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The Computerized Maintenance Management System An essential Tool for World Class Maintenance

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Abstract

The management of maintenance in a large industrial operation is complex and has a significant impact on the profitability of the business. Managing this process effectively without computer-based support is almost impossible, but achieving successful implementation of these systems requires a major change-management program over many years. It is not surprising then that there is a low success rate among even large organizations worldwide in implementing an effective Computerized Maintenance Management System (CMMS) to support improved reliability and performance. This paper focuses on understanding the reasons behind the low success rate achieved and outlines the essential elements that must be included to ensure a disciplined and well-resourced program that can deliver success. Emphasis is put on the need to gain and retain the support of top management to overcome the barriers to change by convincing them that such support makes good business sense.

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Introduction

Proactive world-class maintenance management is nearly impossible without computer-based support. But the success rate in implementing these Computerized Maintenance Management Systems (CMMS) is surprisingly low. This paper will point out 6 key reasons for failure and will highlight some recommended actions to ensure an improved likelihood of success.

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1. Maintenance Management – a complex process that needs IT support

Maintenance of equipment is a significant part of the total operating costs in most industry sectors but its real impact is often under-estimated. The “Iceberg Model” (see Figure 1) highlights the hidden cost impact of maintenance upon the business which is much greater than just the Direct Costs associated with traditional maintenance.

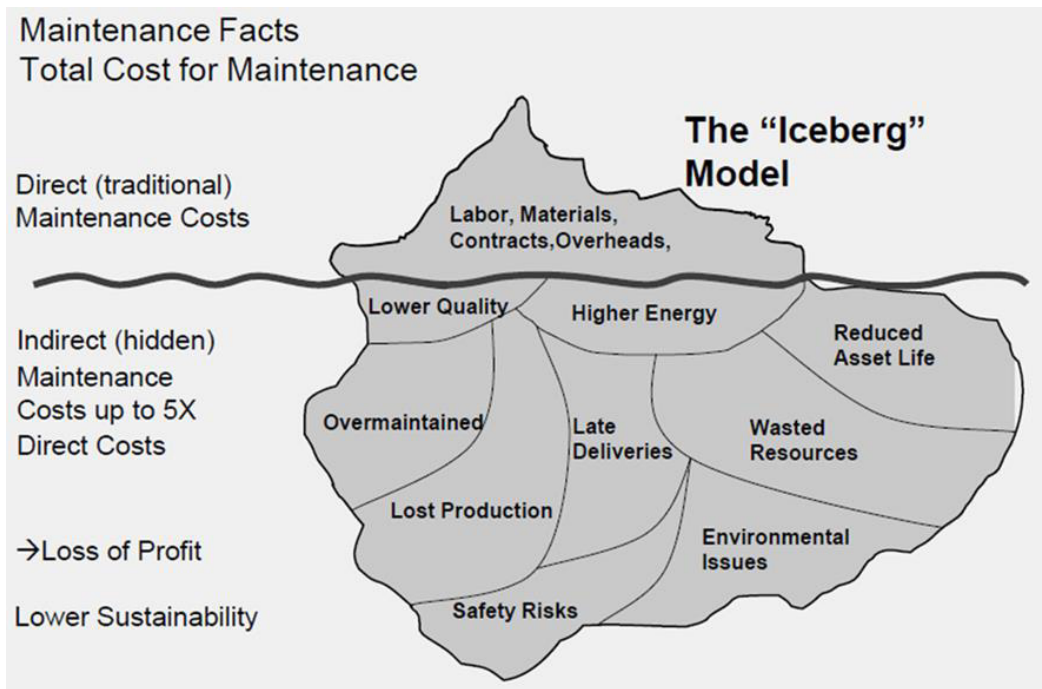


Figure 1: Total Costs of Maintenance - the “Iceberg” Model

For many companies, reducing these hidden costs requires a shift from the traditional reactive approach (“fix it when it breaks”) to a proactive reliability-based approach. For such a shift to be sustainable, a number of key elements must be put in place including:

- A clear strategy
- Policies to support the strategy
- Procedures & processes to enable implementation of the strategy & policy
- Tools to support this implementation
- A well-established Maintenance Business Process with checks and balances

These key elements form the basis of “maintenance management”.

Such maintenance management is a complex process requiring an effective combination of technical and economic expertise.

