

Six steps to selecting a CMMS

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Abstract: There are many CMMS systems on the market, all of which promise to save you money, time and effort. How do you decide which one is right for you? This paper outlines a series of steps you can take to maximize the probability the system you select will mesh with the way your organization does business, with your maintenance goals and needs, and with the available manpower. The method is non-product specific and in a simple step-by-step format. The steps include how to perform a functional analysis, write a detailed specification, identify and screen the vendors against that specification, develop a short list of vendors and decide which ones you want to see demonstrated. You'll see how to conduct a demonstration so it covers what you want to see, not what the salesman wants to show you. And finally, how to make and validate your final selection.

Selecting appropriate computer software

Selecting a software system is not a trivial task. You are buying a system that should serve you for at least five years. If you are methodical and careful up front, it will pay you back. If you select a system based on someone else's recommendation, it likely won't work for you because your culture and processes are different from theirs. The selection procedure may not be fun or flashy but it is very important. The steps below will give you a start on making your selection. Depending on the complexity of your requirements, you may be able to streamline some of the steps. But consider carefully before leaving any out.

Step 1 — Set up a selection committee

This step should 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 decide functional requirements and specifications, do vendor

screening and oversee CMMS implementation.

Select a project manager

A project manager should be selected 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 it's own agenda.

Select a champion

You need a champion for your project. This is a person who works to remove roadblocks to your success. The champion is your advocate to the rest of the organization. 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

This is the hardest step. Here you 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 you are thorough.

A partial list of potential functions is included in appendix A. You can use these as a starting point and add ones unique to your organization.

If there is a function that you don't currently have but wish to add, now is the time to study that. Determine the most effective way to do it in your organization. Now is also 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.

Develop detailed specifications

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 you've 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. Figure 1 is an example of musts and wants using weighting from 1 to 10. The priorities will be used when comparing the various vendors' products.

Must	
Backlog management	
Personnel Qualifications	
Want	Weight
Work order Planning	10
Work order Estimating	8
Trending of parameters with alarms	6
Project Management	4

Figure 1

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

Step 3 — Identify potential vendors

In this step you will identify a list of potential vendors and make a first cut selection based on such 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. Maintenance Technology magazine publishes a list of CMMS vendors in the July issue.

Make initial vendor screening

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 them there, contact the vendors directly. Compare this functionality with your list of want functions. Use the weighting factors to rank them. Give each function a score from 1 to 10. Then multiply that score by the weighting factor. Rank based on weighted scores. Figure 2 is an example.

Want	Weight	Vendor A		Vendor B	
		Score	Weighted score	Score	Weighted score
Work order Planning	10	8	80	6	60
Work order Estimating	8	2	16	6	48
Trending of parameters with alarms	6	5	30	0	0
Project Management	4	0	0	3	12
Totals			126		120

Figure 2

Select short list

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

The next step is to write 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.

Select top 2 choices

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 — Demo product

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.

You should 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. Use the weighting list to decide the ones to have demonstrated.

Communicate this agenda to the vendor and insist they use it. If you don't, the salesman may only demonstrate those functions he knows his system does a good job on. You want to see all the functions.

Set up a selection matrix for each member of committee to use in evaluating the vendors demonstration. Use a form similar to Figure 3 to record observations during the demonstration. Don't try to remember them and write them down later.

Want	Weight	Acme Company			Emca, Inc.		
		Comments	Score	Weighted score	Comments	Score	Weighted score
Work order Planning	10	Standard work instructions database	9	90	Can attach work instructions	7	70
Work order Estimating	8	Weak	3	24	Can enter estimated time and materials	8	64
Trending of parameters with alarms	6	Will have in six month (they say)	4	24	None	0	0
Project Management	4	None	0	0	Basic	4	16
Totals				138			150

Figure 3

Step 6 — Make and validate selection

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.

Summary

Selecting a new software system is not an easy or fun project. But by using a methodical approach to software selection, your likelihood of getting a system that matches your culture and work practices is increased. And by involving all effected parties in the process, buy-in is improved. Decide what you want the system to do and evaluate vendors based on that, not just what the vendor wants you to see. And finally,

validate the selection by visiting one of the vendor's referenced customers to see the system in action.

Remember, just as a table saw is cabinetmakers tool; a CMMS is a maintenance departments tool, not an end in itself.

Bio: Jim Taylor has more than 40 years experience developing, managing, training and performing preventive and predictive maintenance in both military and manufacturing environments. Jim formed the predecessor to Machinery Management Solutions, Inc. in 1995 after resigning from HSB Reliability Technologies, a subsidiary of the Hartford Steam Boiler Inspection and Insurance Company. Machinery Management Solutions, Inc. provides machinery condition monitoring services and mentoring, and project management, technical quality and industrial maintenance related training to industry.

