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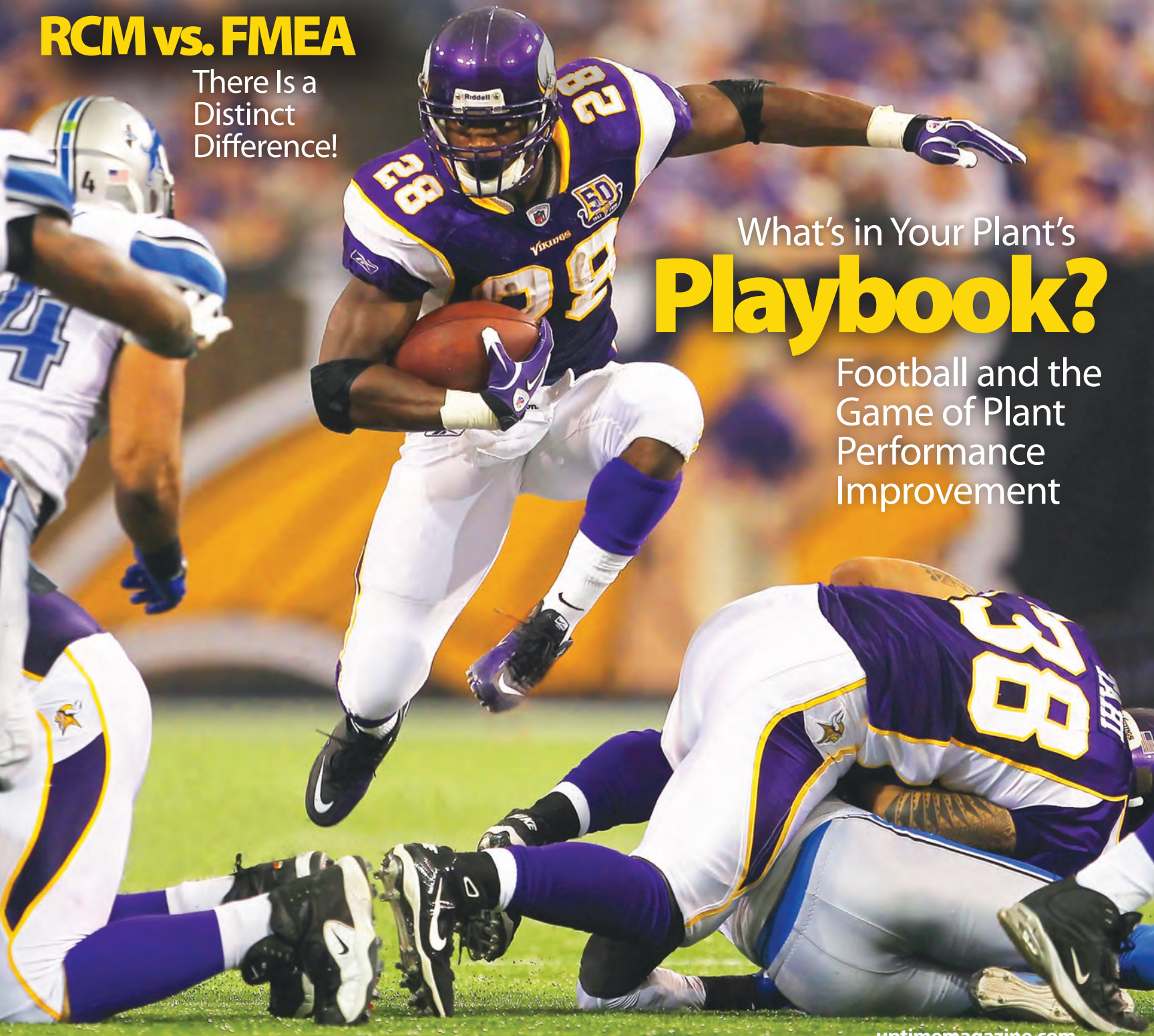
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# You Deserve Your 3 “RIGHTS”

## Deploying Your CMMS for Effective Inventory Management Towards Maintenance Excellence

Tarek Atout

**All manufacturing organizations own a warehouse for MRO spares and most of these organizations use a computerized maintenance management system (CMMS) as a tool to support the maintenance function. This article will focus on the integration between CMMS modules that serve maintenance, mainly work order, inventory and purchasing.**

But first off, let's emphasize some important facts:

- MRO spares exist to support maintenance functions. If equipment to be maintained is not there, then spares and all MRO spares organizations are not required. No need to keep a spare tire if you don't have a car.
- CMMS by name is a maintenance management system and accordingly, all modules in the system must be deployed to serve and support the maintenance process. The inventory/purchasing module is critical in this regard.
- In maintenance organizations, deep focus must be on materials management rather than inventory control and warehouse management, the difference should be clear.

