

Key Processes in Leveraging the Value of a CMMS

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Introduction

Each year companies spend thousands of dollars purchasing, upgrading, and improving computer based work management systems commonly known as Computerized Maintenance Management Systems (CMMS), Enterprise Asset Management systems (EAM), or Integrated Work Management Systems (IWMS). These systems are continually thought of as the Holy Grail of the maintenance world. Their ability to track assets, inventory, purchasing, resources, contracts, and work order information and translate that information into transaction-based costs are heralded by their providers as the ultimate tool for reducing maintenance costs.

When used properly, these tools (referred to with the common term of CMMS for this paper) offer an organization the opportunity to move from a reactive maintenance strategy to a proactive strategy. What is often misunderstood is that a CMMS is just a tool, not the Holy Grail capable of single handedly transforming an organization's maintenance practices. Like other tools—such as FMEA, Reliability Centered Maintenance, Oil Analysis, Thermography, and Vibration Analysis—a CMMS is only part of a larger tool set that can help an organization significantly improve the way it performs maintenance. However, one commonly overlooked component is that the processes that support the tools are what determine their success.

This paper will focus on the key processes required to leverage the full value of a CMMS. It will provide an analysis of those processes and the important aspects to consider when developing them to support a CMMS.

Understanding Your CMMS

Often upper management is not as familiar with the CMMS as the frontline management who use it on a day-to-day basis. Many CMMS vendors target the executive-level managers when making their sales pitch or demonstrating the functionality of a CMMS. These demonstrations are often prepared well in advance and utilize canned data that the vendor has chosen to highlight certain key functionality in the system. The vendors are also able to gloss over or avoid demonstrating any functionality that may not be adequately developed or easily implemented, leaving management with the impression that the various modules of the CMMS are seamlessly integrated and user friendly. As frontline management begins to utilize the CMMS, it becomes apparent where the system is flawed, what functionality is “extra,” and how resource intensive the ongoing administration and data entry would be to realize the full functionality and capabilities displayed in the sales demonstrations.

As key processes to leveraging the CMMS are developed, it is important to ask questions about the system's capabilities. The bullets below highlight some of the areas that should be considered:

- **Is the CMMS Web-based?** A Web-based CMMS resides on a server that can be accessed by other computers via an Internet connection. This is much like accessing common websites over the Internet such as Yahoo or Google. A non Web-based CMMS requires the installation of software on all computers accessing the application. This can limit the number of users and areas of accessibility, which will impact various processes related to work management, inventory, and procurement.
- **How Many CMMS Users are there?** The number of users with access to a CMMS is dependent on the licensing of the CMMS and the accessibility of the system. If the CMMS is only available from a computer in the maintenance manager's office, then the ability to have multiple users will be restricted. If the application is Web-based and its access is controlled by user licenses, then the number of users may be restricted based on the licenses purchased by the organization. Processes will be directly impacted by the number of resources able to access the CMMS. For example, a work management process calling for labor personnel to enter work order completion information directly into the CMMS may not be plausible if those personnel are unable to access the system due to license restrictions or restricted physical access to computers capable of logging on to the CMMS.
- **What Functionality is Included in the CMMS?** As mentioned previously, functionality displayed in a CMMS demonstration may not be part of the purchased CMMS due to license restrictions or failure to purchase certain “extras.” Where functionality resides (e.g., in the CMMS, an ERP like PeopleSoft or SAP, or some other corporate application) will determine how a process must be developed and which resources will be involved based on access to those applications.

- **Does the CMMS have Mobile Functionality?** Whether or not the CMMS has the ability to utilize mobile devices will greatly impact how processes are developed related to inventory and work management. It is important to know if the organization has the technical infrastructure to support mobile functionality. Organizations with wide ranging wireless capabilities can more readily accommodate a mobile deployment. If a robust wireless infrastructure is not in place or practical given the environment, then mobile devices using cellular technology may be applicable. However, this technology tends to be more expensive. In cases where neither is available, a store-and-forward strategy may be used. This type of strategy requires the mobile device to be connected or docked to the CMMS when data is transferred between the CMMS and the mobile device. The pros and cons of all must be vetted before determining if mobile functionality is an option. How inventory and work management processes are developed will depend heavily on whether mobile functionality exists and how it is deployed.
- **What are the CMMS Resource Requirements?** Few organizations fully consider the number of resources necessary to properly leverage a CMMS. The demonstrations provided by the vendor show a limited data set constructed to highlight the application's capabilities; however, the resources necessary to feed the data to the system are not detailed. For example, if a new CMMS with failure hierarchy capabilities is being installed and loaded with data migrated from a legacy system, the failure hierarchies in the new CMMS will only be functional if those hierarchies existed in the legacy system. If they did not exist in the legacy system, as is often the case, then they must be created in the new CMMS. This requires resources to enter the data into the CMMS. The resources required to properly feed data into a CMMS and the available resources to actually perform maintenance will have a significant impact on the resource component of any supporting process.

