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Does the word "frustrating" describe the current state of your computerized maintenance management system (CMMS) or enterprise asset management (EAM) system implementation? How is it possible that with all that time spent gathering information on equipment, preventive maintenance (PM) tasks, and parts, assigning employees, and entering vendor information into the system, all you have to show for it is a "work request/work order generator" and complaints from maintenance workers that continue to pile up. Is their complaint that it takes too much time and too much paperwork? What went wrong?

In the beginning

Was a functioning manual system in place? Or was the first attempt at organizing the maintenance department done with a computerized system? Under ideal conditions, it is best to grow from a manual system, meaning a system with handwritten work and purchase orders and a cardex inventory system. If the manual system is working well, the conversion into a computerized system is less painful and saves time.

Many companies do not have a manual system working smoothly and the implementation of a computerized system necessarily creates work and a significant culture change for the maintenance department. There is no mystery involved in introducing a computerized system; be prepared to manage the change and understand that the work involved will produce tangible benefits.

What were the goals of the project? Were they structured, focused, and clearly defined? Were they communicated to all those impacted by the project? What were the expectations? Was the goal to implement a work request or work order program to control preventive maintenance? Or was the goal to give the company a knowledge base from which maintenance decisions can be made? If there are issues with the system implementation they relate back to the definition of the project goals.

Benchmarking

At some point, a baseline measurement must be made. Answer the question, "What do you want to get out of the system?" Will the system be used to determine service, productivity, and inventory levels? Define the goals of the project clearly or expect an exercise in futility. Without clear definitions being made and acted upon and with a lack of accountability, each user of the system will define his own, usually minimal, requirements. If this is allowed to happen, the

integrity of the data in the system will equal garbage in and garbage out.

Start by reverse engineering the implementation process. Most implementations suffer from an unclear definition of what the users want to get out of the new system. Make sure the effort of data input is consistent with the goals of the project. It is easier to work with a clear idea of what you expect to get out of a system, and then prepare an analysis of what data is needed, and how it will be entered into the system to produce the end results you expect. Any system can store information but the key is taking the information and converting it into knowledge and then being able to make management decisions based on that knowledge.

Here are a few examples of benchmarks and the data that must be entered into the maintenance system in order to calculate the benchmarks:

- Maintenance cost as a percent of equipment replacement value (3 percent)

First, the equipment replacement value must be determined. I have yet to work with a maintenance system in which this field was not available. However, prior to entering the data there must be a definition of equipment replacement value. Is it the original purchase price or the purchase price with a factor of inflation for today's increased cost of replacement? The definition of equipment replacement value needs to be applied consistently to all equipment.

Maintenance costs require more attention. How are maintenance costs defined? Do they include material from inventory, nonstock material, labor, and contractor services? If all of these costs are included in your definition of maintenance costs that information needs to be entered into the maintenance system. For example, if material from inventory is included in the definition of maintenance costs, then stock material will need to be priced and issued from the system. The same will hold true for nonstock material, in-house labor, and contractor services. To properly capture the costs, they will need to be priced and entered into the system. Again, consistency is the key.

- Backlog hours (2-5 weeks)

This is a simple concept that is easy to calculate, but it requires the estimated hours—*typically by craft* —
be entered into the system.

- Maintenance cost by operating department

Earlier I discussed how maintenance costs are defined and what they include. Whatever definition is decided upon, consistency is the key.

How are operating departments defined in the system? Is there a separate field for department, operating department, and location or are you going to use the general ledger or chart of accounts to differentiate between departments? If the location field is used to define some operating departments and the general ledger field for others, pulling the information out of the system can be extremely difficult. Again, consistency is the key.

- Percent of time spent on corrective, predictive, and preventive maintenance work orders

To calculate this ratio, a definition of what corrective vs preventive maintenance work is will need to be determined. Once this is done, the work will need to be flagged as either corrective or preventive work. Then, depending on the definition of labor time, which may or may not include outside contractors' time, this work must be entered into the system. Again, consistency is the key.

How to avoid the pitfalls

Most mistakes are made when the basic information is entered into the system. Basic information answers such questions as "What is a piece of equipment?," "What is a part?," and "How is preventive maintenance handled?". More importantly, "How much detail gives us the information necessary to run the department?"

- What is a piece of equipment? Is it the cost, the critical nature, or a life/safety issue that determines that the piece needs to be set up in the system as a unique entity? Is it anything over $500 or maybe the cost is less but it would have a significant impact on the operation (like the lock on the front door) or a fire extinguisher for safety? A policy needs to be created defining what a piece of equipment is.
- Parts vs equipment. Parts are typically items that make up a piece of equipment and are replaced, not repaired. Disposable filters are typically parts. Electric motors can be both. Smaller electric motors are replaced as parts. As an example, a ¼ hp motor most likely would be a part, while a 25 hp motor probably would be a piece of equipment. Generally, setting up a ¼ hp motor as a piece of equipment would create a cumbersome situation for maintenance history.
- Preventive maintenance. The caution with setting up PMs is again the amount of detail you need. As an example, an air handling unit can be set up as a number of pieces of equipment (fans, motors, condensers, etc.) with each having a separate PM or it can be set up as one piece of equipment with a number of PM tasks. Typically setting the unit up as one piece

of equipment reduces the number of work orders or pieces of paper the system generates.

I have been at sites where the volume of paper generated for PM work orders stalled or exterminated the project. An option to reduce some of the paper yet get the detail is to set up the PMs on the larger unit (the air handling unit) but then do the corrective work against individual pieces of equipment (fans, motors, condensers, etc.).

- Training. People are very good at their jobs and now are being asked to change; how do you get them as comfortable with the new process as they were with the old one? Training and practice is the only way they will overcome the natural human resistance to change. There is no magical solution, but the correct timing and quality and quantity of training is crucial.

Things to be aware of

There is no such thing as a turnkey implementation. You are going to be involved in setting the system up while the consultants are present, or you will be modifying it after they leave. My experience shows it is better to be involved sooner rather than later.

Consultants may want you to do it their way. Use them to make recommendations or guide on the specifics of a system, but you must remain the owner of the implementation. Make sure when it is complete, you are getting what you expect from the system.

At one turnkey implementation I saw, a small air compressor was set up as three pieces of equipment. Then each piece of equipment had separate PMs set up on it. Take this approach and then multiply it for an entire site; the implementation was a paperwork debacle that implied insufficient resources to get all the work done.

So often I see paranoid behavior because the users feel data accumulated will be used to monitor employee performance. More often I see the system being used to preserve jobs and justify the maintenance budget.

Upper management needs to be kept current on the science of maintenance management. Keep them informed by using examples of how the system has been used to save costs and company resources. **MT**

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