

The Role of CMMS

A white paper on the selection and implementation of computerized maintenance management systems

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Computerized Maintenance Management Systems (CMMS) have evolved over the last three decades from elementary asset tracking and preventive maintenance functionality, to enterprise maintenance information systems. There are hundreds of vendors providing solutions on a variety of platforms. These “best of breed” systems provide users comprehensive functionality to facilitate the flow of maintenance information and the ability to check the health of the maintenance organization at a glance.

As the maintenance, repair and operations (MRO) software market continues to expand vendors have developed solutions that focus on specific segments of asset and work management. Systems described as enterprise asset management (EAM), asset life cycle management, asset performance management, asset or enterprise reliability management and condition monitoring are all focused on achieving the same goal; increasing equipment availability and performance, increasing product quality and reducing maintenance expense. When a CMMS is implemented to facilitate established process and standards those goals can be realized.

Does your organization need a CMMS?

The vendor hype surrounding business software is only rivaled by the number of unsuccessful implementations, maintenance management software is no exception. If you are considering taking on a maintenance management implementation, first identify the goals and vision of the maintenance department.

If you just want a list of assets and parts for accounting, CMMS is overkill. On the other hand, if your goal is to reduce unproductive time spent going through filing cabinets trying to answer questions like:

- When was the last time we worked on this asset? And what was the problem?
- Where did we buy this part last time? Who has their phone number?
- Is there a substitute part in the storeroom? Where is it?
- Is this equipment under warranty? Have we performed the required warranty maintenance task?
- How much have all the repairs on this asset cost? Should we replace it?
- When was the last time a part was used? Is it obsolete?
- What did we spend on preventive maintenance last year? Reactive?

If those questions sound familiar you probably could benefit from a CMMS.

Process First

Far too often organizations will purchase CMMS or EAM software with the expectation that their maintenance business will instantly operate more efficiently. As with everything else in life, CMMS can only provide to you what you put into it. By defining and documenting existing process, requirements and establishing a method for measuring performance your team will define the role of the CMMS and what functionality is required to fulfill the maintenance vision.

Your maintenance department has several basic processes, from purchasing inventory for a planned maintenance activity to an emergency breakdown work request. Establish a team that represents all facets of the maintenance organization (planning, storeroom, purchasing, engineering, etc). Diagram existing processes and determine possible bottle necks that can be eliminated and parts of the process that can be automated.

Example maintenance processes include:

- Reactive or corrective work (with and without materials)
- Planned maintenance (with and without materials)
- Preventive maintenance (with and without materials)
- Engineering / maintenance projects
- MRO parts reorder
- MRO parts cycle count
- MRO parts receiving

It is a good idea to establish a continuous process improvement team to evaluate and add maintenance processes on a fixed basis, such as quarterly.

Measuring the Process

To evaluate the success of maintenance processes and your implementation as a whole, key performance indicator's (KPI's) need to be defined. The KPI's will allow your team to identify and further optimize the business processes, determine training requirements and quantify the return on investment.

Common measurements include:

- Planned vs. reactive maintenance (cost and hours)
- Percent preventive of planned (cost and hours)
- Percent project of planned (cost and hours)
- Percent predictive of planned (cost and hours)
- Backlog (cost and hours)
- Inventory turns
- Maintenance cost as a percentage of equipment replacement cost
- Cost by equipment class
- Schedule compliance
- Percent equipment availability
- Loss opportunity due to equipment failure
- Loss opportunity due to equipment preventive maintenance

Requirements Definition

Once the primary processes and measurements are defined the actual information requirements need to be determined. Identify what data is required, and what is "nice to have". Evaluate how labor is scheduled and cost is tracked. Determine the types of work orders and how they will be prioritized. Determine what types of analysis will be performed, and what supporting data is required. Develop standard nomenclature for items such as locations, assets, bins and parts. Identify what entities you are going to track, and what information needs to be tracked for each.

Evaluate the information requirements for other systems. Will an interface be required to accounting, HR, timekeeping, purchasing or project management software? Will other specialty systems need to be integrated such as control and condition monitoring software? Identify requirements from your IT department regarding preferred operating system and database platforms. Does IT want a web or client server deployment? All these requirements should be documented as a formal functional requirements document.

Take this opportunity to review your organization chart. Are positions defined in the work process filled? Possibly a full time maintenance planner needs to be added or additional storeroom personnel. Are job descriptions modified to incorporate process requirements? Who will be responsible for supporting users from the maintenance group and from IT?