The list above does not include every item that should be considered when understanding a CMMS. However, it does comprise several important areas that will directly impact supporting processes. Users are encouraged to do a thorough review of their CMMS functionality before developing CMMS-related processes.

Key CMMS Processes

Processes are the key ingredient to the success of any maintenance methodology. Vibration Analysis cannot be successful without a process detailing what equipment should be monitored, when it should be monitored, what actions should take place based on the output of the analysis, etc. Failure Modes and Effects Analysis (FMEA) cannot be applied effectively without a clear process dictating when it should be used, how it should be used, and how the results should be implemented. It is the process that drives the effectiveness of any tool. Even an antiquated paper and pen work management system can be made more effective with the development of proper supporting processes. It is important to understand that if adequate maintenance processes are not in place within the organization prior to implementing a CMMS, then they will not magically be available once the CMMS is in live production mode.

Many organizations seek to find best practice processes for supporting a CMMS. The expectation is that each process has a single comprehensive best practice. The reality, however, is that best practices can take many different forms depending on the structure of an organization. For example, expecting labor personnel to enter work order completion information directly into the CMMS may be a best practice for an organization with enough labor resources to address both the work and the entry of data in the CMMS. However, a best practice for an organization with limited resources may dictate the use of mobile devices that allow work to be updated from the field and eliminate the need for each labor resource to have access to a computer.

Several key processes commonly used to support a CMMS are listed in the sections below. These are not the only processes needed to support the CMMS, and users are encouraged to identify all processes that should be developed to leverage the value of the system. Although a CMMS can be highly configurable and customizable, it is recommended that processes be developed to minimize the need to drastically customize the application so as not to limit the ability to upgrade the application when future releases or versions become available.

Work Management Process

Arguably, the single most important process to leveraging the value of a CMMS is the work management process. There are many aspects of this process to consider when determining the best way to support the CMMS. Some of these aspects include how work orders are initiated; who reviews, plans, and approves work orders or work requests; what information should be captured in the CMMS when completing a work order; and how work orders are distributed.

The first step in developing this process is to determine how work orders will be initiated. One of the most common approaches is to setup a call center. This call center receives calls, emails, walk-ins, etc., requesting work to be performed. The call center acts as a pre-screen to determine which requests are valid and which are not. An experienced call center staff may be able to rectify a particular issue over the phone, thus eliminating the need to add another work request to the backlog. Key points to consider are:

- What resource levels will be needed to staff a call center?
- What information must be gathered to create the work request?
- Will call center resources create work requests or work orders?
- Will calls, emails, walk-ins, etc., be documented even if requests are denied?
- Will requestors be able to check the status of their requests? If so, how?
- How will emergency or urgent work orders be addressed?

Another common method for initiating a work request is to allow some or all personnel the ability to create a work request directly through the CMMS. This eliminates the need for a call center and ensures all requests are documented in the system. However, there are key points to consider here as well:

- Who will have access to enter requests into the CMMS?
 - All personnel?
 - Representative personnel based on building, department, title, etc?
- Who will be responsible for screening the work request backlog and accepting or rejecting the requests?
 - What are the criteria for acceptance?
 - What are the criteria for rejection?
- Who will be responsible for converting the accepted requests to work orders?
 - What status will they have?
 - What are the various statuses as the work order progresses through its life cycle?
- What will be the required format for a work request and what data must it include?
- Will work requests made directly to maintenance personnel be allowed?
 - Can people submit a request verbally while a person is performing a task?
- How will emergency or urgent work orders be addressed?

