

Waiting for Godot?

Quality Data Is Key to Finding Promising Results

by Tracy Smith and Clay Bush

Have you recently implemented an Enterprise Asset Management (EAM) or Computerized Maintenance Management Software (CMMS) System? Did you develop a "Return on Investment" justification for the project, promising substantial improvements in asset performance, reduced equipment downtime, lowered MRO inventory levels and decreased purchasing costs? Did you commit a large amount of money and time to implementation? And are you still waiting for the savings to arrive and those promises to be fulfilled?

If so, rest assured, you are not alone. Sadly, our research indicates that many implementations fail to deliver on promises made to justify the system's cost. This is unfortunate because the possible savings from correctly implementing an EAM software system are genuine and ripe for picking. Significant reductions in maintenance and material costs, improvements in labor productivity and increased operational equipment effectiveness (OEE) are all realistically obtainable.

So what is the problem?

One common thread seems to weave its way through struggling EAM software implementations. Just one problem is at the heart of every troubled asset management operation. That one problem is data.

Struggling companies are unable to generate the data (and the commensurate business intelligence) they need in order to make informed and educated business decisions about their operation to improve asset performance, reduce costs and increase productivity. Specifically, they...

- Don't know the lifecycle costs of their equipment
- Don't know which failures are costing them the most in time and money
- Can't generate accurate inventory usage data in order to optimize inventory levels
- Can't get rich line item detail in order to negotiate purchasing agreements and rationalize the vendor base

It is all about the data. Content is king in EAM. Data is the foundation of information. The challenge of generating insightful and meaningful EAM information starts with your data.

So, why can't our clients generate accurate and meaningful EAM data? Well, here are a few possibilities:

- Processes are not in place.
- Processes are out of control.
- Roles & responsibilities are not clearly defined.
- System training is inadequate.

- Audit process to identify performance gaps is missing.
- EAM System functionality is under-utilized.
- No measurement program is in place to monitor and evaluate processes.
- Equipment and inventory databases are not set up properly.
- EAM System is not properly configured.

All of these variables impact EAM data quality and ultimately information. If we can fix these problems, then we can generate the data we need to properly manage our operation. Best Practice EAM data is clean, consistent, accurate and complete.

- Clean: the data does not contain spelling mistakes, is free of unnecessarily complex syntax and tables do not contain duplicate records.
- Complete: all of the required fields in each record have been populated.
- Accurate: all of the required fields in each record have been populated correctly.
- Consistent: the data is described in a standardized, structured manner and adheres to an agreed-upon naming convention.

EAM data must meet these requirements in order to maximize reporting, analysis and creation of quality information. Primarily, the challenges of generating great data - and, therefore, usable information - fall into three areas: Best Practices, Technology and Performance Management.

Best Practices

Best Practices refer to the most efficient and effective method for executing a given activity or process. Useful and reliable information is driven in part by Best Practices. Data, Processes and People are key Best Practice components that impact information.

Data

EAM data is made up of static and transactional elements. Static data forms the backbone of the EAM Sys-

tem. It is comprised of the Master Table information and Coding Structures, whereas transactional data is created as a result of a process.

The Equipment and Inventory Master Tables are the two key building blocks of an EAM software database. Getting your data right starts with these two tables.

Equipment Table – The Equipment Table contains information on the corporation's assets, such as descriptions, classifications, and locations, starting at the plant level. The Equipment Table should also define the equipment's hierarchical (or linear) asset structure within each plant. A well-defined equipment structure identifies asset relationships and levels, such as parent and child assets. These relationships facilitate analysis both on "roll up" or aggregate levels (such as by plant or by time period) and also on detailed levels (such as by department or per asset). Figure 1 is an example of an enterprise equipment hierarchy.

Inventory Table – The Inventory Table contains the corporate material catalog and information on each plant's spare part inventories. Inventory Item Numbers should be non-intelligent. Leave the intelligence for other fields in the database. Items should be described in a consistent noun-modifier format. Inventory should be classified in multiple ways to improve system sorting and reporting capabilities. The catalog should be global: item records are shared amongst plants and system security allows for corporate visibility of inventories. See the sample inventory data set in Table 1.