One part of maintenance management is to interpret the data available and turn it into useful information in order to manage the equipment in the best possible way. To do so, the data must be gathered and analyzed in a structured manner otherwise it cannot be effectively utilized.

Managing this process effectively without computer-based support is almost impossible and that is where a well implemented CMMS or eAM system is one of the key tools that is essential to underpin proactive maintenance management.

2. CMMS Implementation – 6 Key reasons for failure

Despite the importance of the CMMS as a key tool in maintenance management, the degree of success achieved in successfully implementing such systems, even in large, well-resourced organizations, is surprisingly poor. According to internet research, the number of successful CMMS implementations is only around 25 – 40 % and the number of users that use a CMMS or eAM at its full capability is only 6-15%.

Six (6) key reasons for poor implementation success are:

1. Attempting to implement a new maintenance management strategy & the associated processes & tools such as a CMMS to an organization that is not “ready”.
2. Believing that the CMMS is the “strategy” rather than one of the “tools” to facilitate effective implementation of the Maintenance Management Process.
3. Inadequate IT infrastructure. The failure to ensure that IT related issues are resolved. (e.g. poor network capacity and speed demotivate people quickly).
4. The failure to sell the benefits of the CMMS to senior management & hence sustain their support over the often long duration of the implementation.
5. The failure to understand the need for a well-designed “change management” process.
6. Inadequate resources to carry out the implementation.

The following sections look at these issues in more detail.

2.1. Organization not “ready”

Many CMMS implementations fail because the maintenance organization is not “ready” to be supported by a complex computer system. The key question for an organization wishing to implement a CMMS is:

“At what stage of maintenance evolution is our organization right now?” (see Figure 2)

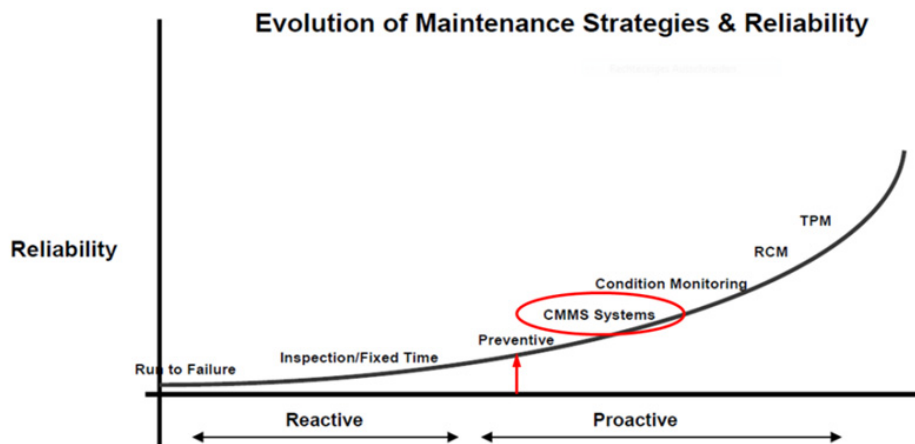


Figure 2: Evolution of Maintenance Strategies

Before adopting a CMMS in an organization the maintenance strategy has to have moved from a reactive to, as a minimum, a proactive approach. It is mandatory that a well organized preventive strategy is in place and is being followed in all parts of the organization. A proper workflow that describes all steps of this strategy is the basis for implementing the CMMS as a tool that will give a good value to all departments and at the end a measureable added-value to the company.

2.2. *CMMS – a tool to support your maintenance strategy*

The greatest misunderstanding of the role of a CMMS is the belief that it is the maintenance strategy itself, not just a tool to support the existing maintenance strategy of an organization.

This belief that the CMMS will change maintenance in an organization from a reactive to a proactive approach is quite common and often results in poor usage of the available modules of such systems. It is not unusual that the wrong use of these tools together with a lack of data implementation leads to the CMMS only being used as a “work order system” without the power of analysis and reporting. In a worst case scenario, the effort expended on the CMMS by a company’s experienced maintenance personnel may result in maintenance performance becoming worse because of the lack of time for those people to carry out the previous well understood maintenance essentials that kept the process at a reasonable level.

2.3. *Inadequate IT Infrastructure*

The IT infrastructure of the organization is an often underestimated critical step in the implementation process of a CMMS or eAM system. For the successful integration of a “new” tool the speed and capacity of the infrastructure needs to be ensured. One point is the internet connection that needs to be on the top level to exchange data rapidly and reliably. This is especially true now that many CMMS and eAM systems are “cloud-based”. As well, the need for a reliable & fast intranet shouldn’t be underestimated either; documents need to be kept up to date, secured and accessible for all people across the organization.