### Maintenance excellence

Maintenance excellence can be defined as achieving a performance level demonstrated as “best in class” by the leading organization in a given industry. In other words, “perform effective and efficient maintenance without waste” or simply “waste elimination from the maintenance process.” The benefits of eliminating waste are effective functions and high key performance indicators that match the output of leading companies.

### What waste to eliminate?

Material-related losses that impact maintenance performance can be translated to time and then to cost. The main bad factor that will cause disturbance to all maintenance activities is being out-of-stock of a critical item. Stock outs will add:

- Increased equipment down time;
- Production interruption costs;

- Unutilized manpower costs;
- Extra costs for expediting emergency orders to overcome stock outs;
- Probable cost of overpricing of the required spares;
- Costs of interruption to maintenance schedule;
- Safety considerations for some equipment.

Other spares-related losses that influence maintenance effectiveness are:

- Incorrect items identification, procurement, or planning;
- Wrong parts kitting by stores staff;
- Time spent to find alternative part;
- Time spent locating parts in the store;
- Additional carrying cost for excess inventory.

The above are obstacles against a smooth maintenance planning and scheduling strategy that lead to lower craft utilization and reduced wrench time. Low productivity and high cost are two threatening enemies to maintenance excellence.

### Balance of different perspectives

There are two different perspectives when each partner looks at MRO spares. The maintenance team views spares as enablers to execute their jobs on time and meet the schedule. They need the right part now or when the job is due. The inventory team is concerned about usage, stock quantities, calculation and ordering. These two views are not contradicting, but integrated together with the ultimate objective of creating a balance between the inventory value and the customer service level without any adverse effect on asset reliability.

### CMMS and your 3 “RIGHTS”

Can CMMS be used to eliminate, or at least reduce the above waste and create the required balance? The answer is absolutely “YES,” if we refer to the traditional definition of the MRO spares function: “Provide support to maintenance to have the RIGHT PART in the RIGHT QUANTITY at the RIGHT TIME.”

Using a mathematical expression, the RIGHT PART is a function of accurate equipment bill of materials, equipment usage history and failure history. The RIGHT QUANTITY is a function of equipment and part criti-



cality, historical usage quantities, consumption rate and lead time. The RIGHT TIME is a function of a proactive maintenance environment with a well designed and implemented planning and scheduling process, with vendor lead time also a factor.

All these factors that impact the above 3 "RIGHTS" can be easily extracted from a successfully implemented CMMS.

## CMMS lifecycle



The lifecycle of the CMMS consists of five major stages: selection, implementation, training, usage and continuous improvement that ensure the system will always give the expected results along the whole usage life.

The lifecycle of any CMMS starts from the selection process, although many people like to start it from the implementation phase. However, selection is the better starting point because it has a significant impact on the other lifecycle phases.

## CMMS for effective MRO spares management with maintenance in sight

**Selection:** There are many factors that govern the selection of a CMMS in relationship to your needs with other system functions' specifications. It is imperative that the selection committee consists of repre-

sentatives from all departments that will use the system. Although maintenance teams are leading the process since maintenance is the driver for other functions, all other departments must be there. Members from stores, purchasing, IT, finance and maintenance should constitute the committee.

Materials-related specifications and the capability of the CMMS can be classified into two categories according to the perspective of the user function:

### Inventory/Purchasing team perspective

- System will notify user when a quantity on hand drops to the reorder level.
- Maintains storage locations and stock storage levels information (on hand, reserved, on-order, max-min, etc.).
- User-defined method for tracking items' prices according to company accounting system.
- Supports multiple warehouse system.
- Purchase requisition is triggered when items reach their reorder points.
- Vendor management considerations:
  - Capability to integrate with vendor's own purchasing system;
  - Link between vendor and parts (vendor parts and part vendors);
  - Criteria for vendor evaluation (volume purchased, lead time, delays, shipment accuracy, damaged goods, invoice accuracy, etc.).
- Has the ability to make different types of materials analysis (ABC, XYZ, etc.).
- Supports the physical inventory count process.