EAM Data Coding Structures – EAM coding structures are the most overlooked and under-appreciated data elements in the EAM System. They help to sort, group and organize information. EAM codes such as equipment criticalities, work order types, priorities, statuses, reasons for outage, inventory classes, purchase order types and vendor service codes are all examples of EAM data coding structures that support asset management Best Practices.

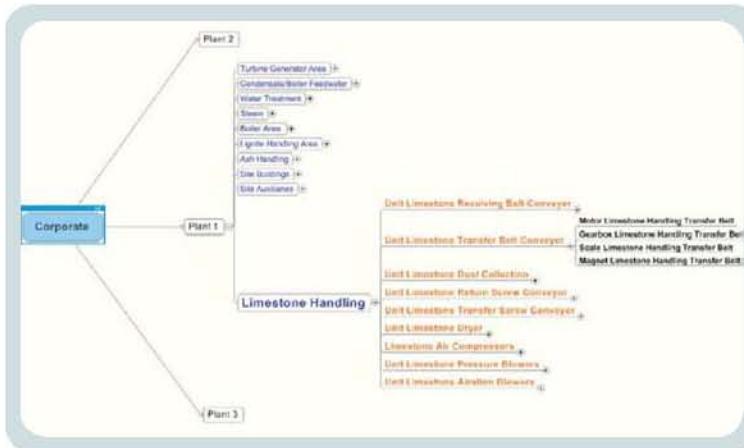


Figure 1 - Enterprise equipment hierarchy.

Item #	Description	Class	Sub-Class	Type
10001	BEARING, BALL 0.3937" ID, 1.0236" OD, 0.3150" WD	MRO	BPT	BEARING
10002	BEARING, BALL 0.7874" ID, 1.8504" OD, 0.5512" WD	MRO	BPT	BEARING
10003	BEARING, BALL 1.1811" ID, 2.4409" OD, 0.9375" WD	MRO	BPT	BEARING

Table 1 - Sample of Inventory Data Set.

EAM codes are also critical to system reporting and analysis capabilities as they are at the core of many key performance indicators (KPIs). For example, a KPI to measure the percentage of reactive maintenance requires that work order coding segregates reactive maintenance work from other types of maintenance work. Table 2 is an example of Best Practice EAM Data Coding structures for Work Order Types.

Developing rich and comprehensive EAM Data Coding Structures allows data to be viewed and reported in a variety of different ways. EAM Data Coding Structures provide insight into maintenance, inventory and purchasing processes, turning transactional data into in-

Code	Field Description
CAL	Calibration
CORR	Corrective Work
DEMO	Demolition/Decommission
FAB	Replacement Part Fabrication
IMP	Improvement/Modification - Maintenance
CAP	Improvement/Modification - Capital
PDM	PdM Maintenance Tasks
PM	PM Maintenance Tasks
RBLD	Rebuild/Refurbish Equipment
RP	Repairable Spare
ST	Standing Work Order
TROUBLE	Troubleshooting

Table 2 - Best Practives EAM Coding

sightful and meaningful information.

Processes

Processes are the system activities supporting the asset. For example, an inventory stock count transaction is created when an inventory item is counted. A work order transaction is created when a work order is entered into the system for a piece of equipment. Transactional Data, mentioned above, is created as an output of a process. EAM Transactional Data is the heart and soul of the EAM system because it drives reporting and analysis outputs and helps to monitor and measure performance. Transactional Data is only as good as the process that is employed to collect it. For example,

- Not issuing materials correctly from the storeroom will result in inaccurate or incomplete inventory usage transactions.
- Not charging parts to work orders will result in inaccurate equipment lifecycle costs.

Processes must be efficient and, most importantly, effective in order to generate good Transactional Data. An inaccurate or inconsistent process will yield sub-standard data. Business rules must be put in place that provide structure and establish guidelines for the process. For example, a work order being required to issue parts from the storeroom. Figure 2 on the following page shows a sample process flow map for the Purchase Requisition Process. Documenting processes is a great way to facilitate buy-in and standardization.

Creating complete and accurate EAM Transactional Data drives reporting, analysis and key performance indicators. Processes must be monitored, measured and audited on a regular basis. Processes must be part of an overall Performance Management Program to ensure continuous improvement and compliance with Best Practice.

