

STRATEGIC ASSET MANAGEMENT INC.

25 NEW BRITAIN AVENUE
UNIONVILLE, CT 06085
(800) 706-0702
WWW.SAMICORP.COM
INFO@SAMICORP.COM



Assessing Plant Potential for Asset Management

by *S. Bradley Peterson*

While some companies have developed methods for assessing the progress of their maintenance programs, there is little guidance on performing a gap analysis for higher levels of achievement in maintenance and reliability. This leaves maintenance councils and reliability leaders searching for tools instead of creating excitement for the future.

Our hypothesis is that work management will improve in most plants only when a vision for a higher-level goal exists. This creates a “pull” instead of a “push” system, allowing maintenance resources to be focused on higher value work. We call this Asset Management.

This article explores the opportunities available to look beyond the same tedious work management issues into Asset Management, measuring against a multi-stage mastery model. The very process of measurement, we find, helps people to see different possibilities. Even more important, it can establish multiple levels of goals to drive for a new vision of plant operation and corresponding value creation.

Australia and South Africa Lead the World

Asset management is a term more frequently encountered these days. Used in the plant context, it seems to imply a broader view of the plant asset than solely maintenance and reliability. Other concepts spring to mind: suitability to purpose, the business value of the maintenance activities, the competition within the plant for scarce resources, and lifecycle valuation for equipment.

Australia and South Africa both employ the asset management concept more extensively than we do in North America. Why is that? In our travels, we find they are, on average, well advanced in the practices for maintenance and reliability. They are able to see the bigger picture, and act on it. Why is this?

In my discussions with plants in these two countries, I am told that starting about 15 years ago they both, for different reasons, had to become more reliable. In South Africa’s case, they were embargoed for the replacement parts to maintain their equipment. In Australia, the country knocked down tariffs, exposing manufacturing to international competition, while giving them a cost disadvantage due to the vast distances their products are shipped. They also didn’t have easy access to repair parts.

As a result, our estimate is that they are a minimum of 10 years ahead of North America in applying best practices. And they are practicing Asset Management.

What is Asset Management?

We define Asset Management’s goal as, “Completely align plant resources to achieve the business goals of the organization at the lowest cost.”

That may sound exactly like the goal of your plant today. The difference is that in Asset Management it’s not just a goal, but a practice with the tools and methods to assure the result. We wrote an in-depth article, *Defining Asset Management*, published in *Maintenance Technology*, January 1999.

A Model for Improvement

Since Asset Management is an advanced practice, reactive maintenance organizations can simply proceed with implementing standard maintenance and reliability programs. We don’t see an advantage, or even a basis of understanding, for such plants studying and evaluating these facets of plant operations.

Increasingly though, we encounter plants who ask, “What’s next?” When the basic elements of planned maintenance are in place, and reliability programs have dramatically reduced failure events, what is the next plateau of achievement?

SAMI’s Asset Healthcare Triangle (Figure I) offers a view of the progression from maintenance, through initial reliability stages, upward into advanced practices for Asset Management.

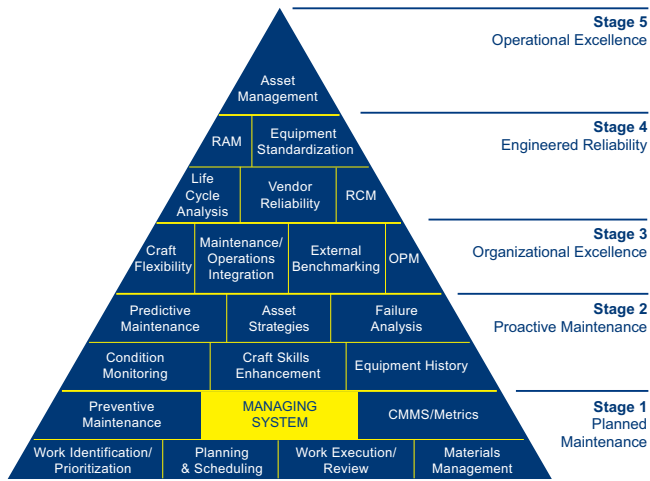


Figure I – SAMI Asset Healthcare Triangle

Stages 1 and 2 comprise fairly standard maintenance and reliability foundations for plant operation. Of note, though, is the highlighted “Managing System” block. One reason planned maintenance implementations may fail is lack of a managing structure that is a part of any well run plant. This starts with clear goals that are measured, these goals being at the plant level (outcomes), the department level (process measures and outcomes) and the individual level (process measures and outcomes). In addition to goals, there needs to be a performance reporting system and review process. The old saying, “You can’t manage what you don’t measure” is a partial truth. The other part of this is, “You get what you inspect”.

We have specific measures we look for to determine whether Stage 1 and Stage 2 are mature enough to move ahead. For SAMI’s purposes, we have three levels of methodologies: for Stage 1, for Stage 2, and for Stages 3-5 as a combined Asset Management implementation. If the reader fundamentally agrees with this representation, we can now move ahead with a basis to evaluate whether one is ready to move beyond Stage 2 into Asset Management.

An overview of the characteristics of each stage is illustrated in the SAMI Asset Healthcare Matrix (visit www.samicorp.com to view the SAMI Asset Healthcare Matrix).

When Are You Ready for Asset Management?

In Stage 1 we look for an established, efficient and effective work management and managing system. How do we measure this? We use a set of process indicators and outcome indicators to identify readiness.

In Figure II there are nine measures which apply to Stage 1. This set of measures, or Key Performance Indicators (KPI’s) are all we need to determine the effectiveness of Planned Maintenance. There are perhaps 20 other leading or process indicators we could use. After careful evaluation, these are

the set, which in combination, determine whether planned maintenance is under control.

Our “in-control” criteria and expectations are these.

