CMMS Implementations: Did you build your foundation?

– Brian Stevens, Senior Reliability Consultant, Emerson
Bob Crull, Independent Reliability Consultant

Over the last several decades, Enterprise Asset Management (EAM) and Computerized Maintenance Management System (CMMS) implementations have become significantly more complex. The days of installing an application and only using it in maintenance departments are gone. Today, with larger and more complex enterprises, management needs to have near real-time access to data that could affect the company's ability to produce its product. That, coupled with the need to reduce the cost of production, makes it easy to understand why the systems have become more integrated.

Simply stated, the applications are designed to house data. That data ranges from assets to inventory to craft types and crew makeup and more. Work orders can be tracked from inception through closure and archiving. There are storage mechanisms for material requests, purchase orders, and inventory issues. Collectively it is a lot of data. Historically, these systems were designed in-house or purchased from an industry-specific vendor. In today's world, however, consistent and reliable data has become a critical component of a company's success, so maintenance management systems are being incorporated into Enterprise Resource Planning (ERP) systems.

At the core, maintenance management systems can all store, categorize, and report on events, but they are only as good as the information they are fed. The data being entered into a new or existing system needs to be evaluated for viability and to determine system requirements based on evolving business drivers. Maybe those drivers will take the shape of new ways of running maintenance: proactively versus reactively. Questions will arise such as: Are we getting what we paid for, and if not, why? Is the pump in the field the same part as the pump on the shelf, and how do we know? Is it the model number, or in some situations, is it the serial number? When assets are linked to items, it makes sense that these two items use the same core information available through a mechanism known as specification templates. Most major vendors provide some level of specification tracking and linking between assets and items. When implementing an ERP with a CMMS component, it is important to be involved in the conversations with all the departments that produce data used to maintain a plant to ensure that the information is accurate and consistent across the organization.

Software developers typically follow the SDLC (Software Development Life Cycle) methodology or some variant thereof. Regardless of the naming convention, the implementation will typically contain these phases: planning, analysis, design, implementation, and maintenance. Successful, game changing implementations focus on multiple intermingled threads. These threads are: software, data, integration, and processes. Each one should follow the same development phases listed above whether during an implementation or as a standalone project. While these same phases can be used to implement any maintenance-related initiatives your department may undertake, this article focuses primarily on processes and data.

EMERSON

Processes – Establishing robust processes and maintaining the discipline to follow them is critical to a system's success. Asset management is more than an application; it is a series of activities designed to keep equipment doing what it needs to do within its operational context. Reliability-centered maintenance, condition-based maintenance, and other philosophies all strive to increase an asset's availability to perform its function.

The inspection of an asset — whether manual or automatic — will produce a backlog of necessary work, which when complete, will allow the asset to produce its output. This is a simplified description of what a process does, but at the end of the day, a process leads to the creation of something. Top-quartile companies have adopted processes to guide and integrate asset-management and work-management functions, as well as purchasing, financial reporting, human resources, etc. Through defined processes and applied discipline, companies are able to better control the events that affect the asset's availability through the adherence to documented processes. The tendency is too often to consider the current costs of implementing processes as prohibitive, rather than looking at the positive long-range impact that a well-implemented maintenance management system can have on a company's financials.

Top-quartile performers usually have processes designed around the initiation, screening, planning, scheduling, execution, monitoring, closure, and completion of a particular piece of work. Though similar, these processes must be defined by your company taking into consideration the environment, staffing levels, operations, and materials management practices to name just a few. Often it is best to turn to process developers for assistance navigating process design. Developing processes often brings to mind the old adage,"Pay me now or pay me later." Ineffective processes can have a negative impact on employee morale and can actually sub-optimize the activity they were designed to improve.

More often than not, we reward lack of process and/or lack of discipline in enforcing current processes, which leads to a reactive environment. The ability of the maintenance staff to put out the fire makes them heroes in the eyes of the operations team. Maintenance workers are quick to respond, with toolbox and band-aids in hand to get the asset back into production. Unfortunately, maintenance all too often only addresses a symptom of the problem, not the root cause. By defining and implementing sound processes, maintenance becomes more proactive, which can help reduce the amount of reactive work. Adopting processes also leads to reduced inventory cost, less overtime, better uptime, and lower cost of goods sold through the reduction of scrap and waste.