Common Components of a CMMS

Once your requirements have been defined, a checklist can be compiled to rate the functionality of systems you are evaluating. Most CMMS applications are comprised of baseline modules that support basic maintenance functions of asset management, work management, preventive maintenance and materials management. Some applications have "add-on" modules available for additional cost that address specialty requirements such as fleet, mobile work order, barcode, and work request.

The following lists common modules and specific fields and functionality found in most CMMS applications.

Labor

- The ability to keep a listing of employees and certifications
- The ability to assign an employee to a specific craft
- The ability to assign an employee to a specific crew and / or shift
- The ability to assign standard and overtime rates to an employee

Asset

- Nameplate data (manufacturer, model, serial)
- Asset criticality
- Material list
- Location or position
- Hierarchy for rolling up cost from the asset to area and facility
- Asset assemblies
- Configurable equipment class and / or type
- Cost codes
- Asset cost
- Warranty information
- Meters (used to trigger PM's)
- Safety procedures
- The ability to attach documents or images that can be printed with the work order
- User defined fields

Work Management

- Work order number
- Work order description
- Work order priority
- Configurable work order type (PM, corrective, safety, etc)
- Problem, component, cause and remedy codes
- The ability to reserve materials planned on work orders
- Materials recorded against work orders are added to the asset material list
- The ability to plan crafts, shifts and employees on work orders
- The ability to record the assets downtime
- Record planned vs. actual labor, materials and cost
- Support child work orders or projects
- Safety procedures
- The ability to attach documents or images that can be printed with the work order
- User defined fields

Task or Procedures

- Create predefined procedures that can be associated to a PM or work order that include:
 - Checklist of tasked to be performed
 - Estimated hours
 - Resource assignments
 - Parts list
 - Safety procedures

Preventive Maintenance

- The ability to associate multiple assets to one PM record
- The ability to trigger PM's based on time or usage based events
- The ability to trigger PM's on fixed or completion based intervals
- Sequence PM work orders (ie. monthly, quarterly, annually)
- Seasonal or blackout dates
- Batch generate PM work orders

Materials Management

- Multiple store rooms
- Bin locations
- Discretely track parts by a unique item number
- Support multiple manufactures and manufacturer part numbers associated to one inventory item number
- Primary vendor and associated vendor contact information
- Inventory class and commodity codes
- The ability to post inventory cost to work orders using "average" or "last price"
- The ability to set min and max reorder points
- The ability to see parts stored in multiple storerooms
- Supports cycle counting
- Supports work order issues / returns
- Supports storeroom transfers
- Supports non-stock items issued to a work orders
- Supports repairable spares

Purchasing

- Purchase requisition generated automatically when parts are issued based on min max levels
- Consolidation of line items from multiple request into one PO
- Ability to track purchase order items on order, received or on back order
- Approval hierarchy

Plug-ins or Add-ons

- Interfaces to widely used enterprise resource planning (ERP) software
- Interfaces to plant automation systems
- Interfaces with customer relationship management and customer information systems
- Ad-hoc reporting
- Fleet
- PDA clients (Pocket PC or Palm OS)
- Bar-coding
- Work request and dispatch
- Integration with CAD programs
- Integration to GIS
- Project management systems
- e-Procurement

Implementation

Once the requirements have been established and a system selected, the implementation process begins. Unfortunately it is not as easy as flicking a switch and saying you're done. To get the CMMS to provide useful information it must be configured, key data collected and entered, and employees must be motivated to use the system.

Use the same team that identified business processes and requirements for your system to spearhead the initial configuration. The best first step is to have your core implementation team participate in an extensive overview of the selected application. This can be done by the vendor or a consultant familiar with the selected CMMS. During the overview validate that the system meets your requirements. You should also identify all the components of the system that are required to achieve your planned level of functionality (i.e. labor, value list, cost/GL codes, assets, bins, inventory, etc).

As the data collection efforts begin start "selling" the system to end users. Engage them in the process of collecting and owning the information that will be entered into the system. Take advantage of assemblies, like safety or tailgate meetings, to provide updates on the progress of the implementation. Express how the system will benefit the maintenance users, management and the company as a whole. Request that the senior management team address the employees about the significance of the system and the importance of their contributions. Promote question and answer sessions, possibly even short product demonstrations. Emphasize that the goal of the system is not to monitor employees, but to move the organization from a reactive mode to proactive mode.

Consulting Services

There are a great number of vendors and consultants that provide maintenance management system implementation support. Some focus more on the business side of the system while others are systems integrators with more of an information technology focus. When considering whether or not your organization should secure the services of a consultant pose these questions:

1. Can your staff remove themselves enough from the existing way of business to evaluate ways to make the old processes more efficient?
2. Do you have someone on your maintenance staff with enterprise software implementation experience? If not, does the project schedule allow for the learning curve?¹
3. Does your maintenance and IT staff have the time to add this project to their existing workload?

