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Sunday, 01 December 2002 16:19

In order to accurately track costs, measure the benefits of implementation, and produce high-quality management reports, a computerized maintenance management system must be tied to the business manager's main tool.

By any objective standard, manufacturing plants and facilities have wide-ranging and deep-seated problems with computerized maintenance management systems (CMMS):

- Surveys indicate that 90-95 percent of all CMMS users feel their systems fail to deliver desired results.
- Fewer than 10 percent of the 300,000 commercial, industrial, and institutional organizations in North America have ever achieved demonstrable, positive results from a CMMS implementation.
- More than 50 percent of CMMS implementations are abandoned in less than 6 months.
- According to a 2000 CMMS survey conducted by the Plant Maintenance Resource Center, only 20 percent of responding organizations attempted to formally quantify the benefits obtained from their CMMS implementations. In the same survey, the percentages of respondents who reported significant savings in the areas of labor, materials, and other costs were 9.2 percent, 11.5 percent, and 10.3 percent, respectively.

What is wrong with CMMS? According to Terry Wireman, a widely published author in the field of facility and plant management, when the failures of strategic maintenance initiatives are closely analyzed, the root cause usually falls into one of two main categories: lack of understanding of the strategy or lack of measurable or quantifiable results.

Wireman also says that measurable financial indicators drive executive managers. Whether measured by return on net assets, return on fixed assets, stock price, shareholder value, some other indicator, or a combination of indicators, their performance is judged in financial terms. This measurement system in turn drives how their organizations are managed. Unless departments within a company can link to a financial measurement system, their performance will not be measured correctly.

Study the accounting cycle

What is a financial measurement system and why is the failure to link to it so lethal to the success of a CMMS implementation? The problem may be seen graphically in Table I .

When you examine the 10 steps in the accounting cycle, note that drafting the financial statements is Step 8. A CMMS will carry only through Step 3. The obstacles this presents when trying to draft high-quality management reports are painfully obvious—you cannot get there from here.

CMMS software has a fatal flaw in its conceptual design and real world implementation because the software creates transactions journals for labor and materials, components, and inventory, but never posts them to a general ledger. CMMSs are unable to capture the true cost of work, and/or measure the true benefits of the CMMS implementation, because they lack a general ledger roll-up structure (Step 4 in the accounting cycle). Managers cannot balance the books because they literally do not have any books to balance. As a result, the high-quality management reports (Step 8) that characterize other types of business organizations are virtually impossible for the overwhelming majority of plants.

Problems with reports

Some of the most intractable problems—*including incoherent reports and the lack of standard costs* —may be attributable to the lack of a general ledger roll-up structure in CMMS. For example, in the area of reports:

- The May 2002 issue of *MAINTENANCE TECHNOLOGY* magazine (Extracting Specialized Information from Your CMMS/EAM, by Christopher N. Winston, HSB Reliability Technologies, p 13) noted that CMMSs come with a set of standard reports. Generally, the number is increased with each major release of new software. Still they never seem to be enough.
- Leading CMMS vendors advertise that their software comes packed with reports, and invite their users to expensive training classes on how to build reports.

Packed with reports but they're never enough? Can a CMMS really be this complicated?

During World War II, General Eisenhower ran the war based on a two-page report that his staff prepared before breakfast. The business world has an Eisenhower-style, two-page report, too—the balance sheet and the income statement. While the terminology for plants might be different, the plant manager is responsible for a balance sheet and income statement, too. Instead of cash, the plant manager might have an asset called budget appropriation on his balance sheet, and instead of sales, he might have a revenue item called budget appropriation used on his income statement.

Without the right tool for the job—a general ledger—plant managers cannot accurately track their costs and measure the benefits of their CMMS implementation. Ignoring the imperatives of double entry accounting will result in the kind of operational muddle and financial confusion that plagues CMMSs and plant management today.

Under the circumstances, it is no surprise that 90-95 percent of plants cannot accurately measure their costs; the real mystery is how the other 5-10 percent do it. The answer is that their CMMS is integrated to a general ledger.

Work order processing and contract accounting

From an accounting point of view, the proper handling of a work order is a relatively complex process because work order processing bears a very strong correlation to contract accounting. A work order may be thought of as a miniature contract—a contract in a microcosm. (See accompanying section "Contract Accounting and Work Order Processing Analogies.")

