structure to stand. This is the introduction to a multi-part series covering each of the 10 components of a successful program. A more in-depth handling of the subject matter can be found in the book, *Audit It. Improve It! Getting the Most from Your Vibration Monitoring Program* by Alan Friedman, available at the MRO-Zone Bookstore.

You cannot succeed without clearly stated goals, but you would be surprised at how many programs do not have clearly defined goals! If you believe your program has clear goals, take a moment right now to write some of them down on a piece of paper. If you can't write them down, then you probably don't have them! If you don't have the ***right goals***, you cannot come up with concise strategies and tactics for attaining them. You will not know what people, tools, data, analysis, etc., are required and you will not be able to easily measure if your goals are being met.

> Each of the components relates to and affects all of the others.

You need the ***right people*** in place to carry out the action plan and keep the program running year in and year out. Your people will need to be trained, certified and given the time, tools and support they need to be successful. You will need to get buy-in from managers and other stakeholders to keep the program staffed and funded. You can leverage outside expertise to help get the program running, to provide training and to step in when internal personnel are reassigned or leave. No program can be successful without support and contribution from the right people.

Not only does a program require the right goals, it requires the ***right leadership*** to state these goals in a way that everyone can understand and inspire the right people to put the plan in action. If a program is going to change the way the plant operates, then it will surely meet with opposition. People do not like change. The journey from the reactive to the proactive is a difficult one that requires an unwavering commitment and consistency over a long period of time. A strong leader is needed to keep the ship pointed into the wind.

Only after you really understand what you wish to accomplish should you select the ***right tools*** to employ. The tools need to be appropriate for the people who are using them. Higher technology is not always better if it is not appropriate for the skill levels of the users. The right tools facilitate the right data, the right analysis and the right reporting. You should have a precise idea of how you want these three aspects of the program to work before purchasing any tools. Often times, the capabilities of the software are more important than the bells and whistles on the data collector, so don't be distracted by the gloss and glitter, make sure the tool does what you need it to do before you buy.

You need the ***right understanding*** to know how to best maintain the asset. In the case of condition monitoring, the right understanding determines what to measure and when to measure it. You need to understand how the machine and its components fail, how quickly they fail and the consequences of their failure *before* you can determine how best to maintain them and avoid failure. If condition monitoring is applicable to the failure mode, then you will

Figure 1: 10 components of a condition monitoring program

1. Right Goals	**Having clearly defined and achievable goals that may evolve over time.**
2. Right People	**Having the right people in the right roles with the right training.**
3. Right Leadership	**Inspiring continuous improvement.**
4. Right Tools	**Having the right tools and technology to help reach the goal.**
5. Right Understanding	**Equipment audits, reliability and criticality audits, FMECA, maintenance strategies, etc.**
6. Right Data Collection	**Collecting the right data at the right time to detect anomalies, defects or impending failures.**
7. Right Analysis	**Turning data into defect or fault diagnoses.**
8. Right Reporting	**Turning data into actionable information and getting that information to those who need it at the right time and in the right format.**
9. Right Follow-up and Review	**Acting on reports, reviewing and verifying results, benchmarking, auditing and improving, etc.**
10. Right Processes and Procedures	**Tying together: people, technology, information, decision-making and review.**

need to understand how the failure mode presents itself before determining which technology to use to monitor for it and what specific data to collect and tests to take. You will need to know how quickly the component will fail in order to determine how frequently to conduct the tests. Understanding the consequences of failure helps to define your goals and calculate the return on investment associated with avoiding the failure or planning for it.

The ***right data collection*** is directly based on the right understanding. If you have done the work required to understand the asset and its failure modes, you should know exactly what data to collect to detect the presence of the failure modes. In vibration analysis, the right data collection includes the types of measurements taken, the type of sensor used, and how and where the sensor is mounted. Multiple test points, axes and test types are typically associated with a vibration test on a typical machine.