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- Definitions for spares storage conditions.
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### Maintenance team perspective

- Provides a bill of materials for each equipment asset and its reverse (where-used).
- Able to cross-reference any spare to substitute spares that are also in stock.
- Criticality assignment for each part.
- Able to forecast materials requirements for preventive maintenance due for any specified period.
- Able to track the planned and actual materials costs for each work order.
- Able to track materials consumption history and costs for all equipment.
- Able to notify user when consumption rate of a specific item highly exceeds the rate of previous periods.
- Able to reserve the planned materials of the approved work orders.
- Able to notify the planner when a planned part is received.
- Able to track requisitions, purchase orders and receipts of all items.
- Ability to order non-stock items.
- Able to flag and report all awaiting materials work orders.
- Links equipment failure modes with used parts.
- Provides stock storage levels with complete technical data.
- Able to produce different key performance indicators reports for all functions.

The ultimate selection criterion is to have a fully integrated inventory and purchasing system function with maintenance function.

**Implementation:** One of the most important links between the maintenance order and the inventory module is the bill of materials (BOM) definition. BOM is the list of parts and components that makes up a specific asset. It must be accurately defined for all assets; critical assets must be completely linked with its BOM. All critical items must appear in assets BOM. The BOM definition for any asset is linked with asset commissioning in finish-to-finish relationship, with no justification for delaying that job after the asset is online. When building bills of materials, keep in mind that they are the main source for materials requirements for maintenance work order planning. The planner will refer to these lists to properly plan the work and identify spares needs. BOM and its reverse (where-used) are in strong relation with the equipment and will be very useful for any design changes, decommissioning, or related reliability studies.

**Training:** As a key phase of the CMMS lifecycle, it is recommended to conduct training sessions with a mixed staff of maintenance, stores and purchasing for specific topics. A separate training session for each department only promotes an isolated work environment. Maintenance and stores teams must have the same understanding, view and interpretation for the common topics so after the training they will go together in the same right direction, no intersections. Training must not focus solely on how the system functions, but also why. Sessions must be educational and facilitate brainstorming on the philosophy of the integrated modules. As shown in the lifecycle graph in Figure 1, training is the link between implementation and usage. Failure to do constructive training will badly affect the usage quality and consequently lead to end of life very soon.



**Usage:** The above three stages of the CMMS lifecycle can be considered investments while “usage” is the return on investment (ROI). The large sum invested in the CMMS will only provide a return with professional usage. Management and users must focus on the quality and integrity of data. Data quality is concerned about completeness and accuracy while integrity is concerned about the effect of bad data in a specific module or transaction to other integrated ones.

The objective is to improve the value of the data provided to management for analysis and decision making. The first action is to assure that NO maintenance, procurement, or inventory transactions are executed outside CMMS.

#### The way to bad data quality (usage stage)

The following actions will restrict the value obtained from your data and your 3 “RIGHTS” will become too far gone to catch:

- Work requests are not raised promptly.
- Work orders are not closed promptly.
- Unused materials are not returned to stores.
- Hidden stock with technicians.
- Spares are issued for blanket work orders.
- Unclear materials loan policy.
- Materials reserved only for “in case of.”
- Inaccurate dates of transactions.
- No on line process for stock levels adjustments.

**Continuous Improvements:** This covers the future care of the system and the nonstop fine tuning throughout the CMMS life. The more care, the longer the reliable life. The following actions are regularly required to assure continuous improvements:

- Maintain data quality/integrity.
- Conduct user refresher training.
- Install vendor version updates.
- Make system configuration enhancements.
- Conduct customer satisfaction surveys (end users).
- Perform regular data audits.
- Any changes in the CMMS assets/spares data must be authorized through a defined management of change process.
- Establish a steering (follow-up) committee to advise on system utilization.
- Implement incentives and/or enforcements for CMMS best practices users.

#### Conclusion

For materials modules in the CMMS to effectively serve maintenance functions, they must be totally integrated with the work order system. A proactive maintenance environment is a key success factor for integrating these two functions. Materials management will not be effective if “firefighting maintenance” is in place.

Great statistics on the subject can be found in the Reliability-web.com 2011 CMMS Best Practices study by Steve Thomas and Terrence O’Hanlon. Refer to this study for practical numbers on how users respond to different queries in the CMMS lifecycle.



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