As the backlog of work orders begins to grow, how they will be processed must be determined. The backlog will need to be reviewed; its work orders assigned, that work performed, and the work orders completed within the CMMS. As with the initiation portion of the process, this portion has many considerations as well:

- Who will review the work order backlog for assignment?
 - A single resource?
 - Several resources based on the type of work, location of work, or craft involved?
- What status will a work order be given after its review?
 - “Waiting for approval” if not yet assigned?
 - “Assigned” if a resource is designated to perform the work?
 - “Planning” if in the process of being planned?
- Will work orders be planned?
 - Procedures included? (e.g., job plans, safety plans, lock out, or tag out)
 - Materials and tools included?
 - Estimated start and due dates?
 - Resources and hours estimated?
- How will work orders be assigned?
 - Directly in the system by supervisors?
 - Through an administrative resource based on supervisor input?
 - To resources based on craft, schedule, or availability?
- What information will be included in a work order?
 - Location?
 - Asset?
 - Job instructions? (e.g., description, procedures, or additional documentation)
 - Estimated duration?
 - Material and tool information?
- How will work orders be given to labor?
 - Hardcopy work orders?
 - Mobile device?
 - Radio or other communication device?
- Are routes used?
- How will completed work order information be entered into the system?
 - Directly by labor personnel? If not, what is the process for getting the completed information to the resource responsible for entering it into the system?
 - Directly by supervision?
 - By administrative personnel?

- Will completed work orders be reviewed prior to close out?
 - By whom?
 - What specifically will be reviewed?
 - Will comparisons be made between actual and planned information?

As can be seen by the preceding information, there are many things to consider when developing a work management process to support a CMMS. The key is to create a process that balances CMMS functionality, resource availability, and organizational structure.

Inventory Management Processes

A CMMS can incorporate inventory management functionality. Inventory management processes must consider how material is received, stocked, issued, transferred, and tracked. Inventory processes should consider the following:

- Will inventory items be “owned” by the CMMS or by a financial system such as PeopleSoft or SAP?
- Who will enter new items into the system?
- Will mobile devices be used?
 - For issuing items?
 - For cycle counts?
- Will bar coding be used?
 - What criterion determines if a single item gets bar coded versus an item lot?
- Are there multiple storage locations?
 - Is each manned?
 - What hours is each available?
 - Are materials duplicated in each?
- How are items issued to personnel?
 - Work order number required?
 - Manager approval?
 - Simple request?
- How are items returned?
- How are stock levels determined? By whom?
- What inventory methodologies are in place?
 - ABC?
 - Just in time?
- How often is inventory counted?
 - Are mobile devices used?
- How is inventory adjusted?

Purchasing Processes

Because of their direct impact on costs, purchasing processes can be fairly complex. A purchasing process needs to consider how purchases are requested and approved, how orders are placed, and how material is received and distributed. Depending on the size of the purchase, a request for quote may have to be submitted, multiple vendors may have to be considered, and in some cases government or industry regulations may be an issue. Purchasing process issues to consider in support of a CMMS are:

- Is purchasing initiated in the CMMS or some other system?
- Who can submit a purchase request?
 - What information must be included?
 - Are requests entered directly into the system or are they submitted in a paper format?
- Who can approve a purchase request?
 - Can someone approve a request from a different department?
 - Can a person approve his or her own requests?
- Can requestors review the status of their purchase requests?
 - Is this done in the CMMS or some other system?
 - Can they do it on their own, or do they have to make a request for the information?
- How does a purchase request become a purchase order?
 - Does this happen in the CMMS or in another corporate system?
- Do purchase orders require approval?
 - Who can approve purchase orders?
 - Are there different approvals based on purchase limits?
 - Is the purchase order routed in the CMMS, another system, or manually via paper?
- How are vendors determined for a given purchase?
 - Can the requestor choose the vendor?
 - Are vendors predetermined for certain items?
- How are materials received?
 - Are mobile devices used?
 - Are items quality checked?
 - Are items distributed, or are they picked up?
 - Are receipt inspections required?
- How are purchased items returned?

CMMS Sustainment Processes

System sustainment is rarely given sufficient consideration when implementing a CMMS. It involves three main areas: technical sustainment, application sustainment, and data sustainment.

