The Complete Guide to Preventive and Predictive Maintenance discussion with Sandy Dunn

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I've gotten some great feedback on my new book The Complete Guide to Preventive and Predictive Maintenance. The most interesting was from Sandy Dunn, a maintenance expert that hails from Australia. He completely disagreed with the second half of my definition of Preventive Maintenance. He says "…you spoilt it for me by defining PM as activities to "Extend the life of an asset" or "Detect that an asset has had critical wear and is about to fail" - the second of these is, in fact, a workable definition of PdM, not PM".

He goes on to say "A quick look at Merriam-Webster's dictionary indicates that the meaning of "predict" is "to declare or indicate in advance; *especially*: foretell on the basis of observation, experience, or scientific reason". The same dictionary states one definition of "prevent" as being "to keep from happening or existing". If we define what it is that we are trying to predict or prevent as being a "failure", then an inspection, on its own, clearly does not prevent failures. An inspection merely allows you to predict a failure.

Furthermore, the frequency of a predictive task is determined by the PF interval - how much warning you get before the failure would occur. On the other hand the frequency of a routine preventive task (such as a routine component change, a regular refurbishment task, or a regular lubrication task) is determined by the "life" of the component - the age at which there would be a rapid increase in the probability of failure, were the preventive task not carried out.

Therefore, I argue that Predictive Maintenance is NOT a subset of Preventive Maintenance - it is in fact a separate, independent category of maintenance - based both on common English definitions of the words Preventive and Predictive, as well as on sound engineering principles which indicate that the basis for task frequency determination is quite different for each classification of maintenance. However, I DO agree with you that an inspection, regardless of whether it uses "high technology" or the human senses SHOULD be considered as Predictive Maintenance."

Thank you for that Sandy. I agree with the definitions but disagree with the specifics when it is implemented in a real business. I also think there is significant confusion about what is Predictive Maintenance and what is Preventive Maintenance. I go back in

this field quite a ways, before Predictive Maintenance was a household word (although the technologies have been around quite a bit longer then I have). Every PM task list I've seen has inspection tasks such as looking at the bottom of the boiler for rust and checking the tightness of a coupling.

While these kinds of activities are clearly properly part of the PM program they are really predictive in nature. In other words you are asking the inspector to view or examine something and "predict" if the condition will cause a failure before the next inspection cycle. Hence I say that a fundamental part of the definition of the PM system is "Detect that an asset has had critical wear and is about to fail"

To take it a step farther I could never see the difference between a hand inspection on a coupling and a vibration check since either could report that the coupling was loose. The only real difference is that PdM required you to spend money on a piece of technology.

Here is where I get radical because in my view PdM is a subset of the inspection portion of PM. It is inspection that requires technology, or sophisticated equipment. The PM system, in most cases, already acts as the master scheduler for PdM activity. So if you do the inspection with a sophisticated tool it is PdM if you do it with your eyes, ears, hands it is PM. BUT both inspections are driven by the PM scheduling system and therefore are "under" the PM system.

Sandy has a fascinating point that the frequency for PdM comes from the decay in performance (from the P-F) curve and the PM frequency comes from "life" of the component - the age at which there would be a rapid increase in the probability of failure, were the preventive task not carried out. That kind of stopped me because I thought that lack of lubrication and the increased probability of failure were the invisible precursors to the decay in performance in the P-F curve in the first place. A very interesting conclusion nevertheless.

In the PM portion of a CMMS such as Maximo it doesn't matter where the frequency comes from. The frequency will cause a work order to be issued for PdM inspection or PM inspection or whatever.

In addition, Sandy has another beef with the book, which I agree with. I use the word "wear" very loosely. In the above definition, I say, "asset has had critical wear." He points out properly that wear is only one (and generally an insignificant one) failure mode – he goes on to say, "PdM (and PM) can, in fact, be applied to many more failure modes than wear. Consistently throughout the book you refer to "wear", but Nowlan and Heap have shown that wear is only the dominant failure mode in less than 2% of all component failures".

Thanks for reading

Joel
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