People

People execute processes that, in turn, create data. Therefore, people have a significant im-

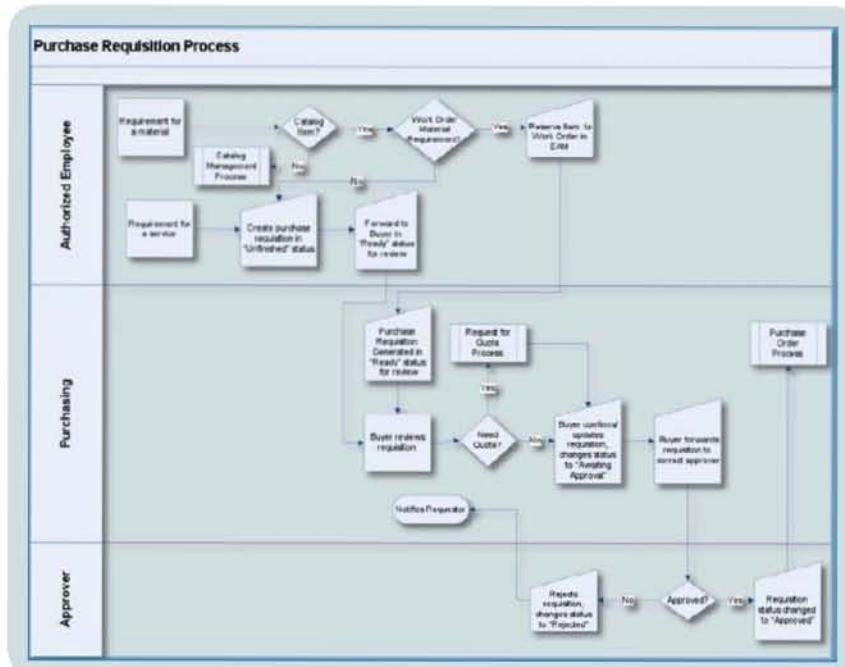


Figure 2 - Process Flow Map for Purchase Requisition Process

pact on data quality, so they must be committed to generating complete and accurate data.

Generating great data requires close coordination and integration of key EAM Functions: Engineering, Maintenance, Materials Management, Purchasing and Accounting Functions form the EAM Value Chain. These functions must collaborate harmoniously and seamlessly in order to properly support asset management and reliability needs. These functions are critically interdependent: no single process can fully accomplish its goals and objectives without the active involvement, respect, and support of the other functions.

Within each function, roles and responsibilities must be defined and audited. Maintenance Planners, Storeroom Clerks, Buyers, Maintenance Supervisors, and others must know their part in generating complete and accurate EAM data. EAM Functions should have their processes documented, internally published and available for personnel use. Everyone in the facility should know how to conduct business with these operations. Together these functions create value in EAM.

Technology

Technology consists of the EAM software and its integration to supporting applications. Technology helps to drive accurate data. Tightly configuring EAM System User Groups

and Security Configuration is critical to generating and maintaining accurate data. Only authorized users should have writable access to key areas of the database (i.e., equipment, inventory, vendor tables, etc.). For example, allowing too many people the ability to create equipment records will ultimately lead to inconsistencies in the data.

The setup and configuration of the EAM system should be easy to use. User groups should mirror roles and responsibilities. Busy EAM System forms should be scaled back and focus solely on critical data collection. Unused fields should be hidden from view. The EAM System should frame business processes and facilitate repeatable activities.

A tight-knit and locked down EAM software configuration keeps users on the straight and narrow and facilitates the creation of great data.

Performance Management

Performance Management (PM) is the nexus where clean and accurate data, generated by Best Practices and Technology, is transformed into useful and reliable information. PM tells you how your operation is doing. Is it on track? Is it out of control? Are you obtaining the results that you expect from your practices?

Performance Management involves measuring

actual values for specific performance criteria and comparing results to:

- Standards
- Historical values, and/or
- Peer group results

Performance Management consists of Key Performance Indicators (KPIs), Reporting and Performance Audits.

Key Performance Indicators – KPIs measure how well a facility, department or business function (i.e., Materials Management) is performing. For example, measuring Storeroom Inventory Accuracy conveys how well the Materials Management Function is managing inventories.

• Identifying the right KPIs to track and analyze is critical. The right KPIs are directly tied to the department's or organization's objectives and maturity level. For example, attempting to measure Work Order Response Times without an effective Work Request System in place doesn't make much sense.