Technical sustainment includes the regular backup of the CMMS software, patches to the CMMS software and system software, upgrade to new software versions, maintenance of system interfaces, general upkeep of the technical architecture, and data archiving. Technical sustainment processes need to define both the owners of tasks and the frequency of tasks, such as system backups. The processes should also outline how technical issues are communicated and tracked.

Application sustainment includes changes to the application configuration, modifications to user interfaces, customization of the database and application, and creation and registration of reports and key performance indicators (KPIs). Processes should define how requests for changes or modifications are initiated, approved, and processed.

Data sustainment includes the entry of new data records (e.g., assets, items, users, resources, procedures, etc.), maintenance of existing data records (e.g., moving assets to different locations, marking inventory items no longer used as obsolete, changing personnel associated to labor groups, etc.), and transactional data entry (e.g., work order processing, purchase order processing, inventory processing, etc.). This area tends to have the biggest impact on resources and should be carefully thought out to ensure responsibilities are not given to resources already over tasked or unable to give the level of commitment needed to be successful.

Several areas to consider when developing CMMS sustainment processes to leverage the full value of a CMMS include:

Technical Sustainment Process

- Who decides when patches or upgrades will be applied?
 - What is the criterion for making this decision?
- How are system backups performed?
 - How often?
 - Where are the backups stored?
- Where are requests directed?
 - Are requests submitted to the information technology department (IT)?
- What system or method is used to track IT-related CMMS requests?
 - Is a ticket tracking system used?
- How are interface issues reported and tracked?
- How often will data be archived?
 - What is the cutoff point for archiving?

Application Sustainment Process

- Who approves application modification requests?
 - What criteria are used for approval?
- What method ensures requests do not conflict with other user needs?
- How are application modification requests tracked?
 - What system is used to track the requests?
- What determines when external resources are necessary?
 - Who has the authority to bring in external resources?
 - Are internal resources required to work with them?
 - Is safety training necessary when using outside resources?
- Who has application rights to make changes?
- How will multiple instances be kept in sync?
 - Will the training environment mirror the production environment?

Data Sustainment Process

- How will data be given to resources to enter into the CMMS?
 - A hardcopy request form?
 - Email?
 - Phone call?
- Who will approve entry of new data? (e.g., assets, items, etc.)
 - Will this be one person or several based on data type?
- What data elements need to be included when entering new data?
 - What information must be included on a work order for entry into CMMS?
 - What data elements must be entered when adding an asset?
- What happens to paper documents? (e.g., work orders after data is entered)
 - Are they filed?
 - Are they destroyed?
 - Are there regulations guidelines that must be followed?

Summary

For the past 20 yrs working with steel mills, automakers, hospitals, college campuses, and other companies I have seen a consistent pattern in their approach to utilizing work management systems. They have all focused on the system from a technology perspective. They focus on changing the screens, updating the software, adding additional software, and interfacing other systems. Many became frustrated with their systems because they did not live up to the expectations set during the initial sales and demo meetings. Systems considered by many to be best in their class were deemed “useless” by all levels of management. These companies failed to realize that the processes they had in place before implementing the new system were inadequate and ineffective. They did not understand that implementing a new system without focusing on the processes that support that system would not solve their problems.

Conclusion

A CMMS can be one of the most valuable tools a business has for developing a world-class maintenance organization. When properly implemented, it can provide maintenance management with the ability to gather and organize data critical to making decisions to improve the way the organization performs maintenance. Without well-developed processes to support the CMMS, however, the true value of the system cannot be properly leveraged. To obtain the full value of a CMMS, processes should be fully developed, documented, and routinely reviewed. Process communication and training should be conducted before the system “go-live” date.

Procedures for work management, inventory management, purchasing, and CMMS sustainment must be thoroughly and properly developed to support the CMMS. Available resources and their capabilities, organizational structure, and available CMMS functionality must all be considered to fully realize the system’s value.

Companies should use subject matter experts within the organization to help develop sound processes to support the CMMS. Outside resources should also be considered if internal expertise does not exist with the skills to utilize Microsoft Visio or similar software, develop swim lane diagrams, create process standards and procedures, or, in short, develop professional, robust CMMS support processes. The success or failure of the CMMS will depend on the key processes that support it.

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