COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEMS SELECTION IN HOSPITALITY INDUSTRY

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Abstract
The objective of maintenance is to reduce the number of unexpected breakdowns due to failures, which may be catastrophic and may incur huge loss. Computerized maintenance management systems (CMMS) and enterprise asset management (EAM) enable the planning, controlling, and monitoring of physical asset events and maintenance tasks as they pertain to plants, equipment, and facilities. CMMS/EAM systems span all phases of the asset life cycle across all services, including investment planning, specification, design, operations and maintenance, and disposal. CMMS/EAM systems help managers better allocate equipment and resources, and ensure that proper and timely maintenance is carried out.

Key words : maintenance, CMMS, EAM, ERP, life-cycle

INTRODUCTION

Selecting a CMMS / EAM software is not a trivial task. This software must collaborate with other, as shown in figure 1. Bought system should serve for at least five years and must pay back.
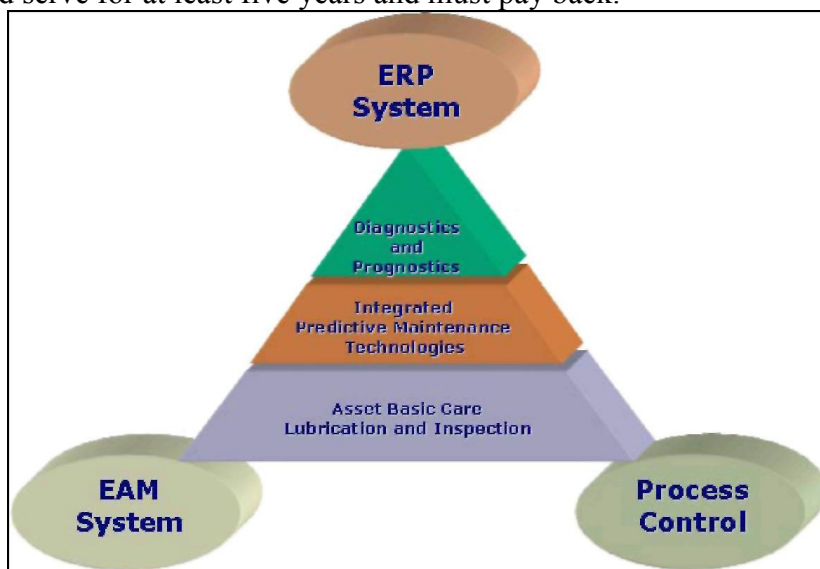

Fig.1. Software collaboration

Below is described a series of steps to maximize the probability the system selected will mesh with the organization business way, with maintenance goals and needs, and with the available manpower.

Step 1 — Set up a selection committee include selecting representatives from each affected department or function. Some of these representatives will be full time members of the committee, participating in all sessions and decisions. Others will be part time members, only active when their function is affected. Input from all users is very important in fostering buy-in. When people have an input in the selection process, they come to feel that the system is theirs. They will be better users. The steering committee is the core of the selection committee. It is a working body that will review recommendations and will decide functional requirements and specifications, do vendor screening and oversee CMMS implementation. A project manager should be a person who has the respect of the entire organization. He will be the coordinating factor for the project and will chair the Selection Committee. He must be able to work with both senior management and front line personnel. He is responsible for gaining upper management commitment and keeping upper management informed of progress. The project manager must be able to "make things happen" among diverse factions, each with its own agenda. The next person to be selected is the champion. This is a person who works to remove roadblocks to success. While the project manager concentrates on the process of selecting the system, the champion concentrates on building and maintaining support. They should not be the same person.

Step 2 — Perform system functional analysis is the hardest step. Here will identify the functions that will be affected. The functions will be ranked. The goals in each function will be identified and a description of the most significant developed. This is the first step towards defining what software modules and job requirements are the most important. The results of this step are the basis of the detailed specifications so it's very important that are thorough. Determine the most effective way to do it in organization. Now it is the time to consider such things as how work orders are handled, what the parts process should be and how the work backlog is maintained, approved for accomplishment and scheduled. Based on the functional analysis, this step will develop a list of general and functional specifications. The general specifications will address the operating environment and hardware issues. This includes computer platform, network and operating system issues as well as office facilities and support personnel. The functional specifications will match one by one the most important functions. Once have completed the function list, divide it into must have items and want to have items. The want to have items should be prioritized and given a weighting factor. Documents and selection matrices

that will be used in screening systems and vendors will be prepared during this step.