• Identifying the correct number of KPIs to track and analyze helps the organization remain focused. As the old saying goes, "you can't boil the ocean." Too many KPIs can dilute focus and create paralysis. Conversely, too few KPIs provide an incomplete performance assessment. Important processes go unmonitored and opportunities for improvement are missed.

KPIs exist for all EAM Functions, but don't make the mistake of identifying them in a vacuum. Even though EAM Functions are separate organizations, their activities are integrated. For example, effective planning and scheduling are difficult to achieve without an effective storeroom and purchasing operation. By taking a holistic approach and evaluating the entire EAM Value Chain you will ensure a cohesive vision across asset management operations.

Reporting – EAM System reporting tools are required to extract, aggregate and analyze data. Reporting tools must be user-friendly and facilitate data visualization. Reporting is comprised of three areas: operational, cost & budget and performance reporting.

- Operational reporting focuses on the day-to-day or tactical operations of the facility.
- Cost reporting focuses on labor, material and services costs and how these costs are distributed across the facility's assets.

Operational Reporting	Cost & Budget Reporting	Performance Reporting
Daily Work Schedules	Equipment Failure Costs	Reactive Maintenance %
Inventory Issue Transactions	Inventory Valuation	Inventory Accuracy %
Purchase Receipts...	Purchase Committed to Cost...	MRO Contract Purchase %...

Table 3 - EAM Reporting Examples.



Figure 3 - Enterprise equipment hierarchy.

- Performance reporting focuses on KPI outputs.

Table 3 shows a few examples of EAM Reporting. Information delivery brings data to life. Charts, graphs and tabular reports like the one in Figure 3 are the best way to visualize and trend data.

Performance Audits – EAM Performance Audits are a key component of continuous improvement. Audits keep you focused. In many cases, an EAM System implementation will start quickly out of the gate, enthusiasm will run high, but the process will lose traction and momentum after going live. Periodic audits help to ensure the facility stays on track, continues to improve and closes Best Practice gaps.

Summary

The implementation of an EAM System that creates value across the organization, on a sustainable basis, can be challenging. Integrating

Performance Management program built on reporting, KPIs and continuous improvement.

Ultimately, "Success with EAMs" lies in the happy union of Best Practices, Technology and Performance Management.

So take that first step. Identify what is important to your organization. Start with the end state in mind. Define the performance data you need to make educated and informed business decisions. Next, identify the activities and processes required to support this data. Once these designs are complete, implement them and stick with it.

By taking these first few steps you will begin the journey of creating and transforming EAM data into actionable and intelligent business information that creates value across the organization, improves profitability and drives continuous improvement.

Tracy Smith and Clay Bush are managing partners of Stratum Consulting Partners in Superior, Colorado. Stratum is an Enterprise Asset Management software consulting firm that delivers Application Technology, Best Practice and Performance Management solutions. Clay and Tracy can be reached at 720.221.3559 or by e-mail at Tracy.Smith@Stratumcp.com or Clay.Bush@Stratumcp.com

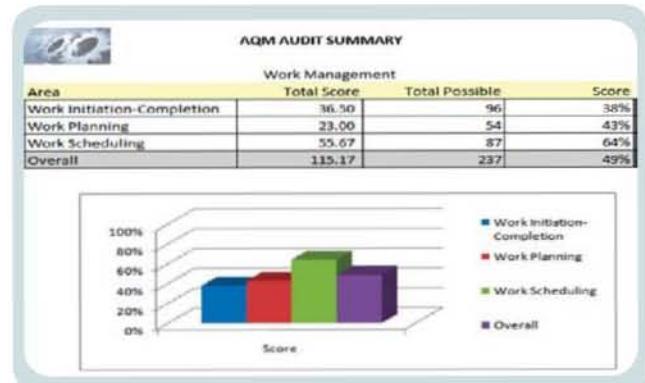


Figure 4 - Performance Audits foster continuous improvement.

systems, people, processes and data requires a well-coordinated and dedicated effort. But the effort it takes is well worth it, as the savings are both real and significant. The key to generating these savings lies in data and information.

- Generating accurate and complete data requires the implementation of Best Practices and EAM Technologies.
- Transforming this data into information requires a Performance Management program built on reporting, KPIs and continuous improvement.

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