¹ If you don't have anyone on staff with prior CMMS *implementation* experience, plan on allowing for 3-6 months of additional time for your project so that resource to get up to speed on the application and the requirements for getting the system up and running. A team member with a lot of experience using a CMMS is your second best choice, and should be able to reduce the ramp up time by a month or two. Select someone to lead your project that is motivated, works well with others and won't get discouraged when the road gets a little bumpy.

If your answer was no to any of the above, or if you plan on your system being fully functional in under 6-12 months, you should consider securing a consultant. As well as contributing years of lessons learned to the implementation team, a seasoned consultant will help you develop a project plan, and guide your team through the implementation process.

If a turnkey type implementation is desired, it is critical that your team evaluates and approves key deliverables such as, business processes, nomenclature, customizations, data and the final system configuration. Regardless of the consultants role, during testing, training and go live your resources should be visibly leading the effort.

System Configuration

The bulk of the work that goes into a CMMS implementation is the collection of data, data migration, system configuration and testing. It is essential that the data entered in the system follows consistent naming standards. The identification numbers should be recognizable. If you're implementing a new naming convention, label assets in the field and provide hierarchy or plot plan diagrams next to maintenance workstations. The data should be as complete and accurate as possible. Incorrect or inconsistent data is the quickest road to frustration for your maintenance users.

The system should be configured to provide the most intuitive user interface available. Work request and work order entry screens should take advantage of as many "value lists" as possible. Use default values if supported by the system. If the CMMS supports hiding unused fields, take advantage of that feature as well. To ease future upgrades keep customizations to the application and custom database triggers to a minimum. When customizations can't be avoided, make sure that they are well documented.

The system should be well tested prior to training. Develop test scripts that model your work process and recruit computer savvy end-users to participate in testing. They will also be able perform data quality spot checks. Do not start training until you're confident the system will perform "as advertised".

Training

Training is where the rubber meets the road. Your end users are getting their first hands on experience with the system and are developing first impressions. Don't use "canned" data for training. The training environment should mirror the production database. The format of training should be role and process based. A work requestor is going to be overly confused if you train them on all the functionalities of a work order instead of the one screen and few fields required when creating a work request.

Make sure that one or two implementation team members are available to help users that fall behind during training. Follow-up with those users during "go-live" and provide auxiliary training. Provide a "play" environment where users can exercise and reinforce what they learned in training without corrupting production data.

"Go Live"

Schedule "go live" when you will have plenty of support for the users and lower than average work order volume. Have a back-up plan for managing the flow of information in case the system goes down unexpectedly. If users have to fall back to the paper system for a few hours, have them create work orders in the CMMS at the end of their shift. Have quick reference or "how to" sheets available as well as diagrams that will help them enter the proper values into the system.

At the end of every day review what went right and where changes are required. Update and re-post the work processes the following day. Track and prioritize configuration issues and system "bugs". Provide a daily update to your vendor or consultant. Reviewing the work orders daily is an excellent way of seeing how successfully each maintenance user is interacting with the system, or who needs extra help.

Post Implementation

Following “go live” and prior to the transition from the project team to normal operation, review all the defined requirements and whether they have been fulfilled. Insure that the mechanisms to facilitate and measure business processes are in place. If a vendor or consultant was utilized make sure all their deliverables have been completed.

Develop a support and issues escalation path. Have users go to their supervisor or resident “power user” with issues. If the issue can’t be resolved, escalate it to a site or company administrator. The company administrator should be the sole point of contact between your organization and the vendor. The administrator should be responsible for logging and tracking all open issues and enhancement request.

Closing

Today’s businesses operate on the premise of doing more with less. The only way to balance the scale is through better work processes, skilled employees and enabling technology. CMMS is one tool that can genuinely enable your organization to meet their goals. Like any other tool, it won’t do anything for you if it sits on the shelf, and if you’re not prepared to use it as intended, it can do more harm than good.

Those organizations that successfully implement CMMS and supporting processes have claimed 10-30% reduction in maintenance related expenditures. When lost opportunity due to equipment failures and the potential liability of safety related failures are factored in, it is plain to see the value behind even a large scale effort.

If your organization is not ready to jump in with both feet, consider a phased implementation. Focus on building the foundation through work process and data collection. Begin using the system for reactive maintenance work orders then bring on additional functionality such as task, PM’s, inventory, purchasing and integration to other business systems.

About the Author:

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