Step 3 — Identify potential vendors and make a first cut selection based on criteria as cost, hardware, platforms, etc. This is an important step because of the large number of software vendors. A good first list will help assure selections made later are efficient and valid. In this step will make initial queries of vendors. They will be asked to respond to the most important of the functional specifications (must items). Telephone follow-up will be made to clarify the responses. This step will further narrow the search by dropping non-responsive vendors and unsuitable software. Vendors are dropped from the list for failure to support a must item. Many vendors have lists of their functionality on the web and in brochures. If you can't find then there, contact the vendors directly. Compare this functionality with your list of want functions. Use the weighting factors to rank them. Based on the responses in the previous step, the vendor list should be reduced to the 5 most qualified. The maintenance software business is very competitive and low margin. Vendors are reluctant to respond to a detailed request for proposal (RFP) unless they have reasonable confidence they are on the short list.

Step 4 — Screen short list consists in writing a Request For Proposal (RFP) based on the detailed specifications. The RFP should provide enough detail so the vendor knows what is needed. The most important of the specifications should be included. After receiving the proposals from the short list, they will be matched to the specifications and the results ranked. The 2 vendors most closely matching will be selected.

Step 5 — Each of the vendors selected in the previous step will be asked to make a one-half day demonstration of his product. If a demonstration is not possible, he will be asked to provide a fully functional copy for evaluation. The full steering committee should rate the demonstrations. It will develop a detailed agenda for the demonstration that covers all the must items and many of the want functions as possible, in the time limits. Communicate this agenda to the vendor and insist on respecting it. Set up a selection matrix for each member of committee to use in evaluating the vendors demonstration.

Step 6 — References provided by each vendor will be formally checked and a preliminary selection made. An on-site visit of a reference customer should be conducted. If the results of that on-site visit are satisfactory, the selection will be finalized. The purchase will be negotiated and completed.

MATERIAL AND METHODS

The methods used to process the results were comparative methods based on table 1.

Table 1

Request for proposal items

1	**General CMMS Functionality**
1.1	Enterprise-Level Standards
1.1.1	Descriptions and boilerplate
1.1.2	Dictionary
1.1.3	Enforcement of enterprise standards
1.1.4	Enterprise-wide numbering schemes
1.1.5	Forms and reports
1.1.6	Hierarchies
1.2	Risk Management
1.3	Help
1.4	User Interface
1.5	Customization
1.6	Reporting
1.7	Internet Site
1.8	Workflow
1.9	Document Management
1.10	Import/Export
1.11	Barcode Technology
2	**Maintenance Management**
2.1	Work Order Management
2.1.1	Work Orders
2.1.2	Spare Parts Selection
2.1.3	Contract Maintenance
2.1.4	Approvals
2.1.5	Closing Work Orders
2.1.6	Web-based Work Requests
2.1.7	Scheduling
2.1.8	Third Party Billing
2.2	Preventive maintenance
2.3	Equipment History
2.4	Vehicle Maintenance
2.5	Calibration Management
2.6	PDA
2.7	Specialized Modules
3	**Integration**
3.1	3rd party ERP software
3.2	3rd party PdM software
3.3	3rd party shop-floor data collection
3.4	3rd party wireless handheld devices
3.5	3rd party CAD software
3.6	Built-in utilities that allow remote user sites to synchronize databases
4	**Human Resources**
4.1	Personnel Management
4.1.1	Recruitment Management
4.1.2	Profile of Personnel
4.1.3	Organizational Structures
4.1.4	Job Position and Wage Profiles
4.1.5	Career Management
4.1.6	Budgeting and Cost Control
4.1.7	Government and Compliance Reporting