As Director of Operations at HSBRT, he was responsible for operating the maintenance management systems for 150 client companies. Clients included Ford, General Motors, Rubbermaid, Armco Metals and Weirton Steel. These systems included preventive, predictive and corrective maintenance. He had the opportunity to work with both middle and senior management in many companies and to help them in improving their maintenance functions.

He has done assessments of maintenance as part of World Class Maintenance benchmarking and implementation. He performed both formal and informal evaluations in steel mills, injection-molding plants, printing plants and other process and discrete manufacturing plants. The changes resulting from these projects have saved his clients millions of dollars.

In 1992, he completed 28 years of naval service in engineering operation and maintenance. Until July of 1992, he was general manager and officer in charge of the U.S. Navy's Performance Monitoring Team

located in Norfolk, VA. Under Jim's direction, that team performed periodic machinery predictive maintenance for the ships in the U.S. Atlantic Fleet, saving the taxpayer more than \$20 million per year. Before joining PMT Norfolk, he spent many years as a ship repair and overhaul project manager in shipyards. He has managed projects up to and including a \$500,000,000 overhaul of the aircraft carrier USS America. He also has had extensive experience as a shipboard operating engineer.

Jim's academic background includes graduate degrees in Ocean Engineering, Naval Architecture and Marine Engineering from the Massachusetts Institute of Technology. He received his BS degree from Purdue University where he majored in physics. He has been a Navy Certified Boiler Inspector and has completed many specialized technical courses.

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Appendix A — CMMS function list

1.0 Work management

1.1 *Work Order Management*

1.1.1. Workorders

1.1.1.1. Custom formats

1.1.1.2. Attach work instruction

1.1.1.3. Attach photos

1.1.2. Work request

1.1.3. Work approval

1.1.4. Planning and estimating

Planning

Estimating

1.1.5. Scheduling and assignment

Scheduling

Backlog management

Assignment

1.1.6. Work order closure

1.1.6.1. By technician

1.1.6.2. By supervisor

1.1.6.3. By requester

1.1.7. Shutdown/outage Management

1.1.7.1. Work list generation

1.1.7.2. Planning & estimating

1.1.7.3. Contracting

Contracting out

Contractor supervision

Contractor work acceptance

Guarantee work

1.1.8. Project Management

1.1.8.1. Definition

1.1.8.2. Planning

WBS

Planning

Estimating

Scheduling

Risk Management

1.1.8.3. Execution

1.1.8.4. Closure

1.2 Preventive maintenance

1.2.1. Tactics

Time directed

Condition directed

Failure finding

Run to Failure

Regulatory Compliance

1.2.2. Planning

Estimating

Standard estimates

Work Instructions

1.2.3. Scheduling

Schedule development

Schedule issue

Work load leveling

1.2.4. Completion

1.2.5. Work generation

1.2.6. PM optimization

1.2.7. Reliability Centered maintenance

1.2.8. Predictive maintenance

Trending of parameters with alarms

Technology support

1.3 Emergency work management

Initiation

Documentation

2.0 Asset Management

2.1 *Life Cycle Cost*

2.2 *Operating costs*

Downtime (lost production) costs

Preventive maintenance costs

Repair costs

3.0 Inventory Management

3.1 *Spares inventory*

Allowance list

Reordering

Insurance spares

3.2 *Project materials*

3.3 *Kitting*

3.4 *Purchasing*

3.5 *EDI*

3.6 *Tools management*

4.0 Document management

4.1 *Manuals*

4.2 *Drawings*

4.3 *Procedures & Work Instructions*

4.4 *EDI*

5.0 Reports and Analysis

5.1 *Executive level reports*

5.1.1. Overall measures

Planned work ratio

Tracked inventory ratio

OEE

5.1.2. Exception reports

Problem, solution, prognosis

5.2 *Management level reports*

5.3 *Working level reports*

6.0 Measures of effectiveness (MOE)

6.1 *Overall measures*

PM completion rate

Emergency/Routine work ratio

Preventive/corrective work ratio

Overall plant vibration level

Planned work ratio

Tracked inventory ratio

Overall plant vibration level

Inventory cost per item

Procurement cost

Time from purchase request to purchase order

Number of manual POs per month

Monthly workorder cost

% Work tracked

% Work planned

WO aging

PO aging

Training level

Overtime

Emergency/Routine work ratio

PM completion rate

Time from WR to WO

Time from WO to WO completion

6.2 *Public reports*

6.2.1. **Overall Measures**

6.2.2. **Successes**

6.2.3. **Familiarization**

7.0 Accounting

7.1 *Budget management*

Pro-forma budget

Cost tracking

EDI

8.0 Personnel

8.1 Personnel data

8.2 Qualifications

Qualification check off lists

Written exams

Skills exams

Qualification boards

8.3 Training management

9.0 Business Management

9.1 Policies

9.2 Procedures

9.3 Work Instructions

10.0 Reliability Engineering

10.1 Strong sort capability

10.2 Trending of MOE

11.0 Other

11.1 Data entry requirements

11.2 PDA capability

11.3 Wireless capability