For example, when preventive maintenance work orders are scheduled, the job should be bid by estimating the time and materials costs. Otherwise, you will never know your proper staffing levels. How many people are needed, and when are they needed? What is in the backlog, and how long will it take to catch up?

At the end of an accounting period, the plant manager must make some adjusting entries to his general ledger to accurately track his costs. For example, some uncompleted work orders will have some charges to them, and accordingly, they should not be closed out. Similarly, what is the change in the backlog? If the backlog grew from two to four weeks, the liability should be provided for currently. Both of these situations call for adjusting entries to be made in the general ledger.

Despite the analogies between new construction and plant management, the plant manager has a harder job than the construction supervisor. By the nature of a work order, a plant manager has many more "contracts" to administer than a construction supervisor. In terms of pure number crunching, there is no comparison. The plant manager has many more "transactions" to process because costs are allocated over many more cost centers—*the work orders and the components* —than construction accounting where the contractor will have relatively fewer contracts to track and administer.

An ice storm can shut down a construction project for a day. Relatively speaking, this is no big deal, the crew gets a day off. However, an ice storm can shut down the critical and indispensable operations of a hospital or a university. Accordingly, the plant manager must perform under time pressure on another order of magnitude compared to a construction supervisor.

The construction supervisor is given the most sophisticated computer tools that capitalism can envision and technology can provide. In contrast, however, the over-worked and under-appreciated plant manager, while saddled with accounting problems similar to a construction supervisor, must try to make financial sense without even the most basic and essential tool of the business manager: a general ledger.

Do I have to do this?
Just how much number crunching does the plant manager need to do? There are various levels that can be done in a CMMS and someone needs to do it. However, that does not mean it has to be you, and in fact, it probably should not be you.

Remember, your accounting issues—*your income measurement problems*—are very similar to a construction company's, only more difficult because they are more abstract. The construction company has compliance issues that drive the accounting process, and at the end of the year it needs accurate information for financial statements, tax returns, bonding, insurance, and credit purposes.

These compliance issues are powerful motivators to get the job done—but these factors are not in play in the plant manager's world. The construction industry employs legions of accountants, and although the accounting industry may be blind to the needs of manufacturing plants, an accountant should lead your efforts in gathering the appropriate financial information.

Since you are reading this article, you probably have been very disappointed with your CMMS. It must be galling to know that, in some respects, your job was Mission Impossible; without a general ledger, you never had a chance. The CMMS lies at the intersection of three powerful and complex technical disciplines: functional engineering, computer, and accounting technology. It cannot be easy to summon new enthusiasm for something that disappointed you so badly in the past, but if you fix your general ledger problem, your CMMS can finally start to deliver on its promise.

In order to accurately track your costs, measure the benefits of your CMMS implementation, and produce high-quality management reports, your CMMS must be integrated to a general ledger. The good news is that the payoff for a successful CMMS implementation can be substantial. According to the January 2002 issue of *MAINTENANCE TECHNOLOGY* magazine (Reaping the Benefits of CMMS, by Derold Davis and Joe Mikes, Westin Engineering, p 13), a successful CMMS implementation may reduce overall maintenance costs 20-40 percent and inventory valuation may be reduced by 20-30 percent; other authorities cite savings and benefits that are just as compelling. To get there, however, you need the time-honored, singular, and imperative tool of the business manager—a general ledger.
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Table I. Accounting Cycle Vs. CMMS

The Accounting Cycle

1. Collect and verify source documents
2. Analyze each transaction
3. Journalize each transaction
4. Post to the general ledger
5. Prepare a trial balance
6. Adjusting entries
7. Adjusted trial balance
8. Financial statements
9. Closing entries
10. Post closing

CMMS

1. Collect and verify source documents
2. Analyze each transaction
3. Journalize each transaction

4. A CMMS never gets to Step 4, Post to the general ledger

Contract Accounting and Work Order Processing Analogies

The Accounting Cycle
Contract
"Take off" the bid
Estimate the contract
Costs incurred to date
Estimated costs to complete
Budgeted vs actual
Completed contracts
Uncompleted contracts
Cost over-run
At year end, carry over costs on uncompleted contracts

Work Order
Work order
Plan the work request
Estimate the job
Costs incurred to date
Estimated costs to complete
Budgeted vs actual
Completed work orders
Uncompleted work orders
Cost over-run
At year-end, carry over costs on uncompleted work orders

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