The consequence of poor infrastructure is that people who want to use the system are interrupted or slowed down in their daily work and are quickly turned-off from using the tool. This may lead to the reversion to or the re-creation of local databases (e.g. MS Office) by these frustrated employees and the benefits of having a CMMS will be lost.

The implementation can also be hampered technically by inadequate printing capability. The tendency towards centralization of printers and the connection of these via the organization network raise the necessity for the planning department to have access to suitable software to enable the printing of complete work packages with minimal effort. Even for large CMMS’ (e.g. SAP, Oracle eAM, etc.) this option is not always available. The lack of a print package solution will also decrease significantly the productivity of the planning department.

2.4. *The failure to sell the benefits of the CMMS to senior management & hence sustain their support over the often long duration of the implementation.*

Many projects (IT particularly) have unrealistically short milestones and it is not uncommon that deadlines are exceeded. When this happens, the critical support of senior management can be lost. Implementations also fail because the benefits are not sold clearly enough to the management and realistic timeframes are not established. Management is turned-off after continual extensions to projects and stop supporting, particularly when they are unaware of the real benefits of maintenance tools. “Time is money.” and the effective return on investment of CMMS and eAM systems must be sold together with the long implementation duration.

2.5. *The failure to understand the need for a well-designed “change management” process.*

Many Companies struggle with implementing a CMMS or eAM system. Often maintenance craftsmen and supervisors resist the effective use of such systems. The problem is often a change-management issue, not a technical problem related to the CMMS itself.

Often implementations start with the focus on the technical side in areas such as creation of PM Plans, Codifications, user training, etc. but the human aspect is ignored, forgotten or simply considered too late. This leads to poor implementation regarding the usage and every database dies before it can give any value because either no data or unreliable data are entered.

The change management challenge is in 2 parts:

- Underestimation of the resistance to change that will be faced during the implementation, and
- Dealing with the unrealistic expectations of the positive changes (see Figure 3) that CMMS or eAM system will bring.

The problem is often one of shortfalls in the communication process and distribution of information in the early stages of the change process. People are not aware of what will come, what will happen, where it shall lead to and how they will be taking part in the process. The delay in properly communicating a plan means that not only is the time for resistance to build up extended, it also creates a vacuum in which the initial feelings of “unfounded optimism” that some people held then turn to doubts. & they lose faith in the system. As in all situations, change is not perceived by everyone as positive and reactions like anger or negotiation can’t be ignored and need to be intercepted and addressed within the change management.

Even when the major change management process is well considered, some companies struggle to reach the point of satisfaction because of omitting to nominate a “champion” from the senior management to drive the project. Without such a leader the organizational awareness &/or power is missing for identifying the department or even person needing more clarification, support and training to overcome the peak of the change curve.

Within the change management process must be recognized the need for a disciplined approach which reflects a good balance between the often conflicting targets of implementing a system that can assist the maintenance management process and deliver useful, correct and fast reports and that of achieving a perfect database. The desire to compile a complete database before starting the roll-out rather than being satisfied with a reasonable degree of completeness, provided it is accurate, will cause unnecessary delays & frustration and with little payback for the extra work.