In a condition monitoring program, you are trending or looking for change. Therefore, the ***right analysis*** is often a matter of developing baselines or alarms based on prior data collected under the same conditions (the right data) and looking for change. If you have the right tools, the software should be good at detecting this change for you in an intelligent and sophisticated way. If you are spending an hour looking at data from each machine every month, then you are doing something wrong. Analysis should be efficient and mostly automated. Most of your machines should not have defects in them, so you should not have to spend tons of time analyzing data from healthy machines month after month. Your software should tell you which problem machines to focus on.

Decision makers don't need data or alarms; they need actionable information. The right analysis is about turning the right data into fault diagnoses and the ***right reporting*** is about turning analysis into actionable information. This tells the decision makers what to do with the information. Reports need to be delivered to the right people at the right time and in the right format. Different people may require different levels of detail in the reports and may require the report at different times in order to make timely decisions. Reports should have priorities or severity levels associated with them. There should be a clear understanding that defects are reported at an early stage. Priority or severity levels should be increased as the problem worsens over time. Planners can then determine the optimal time to carry out the repair.

After a report has been issued and action taken, the ***right follow-up and review*** is required. You need to know if the report was correct and if the action taken was the correct action. There needs to be a feedback mechanism in the process so those doing the analysis learn to do it better and those making the decisions know whether they made the correct ones. If a bearing defect was diagnosed, the bearings should be cut open and inspected and an "as found" condition report generated. Not only do you want to know if the analysis was correct, but you also want to ask, in a formal way, what caused the bearing defect? There needs to be a formal mechanism in place to remove the root cause of the failure. The right follow-up and review is also where you measure to determine if your goals are being met. This is where you gather the data for your key performance indicators (KPIs) and calculate your return on investment. The right follow-up and review helps you audit and improve the program.

The ***right processes and procedures*** is the thread that ties the 10 components together. A good program is not dependent on any individual. Often times, what is supposed to be a condition monitoring program is actually just a person with a tool and the so-called program fails when the individual leaves. Condition monitoring programs are based on an understanding of the assets (the right understanding) and trending. Trending is based on the right repeatable data, which means the data is collected in the same way each time no matter who collects it. All of this implies that well-documented processes and procedures are the cornerstone of a successful program. They are what keep the program running, evolving and continuously improving over time, even as personnel come and go.

Vibration or CM program audits help you verify that these 10 elements are in place in your program and that your program follows ISO guidelines and accepted best practices. This is the best way to make sure you are getting the most from your program. So, now is the time to audit it and improve it!

Alan Friedman *is the founder and CEO of Zenco, a provider of vibration monitoring program audits and training. Alan has more than 24 years experience in helping people set up and manage vibration monitoring programs. Alan is the author of the book, Audit it. Improve it! Getting The Most from Your Vibration Monitoring Program. (www.mro-zone.com).*
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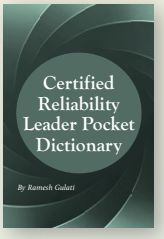

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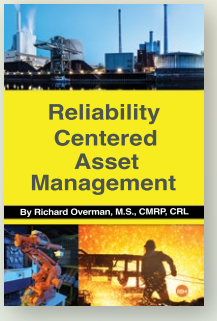

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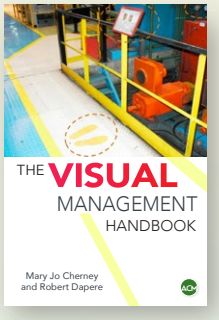

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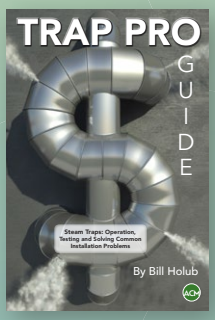

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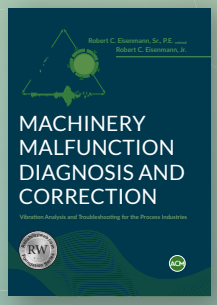

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