7.2	Processing Requirements
7.3	Data Requirements
7.4	Reporting and Interfacing Requirements (Inventory Management)
7.5	Locations and Lot Control
7.6	Forecasting
7.7	Reservations and Allocations
7.8	Adjusting Inventory
8	**Reliablity**
8.1	Asset Definition
8.1.1	Unlimited hierarchy levels
8.1.2	Graphical presentation of asset hierarchy with drill-down capability
8.1.3	Hierarchy that can be navigated by clicking on graphical presentation
8.1.4	Condition data that are linked to assets and are accessible through asset hierarchy
8.1.5	Multiple asset hierarchies in the same instance
8.1.6	Availability of all asset functions via a single mouse click
8.1.7	Copy and change capability to create new assets from existing records
8.1.8	Availability of asset nameplate data and specification sheets
8.1.9	Unique asset nameplate data and specification sheets that can be set for each asset type
8.1.10	Problem or cause codes that can be assigned by asset type
8.1.11	Work history for the asset
8.1.12	On-line documentation of complete asset criticality analysis
8.1.13	Prioritization based on a combination of risk and probability of failure
8.2	Work Identification
8.3	Condition Monitoring
8.4	Inspections
8.5	Triggers and Alarms
8.6	Work Management
8.7	Work Order Control
8.8	Hand Held Support
8.9	Key Performance Indicators
8.10	General
9	**Product Technology**
9.1	Architecture
9.1.1	Data Integration Technologies
9.1.2	Messaging Protocols
9.1.3	Device Interfaces
9.1.4	Architectural Foundation
9.1.5	Web Enablement
9.1.6	Organizational Structure
9.1.7	Application Security
9.1.8	Multisite Management
9.2	Platforms
9.3	Application Tools

RESULTS AND DISCUSSION

There are hundreds of commercially available CMMS packages, but here there were compared only low-cost solution for agritourism and small Romanian organization where price is a critical consideration. After completed the RFP items the first was ranked Cworks Pro and second Calem Enterprise edition. It was compared Cworks, Calem eam, CheckMaint, Maintenance Tracker, Bigfoot (Smartware Group) and Mapcon Lite.

1. Clueword Dotcom Sdn Bhd, a Malaysian firm, makes its Cworks CMMS package available for free download on its web site. Cworks offers the basic functionality needed to run a small maintenance operation. Its work-order module defines general-request information and capture labor and material costs. Its preventive maintenance (PM) module supports calendar-based scheduling. It also provides basic asset tracking, work-order history, employee information, and a dozen standard reports. Cworks requires MS-Access, so it is not truly free to prospective users who cannot meet this requirement. Also, Clueworld Dotcom encourages users to purchase an expanded version of their program, called Cworks Pro. This upgrade provides more advanced inventory and PM scheduling capabilities for $750 and the yearly support fee is $450. The company provides also custom programming services. Another solution based on subscription fee ($770/year) called CareWorks, requires only an Internet browser. All product include romanian language.

2. CheckMaint from Hoffman Innovations is a $99 preventive-maintenance management solution that supports calendar-and meter-based scheduling. It also provides the ability to capture material and labor requirements. CheckMaint utilizes an Access database, but does not need a full MS-Access package to be installed on the target PC.

3. Maintenance Tracker from Triska Technologies is a DOS-based solution written in a compiled version of dBase. For $99 it provides elementary work-order, inventory, asset and technical manuals, and drawings tracking. Work-order procedures, equipment settings and other information are captured in notes-like memo fields. Maintenance Tracker comes with an on-line manual and sample database. Additional network licenses are available for $49 per user.

4. Smartware Group's Bigfoot provides many features found in higher-end packages, such as equipment history analytical reporting and e-mail alerts. It has optional mobile and Internet request modules. The Smart Maintenance single-user edition costs $1,195, a five-user network license for $2,995 and annual support for 15% of the license fee.

5. Mapcon Technologies offers a full-featured CMMS package, called Mapcon, and a variety of companion products. Mapcon pricing starts at $4,550. Mapcon Lite, an entry-level product is priced by module. Its base Work Order and PM system costs $495. Optional Inventory, Purchasing, Costing, Timecards and Security modules are available for $195 each. A completed bundled Mapcon Lite package can be purchased for $995.

6. Calem is a open source web solution with two versions. The free version is named Community Edition. Because is open source isn't license fees. The yearly support price for Calem Enterprise start at $2700 for 5 users plus $540 for each additional user. Additionally the buyer will get

Calem Offline and Calem Mobile software. Because it is an open source it can be translate in Romanian.

CONCLUSIONS

Selecting a new software system is not an easy project. But by using a methodical approach to software selection it will get the best option. It is important to decide what the organization wants the system to do and to evaluate vendors based on that, not just what the vendor wants to see. And finally, to validate the selection by visiting one of the vendor's referenced customers to see the system in action. The primary investment required is time. An „affordable" initial price tag will do little good if the solution doesn't meet all whishes. Before buying, a good idea is to start with a free version of CMMS, Cworks free edition is a good option. The data from free CMMS application will be migrate easily in the new CMMS.

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