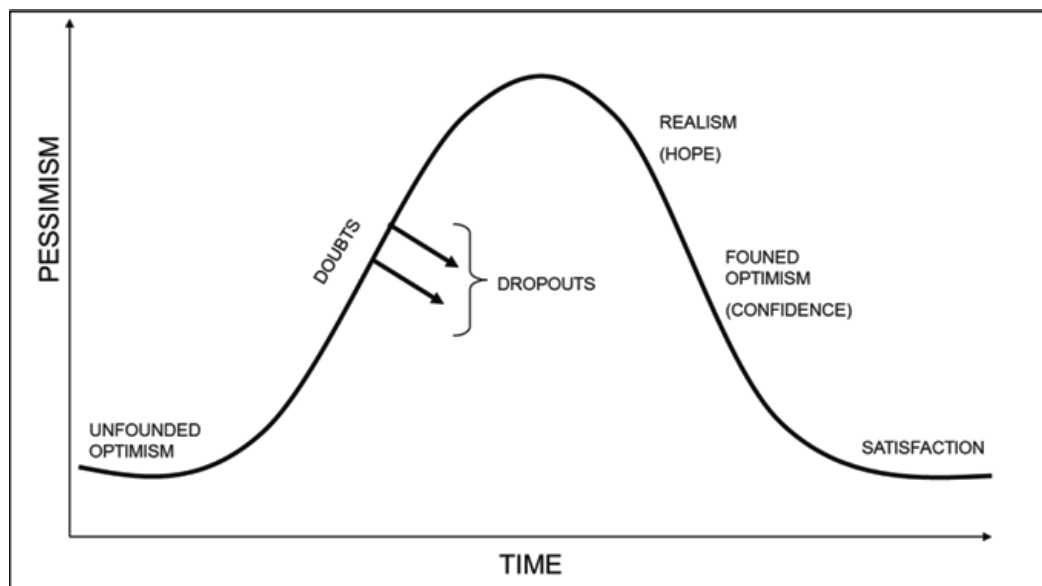


Figure 3: Change Curve - Reaction to positive change

2.6. *Inadequate resources*

An often under estimated point is the required hours that must be spent on the implementation of a CMMS or eAM system. It takes a major effort just to gather the required data and convert it into a format suitable for uploading into the system. In addition to this, the roll-out of the system requires constant follow-up and feedback to ensure that the defined processes & procedures are being followed & that “parallel systems” are being progressively eliminated.

Many companies try to use only in-house resources but considering the number of man-hours and work-management effort required, this is often not realistic.

3. **Possible strategies & solutions to avoid the 6 key reasons of failing**

3.1. *Organization not “ready”*

It is understandable that an organization wants to have the best and newest tools when implementing new processes. But an important step before implementing a new “tool” like a CMMS or eAM System is to assess the current status of the organization against the curve for the “evolution of Maintenance Strategies”.

This is best done by an external company because when done by internal resources with long-term relationships among the people, the assessment scores are often more favorable than they should be.

The management of an organization needs to be aware that implementing a CMMS to improve their maintenance and the resultant increased profit from the added-value generated will only be successful if a well-structured maintenance strategy is in place and follows a proactive approach. If the assessment shows that this is not the case then focusing on achieving this outcome is an essential first step to get the organization “CMMS ready”. Without this step then failure will almost certainly follow.

3.2. *CMMS – a tool to support your maintenance strategy*

Management and people of an organization have to realize, understand and accept that a CMMS is not a maintenance strategy itself. The effective use of a CMMS is only a tool, but an important one, to improve maintenance management.

Only by understanding the role of a CMMS in the maintenance strategy will it be obvious which information the system must generate to support the strategy. From this understanding of the outputs required, the necessary inputs can be determined such as what data needs to be fed to the system, which structure needs to be set up and which workflow process the system needs to be able to support.

It is essential that crafts people and maintenance leaders must work as a team with operators and operations leaders to achieve significant improvements in the total operations process. Total operations success is the goal. Profitable long-term business survival is the tangible result. The CMMS is the tool which provides a common platform to implement the strategy in departments all over the organization. It will help to communicate quickly and effectively and will bring many benefits to the organization including:

- Improved Planning & Scheduling
- High quality reporting & easy access to history data
- Reduced time for spare parts & tools assembling
- Reduced stock
- Overall increasing productivity
- Etc.

3.3. *Inadequate IT Infrastructure*

To ensure that the IT infrastructure is “ready” to support the use of the CMMS or eAM system the needs must be clarified and the infrastructure has to be assessed according to this.

The internet connection, the intranet and the printing environment need to be well-prepared so that the performance of the system will be seamless, fast & reliable.

A software solution for printing work order packages with all necessary documents (attached to a work order) can be purchased from a third party. Some suppliers even are able to implement the server structure of the organization so that always the latest versions of documents are printed with the work order e.g. safety documents. A suitable printing solution will also ensure that all parts of the work packages are printed automatically once the process has been initiated.

3.4. *The failure to sell the benefits of the CMMS to senior management & hence sustain their support over the often long duration of the implementation.*

Well implemented a CMMS will bring many benefits to the organization but the biggest added value that has to be sold to the senior management is the ability of the CMMS to “turn data into information” that can be used to analyze problems and help identify solutions that will improve performance by reducing the hidden costs shown in the “Iceberg Model”. This includes the ability to calculate MTBF, MTTR, OEE etc. and produce “Top Ten” reports that assist maintenance managers to more quickly target problem areas & optimize the use of resources. This is the “real power” of the CMMS.