Data – The fuel for this analytical engine is data. Without it, analysis is at best a hypothesis if not a blind guess. That is not to say that every asset needs exhaustive history, but the level of detail required to generate meaningful data must be considered. The output of the captured data has multiple uses, including financial reporting, budget development, failure analysis, document tracking, etc.

It is crucial that data be consistent in its use and that consistency be dictated by the processes in place. Before the first maintenance transaction is documented in the new application, there is a considerable amount of work to be performed in cleansing, normalizing, and converting existing data. The data must be scanned for duplicate and obsolete records, naming conventions and descriptions must be standardized, and a field-by-field map must be built to move data from one place to the next. Often it is easier to start from scratch, unless there is a corporate or regulatory requirement to maintain current history. A fresh start provides a chance for the organization to agree on things like what constitutes an emergency and how to name assets. An emergency can be defined as safety critical and/or significant loss of production. Asset names vary between organizations; however, best practice naming conventions indicate a classification system using a class/sub-class structure, pump/vane, or pump/centrifugal.

Similar to the foundation of a building, it is important that the management of assets begins with good foundational data; otherwise, it will become increasingly difficult to obtain useful information from the collected data of the system. Think of foundational data as that which doesn't often change. Some examples include work order types, catalog items, locations, failure codes, class/subclass combinations, and nameplate templates. The purpose of foundational data is to assist in the consistent execution of processes. The goal of a reliability-centered maintenance program is to maintain an asset in its optimal operating condition given the context in which it operates. The task of performing analysis across similar assets in a plant or multiple locations around the world becomes much easier and more meaningful when the foundational data is thoughtfully developed. Some organizations have gone to the extreme in trying to normalize poor data by enlisting the help of report writers. These resources make sense of the data as it is housed in the systems and find a way to report consistently across organizations. This task is made difficult by differing views about what information is foundational data and the inconsistencies in the processes that create that data. The report writers often have to resort to keeping a "Rosetta Stone" of sorts in a separate spreadsheet or database table, so they can map one department's meanings with that of another.

Strong foundational data provides the framework for consistent and meaningful reporting to drive the analytical engine. Assume that a vane pump at Plant A is the same make and model as a pump at Plant B, except Plant B calls it a drain pump even though it is the same as the pump at Plant A. Both pumps will experience similar failures and will have similar inspections applied. An issue can arise when trying to get an accurate failure analysis for all vane pumps. The drain pump is likely to be left out of the first pass of data collection because its name is not consistent with other similar pumps. When dealing with a single facility, it might be possible to piece together data that was inconsistently named, but when that same effort is applied across plants around the world the task becomes daunting.

The same concept holds true for classification of work. What one plant calls a corrective action, another plant may assume it is preventive maintenance (PM). It all depends on the operating philosophy of the plant. Process standardization is supported by consistent data, and data consistency is heavily dependent on how well established processes are followed. The data collected from work events performed on a specific asset can be analyzed to create information. It is, after all, that information which is needed to continually improve plant operations and drive out unnecessary costs.

Failure information fuels many decisions that enable continuous improvement, such as whether more precision needs to be incorporated into repairs or if the training curriculum should be updated. It can also feed engineering design changes that would have been overlooked if not for accurate information. Work stoppages can also be reduced by analyzing work order data. These have critical implications for historical data usage when needing to find out if older information will help resolve current situations or issues. The full range of possibilities for information creation is beyond the scope of this article, but consider the following questions when thinking about how asset and work data consistencies impact the overall operation of the plant.

1. How effective are your processes?
2. Is there room for improvement?
3. Does your data allow for meaningful reports across your assets and your plants without special resources dedicated to the reporting function?
4. Did your implementation take these factors into account?
5. Can you determine what improvements can be made to your implementation?
6. Are you getting everything you want out of your application?
7. Finally, are you getting what you paid for?

If you are not getting the best return on your investment, turning to an implementation specialist with a reliability background could help your organization get the most out of your CMMS.

Emerson
1100 Buckingham ST.
Watertown, CT 06795
860 945 2300

www.emersonprocess.com/reliabilityconsulting

EMERSON™