1. The total identified work is stable or decreasing (the work is getting done)
 - Estimated backlog in crew weeks (five weeks and stable or decreasing)
 - Scheduled work as % of available hours (80%)
 - Schedule completion by week (80%)
2. The type of work is moving toward plannable, away from urgent
 - Percent emergency work orders (fewer than 10%)
 - Planned work as % of available hours (60%)
 - Inventory stock-outs (<3%)
3. Prevention is ascendant, and effective
 - PM work as % of available hours
 - PM compliance (80% weekly)
 - PM effectiveness (average of 4 issues identified by each PM)

How do these work together to assure control?

The first issue is whether our work backlog is increasing. If so, over a period of time, we are in danger of not attending to the equipment issues properly. A small problem not attended to can become a catastrophe. Completing scheduled work and scheduling most of the hours are the best overall measures of the effectiveness of planned maintenance. If we maintain schedule performance, and the backlog is increasing, we know we need additional resources.

We also know that our ability to get work done is dependent on the work being plannable and schedulable. If we have too much urgent work, we cannot get efficiencies in executing it. This is a very important area to trend. Inventory stock-outs are a measure both of inventory management effectiveness, but even more of our ability to have lead times for the work.

Finally, we know we break out of control when we can’t execute our prevention activities. Sometimes, though, we can fool the system by putting in time and pencil-whipping the Preventive Maintenance’s (PM’s). That’s where the measure of PM effectiveness comes in. We expect to catch problems with equipment through our PM’s. If we are not, then either our PM frequency or task-list are wrong, or we are not performing the job thoroughly.

Why are these important as a group, rather than individually? P.T. Barnum said something like, “You can fool some of the people all the time, and all of the people some of the time”. There is a natural tendency to define and report measures that are improving, whether that is true or not.

So let's say someone is reporting a decreasing backlog of work (constraining writing new work requests). Over time, our urgent work will increase because we don't have visibility of looming problems. PM compliance will also decrease as people are spending time on urgent activities.

How about if we are reporting a high PM compliance where it's not true? We will know if our PM effectiveness ratio is falling. Planned work will decrease; urgent work and backlog will increase.

What if work is not properly classified (e.g. by definition we won't call things urgent?). Again schedule compliance will decrease; inventory stock-outs will increase, as may the backlog.

We hope you can see that maintaining these levels of performance while difficult, assures the work is getting done, done efficiently, and effective prevention is the order of the day.

In-control criteria for Stage 2:

1. Mean-time-between-failure for classes of equipment (variable)
2. Stable or decreasing "cost of unreliability" (a measure of labor, parts and lost product)
3. Percent equipment/components with a meaningful asset healthcare plan (100% critical, 80% overall)
4. Percent prevention compliance (90%)
5. Percent of failures to be analyzed (80% of class 1, 50% of class 2)
6. Percent of equipment with meaningful history (80%)

Here we look for the business impact of equipment failures to decrease, and process measures to assure we are getting to prevention, and the work is the "right medicine for the illness involved."

Asset Management vs. Maintenance & Reliability Assessments

Many plants have submitted themselves to examination. These may be called benchmarks, assessments, analysis and

design, gap analyses, maintenance audits, etc. For Stage 1, there are quite a lot of internal and external means of assessing. Large, multiplant manufacturing organizations usually have an established maintenance council, which often takes on the task of developing an internal set of standards to measure current position vs. best practices and KPI's. Consulting organizations often do this type of work, especially those that specialize in maintenance. The Society for Maintenance and Reliability Professionals (SMRP) also has a benchmarking program for executive members.

All of these tend to share an evaluation of several common process and performance indicators. In addition, some have a defined standard for best

practices, and evaluate against (usually) Stage 1 expectations. Some will develop an economic gap whose value is an impetus for making difficult changes. If these are artfully managed they create positive momentum for change.

The issue comes when you want to know what is beyond planned maintenance. We have developed a competency model for all five stages of the triangle that evaluates the level of achievement for each stage. That way you can develop a gap at each level, and have a larger view of where improvement efforts are leading.

Process Indicators (Leading)

- **Percent emergency work orders**
- **Estimated backlog in crew weeks**
- **Schedule completion by week**
- **Planned work hours % available hours**
- **Scheduled work hours as % available hours**
- **PM work as % available hours**
- **Work hours by classification of work**
- **Inventory stock outs**
- **PM compliance**
- **PM effectiveness**

Figure III Key Performance Indicators (KPI's)

Stage 2 Control Criteria

The intent of Stage 2 is to eliminate 80% of failure events. We employ the 80/20 rule: eighty percent of failure events are due to 20% of failure causes. Almost any plant has common systems or components that contribute to the bulk of the repair work. In a fab shop, it may be tool adjustment issues. In a chemical plant or refinery it is certainly pumps, motors and heat exchangers. In a utility heat exchange tubes are a very tough issue. But if we can solve our common issue, we can reduce the work to a remarkable extent.

When to Do an Asset Management Assessment

Those people who are active in maintenance and reliability organizations have a common understanding of the difficulty in making this area a plant priority. There is always a focus on getting the golden eggs, but not always someone willing to care properly for the goose!

There are leaders, however, determined to become the best they can be. They realize how cost effective it is to improve maintenance and plant reliability, and know that the disciplines required to be good in this area apply to all aspects of plant operations.

So there are essentially two necessary conditions to proceed with an Asset Management Assessment. First is a drive for true leadership, and a willingness to hold the plant to high standards. Second is that the well-known processes for Stage 1 and Stage 2 are mature enough to stand up to tough standards.

There really is life after planning & scheduling! Asset management offers the potential to go well beyond current levels of performance. When your plant has done all it knows how to do, learning your level of readiness for Asset Management may be the right path for you.