While the benefits of the CMMS in reducing the hidden costs are substantial, they are sometimes a little difficult to predict. What is well proven is that a properly implemented CMMS will lead to a reduction of direct maintenance cost by 5 -10 % within three years driven by a significant improvement in planning (workforce utilization) and inventory control (including stock levels). The ROI (Return on Investment) for a properly implemented CMMS or eAM is often less than 1 year.

It is important that these benefits are sold to the management but in terms of establishing the project duration there should be a conservative safety factor chosen. It is critical that the senior management is aware of the often long implementation time and supports the project over the whole period.

3.5. *The failure to understand the need for a well-designed “change management” process.*

It is human nature that change is feared by many people and the only way to break through these human barriers is to develop a well-planned change management process where all employees are addressed in an open communication from the first step of the process. It is absolutely essential that all employees, from the craftsmen to the manager, know what the overall vision is, what the steps of the implementation process are and which milestones have to be reached. Important points which need to be addressed and communicated within all of the organization departments include:

- Clearly-defined roles & responsibilities.
- Clearly-defined guidelines.
- The need to work across the whole organization & not in silos.
- The understanding that resistance to change is normal and the provision of information/feedback opportunities to answer concerns.
- The projection of realistic expectations of the changes & benefits that will occur.

The senior management has to be aware that it is not uncommon that such a major change management process can last for several years. Companies that have successfully implemented such system have usually nominated one Senior Manager as the “champion” of the project implementation. This person needs to be sensitive to the employees to identify who needs to be addressed, trained and convinced in order to pull the whole organization through to the stage of acceptance and satisfaction.

Within the change management process the “champion” together with the implementation team and the management need to have a common understanding about how the usage of the system can be taught to the people of the organization. It is critical that the parties agree a disciplined approach which reflects a good balance between

implementing a system that can deliver useful, correct and fast reports and that of the “perfect database”. The CMMS needs to be set up correctly, reflecting the policies and procedures of the organization and while ensuring that a satisfactory initial database exists, the concept of continuous improvement by doing updates and additions needs to be promoted as a necessary part of ongoing system management.

3.6. *Inadequate resources*

During the budget development phase proper consideration must be given to manpower issues and adequate contingencies provided.

Based on the total man-hours estimated and “readiness” of the organization, the implementation team should be mixture of:

- CMMS supplier personnel
- Key Users (own company staff – released for the project duration)
- Own Company staff (temporarily released from normal duties)
- Experienced contractors

By bringing in external personnel, management can release some of their own staff to avoid the situation of too much part-time involvement. A high level of in-house resourcing usually fails since attention (and responsibility) stays with the day to day operational activities. The implementation of a CMMS is a complex project that requires full-time involvement of knowledgeable & experienced personnel.

Having a full-time project implementation team that includes external support also helps by freeing up future users to take ownership of the system as soon as possible after the start of the implementation project. Many companies have found success by nominating “key users” who they send to workshops to learn the advantages, the use and the benefits of the system for the organization so that they are able and willing to support the implementation of the system in every aspect. These key users should be chosen based on the following characteristics:

- Open-minded to new techniques.
- Representative of the different areas of the plant areas and departments of the organization.
- Well connected socially in the organization.
- Leadership skills.

Summary

For the complex process of maintenance management it is necessary to have powerful tools to support the day-to-day workflow in an effective manner, to generate information that identifies key maintenance issues that impact on the hidden costs of the “iceberg”, to improve overall business performance, etc. One tool that can deliver this support is a CMMS or eAM software. Without such a system world-class maintenance is difficult to achieve.

For the successful implementation of such a system it is mandatory to ensure that:

- The organization has already moved from a reactive to a proactive maintenance strategy with the associated policies and procedures implemented.
- The people of the organization are aware that a CMMS/ eAM system is only a tool and not a maintenance strategy but know how to use it to support the strategy
- The IT infrastructure is ready to provide a reliable and fast access.
- The senior management understands the added-value a CMMS/ eAM system will bring and is willing to support the project over the whole implementation time.
- A well-designed change management process is in place.
- There are enough skilled people to drive the project over the whole duration.

If these 6 issues are addressed, the chances of achieving successful implementation will be significantly improved.