PREDICTIVE SERVICE®

All Shook Up **by: John Pucillo, Director of Product Development**

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MAINTENANCE TECHNOLOGY

Designing a best-in-class vibration analysis program starts at the beginning

It's not really a secret that when machinery operates effectively and efficiently, it will run longer, safer and without unscheduled downtime – improving the bottom line of any organization.

Vibration analysis can be a very effective part of a good predictive maintenance program (PdM) and an integral part of an overall conditioned-based maintenance (CbM) approach. The theory itself is pretty straightforward. An increase in vibration almost always accompanies deterioration in running conditions, so monitoring vibration levels can indicate the general condition of a machine.

Unfortunately, not all vibration analysis programs are as straightforward. Many programs today aren't as effective as they could be largely due to resources, time and a lack of formal program processes. Is your CbM vibration program living up to its full potential?

Here are several questions to ask in evaluating your program. Do you struggle with:

- Allocating time and/or resources to run the program effectively?
- Turning the raw data into actionable information?
- Implementing a "close loop" program process that ensures recommended actions are handled quickly while correctly fixing the diagnosed problem?
- Guaranteeing the consistency and quality of the data?
- Sharing equipment problems/diagnostics effectively throughout your facility or corporation?
- Assigning annual cost benefit dollars to your program's effectiveness?
- Achieving (or even tracking) the stated goals set when the approval was given for the program's inception?

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If you struggle with any or most of these issues, you're not alone. Many programs today simply survive by keeping the basic lifeline of the program functioning, collecting a mountain of data and performing basic single-pass analysis, resulting in quick and dirty maintenance recommendations. Little or no time is left to perform needed program functions such as tracking predictive work actions to establish repair effectiveness, establishing new baselines, reviewing alarm effectiveness and fine tuning alarm parameters, database management, root causes analysis, bad actors review, analysis technique review and sharing valuable information across sites, business units and corporations. The problem gets substantially worse when trying to truly integrate all predictive technologies into a comprehensive program.

The most effective vibration analysis programs today ensure the program doesn't just stop after the monthly vibration rounds are complete, points in alarm have been identified and machines with high levels are passed to maintenance planning for action. Communicating the diagnosed problems with clear, concise, easy-to-navigate reporting tools and the ability to track the repair actions through completion are critical to the program's success. Evaluating the benefit of those actions is also critical. This ensures the program truly turns the raw vibration data that is meaningless to most operations and maintenance personnel into useable, actionable recommendations.

Making the Right Design Decisions

For many organizations, these problems are real and can seem insurmountable. Many times, the problem begins with the initial program design. Critical design decisions might be overlooked or minimized. More time is typically spent trying to choose the best hardware and software platform and not on ensuring the program design is appropriate to achieve the stated goals. Whether the goal is to lessen unplanned failures and downtime, minimize emergency or overtime work load, increase or improve availability, or to just reduce maintenance costs, the program needs to be effectively designed from the beginning to achieve stated goals and provide a return on investment.

There are several critical decisions to make during the program design phase before moving forward with potentially purchasing equipment and moving toward implementation:

Program goals or expectations – what should the program achieve to be deemed successful? What is the payback required? In what timeframe? Are the metrics required to fully evaluate the cost benefits of the program available? Programs developed that do not have a good foundation for tracking benefits or ROI usually become less effective over time and harder to justify the resources, costs and ongoing training requirements.

Critical equipment assessment – you likely cannot or do not want to cover all assets. Determine what equipment is critical to achieving your goals and to maintain continued operations. Use an 80/20 rule approach to ensure you spend your time wisely and getting the maximum return on your investment.

Technology assessment – which predictive technologies (vibration, infrared, oil analysis, ultrasound, MCE, etc.) should be applied to the critical equipment list to ensure effective detection of impending problems or problem types.

Required frequency for collection – how often does trend data need to be collected and stored for proper analysis and predicting typical machine failure modes. Machine types with typically short failure modes will need data collection intervals to be equally short or even continuous. Failure modes that usually develop in a longer period of time can be handled with manual collection and at longer intervals while still being effective.

Required program equipment – information will need to be gathered on the necessary program equipment to achieve the desired data for at the desired frequency. This process likely requires working with multiple vendors for hardware and software to support their technology.

Program quality and effectiveness – most programs are designed to focus solely at a site level. Consistent program traits and quality are very difficult to manage without the proper tools. There is tremendous benefit in establishing program templates for data collection, data analysis, reporting and deriving cost benefits. Additional benefits come from the ability to analyze equipment type trends over similar operations across multiple sites. These trends can prove OEM quality or flaws that can cause significant problems throughout your operations.

In-house vs. Outsourcing – possibly the single most important decision is the internal evaluation to run the program with existing resources or to outsource it to certified experts who can manage the program for you. This decision needs to take into account the availability of resources, the training requirements of those resources, the initial program investments (including all hardware and software), the ongoing training and program costs, and the other inevitable distractions that will come when using in-house employees with many other job duties to run your program.

Depending on your situation, outsourcing to experts whose core expertise is designing integrated programs to achieve program goals and provide services such as vibration analysis, infrared and oil analysis as primary offerings might make the most sense. Outsourcing allows your valuable resources to focus on core maintenance, operational and productions goals.

The next question then would be how to choose the right partner. The right partner should be able to assist with all the design decisions discussed earlier. They should also be focused on not just providing integrated program services but also providing the tools to track the program at the data level and analyze the data with true sortable, web-based integrated reporting, repair tracking and real-time, customizable cost benefit tracking.

The right partner will have the right approach and technology required for running a truly successful, corporate-wide integrated PdM program.