

The Anchor of Asset Management

Asset management relies on a systematic approach to the care and organization of a company's resources. This notion is fairly simple - if an asset remains in production for longer than expected, then the company does not have to replace it as often, saving money over the course of its life. Likewise, as long as the asset is in use and functioning properly, the company is generating income. Yet the moment that a critical piece of equipment breaks down, production slams to a halt, which means forfeiting sales and potentially unhappy customers.

Every minute of downtime means lost revenue for the oil and gas industry. A US-based study found that compared to other asset intensive industries, which experience downtime ranging from 3-5%, the oil and gas industry suffers at 5-10% downtime. These companies also tend to have more valuable and difficult to maintain assets, such as remote offshore rigs, so even a 1-2% loss in production time can equal major cost to operations. It's common for an offshore platform in crisis mode to run at 30% unplanned downtime².

Asset management is the science of balancing these measures of performance, risk, and cost over time. There are many factors that contribute to these three measures, as illustrated by the SAMI diagram in Figure 1.

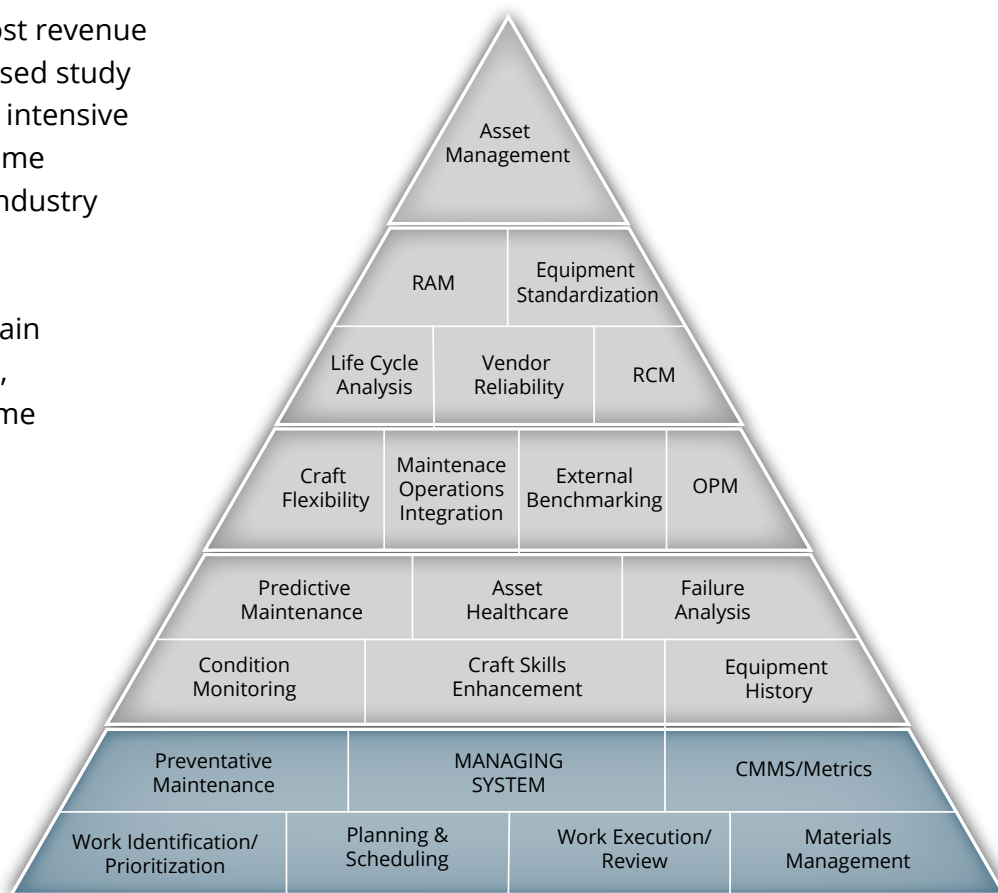


Figure 1: The Sami Pyramid of Asset Management

1 http://www.afestlouis.org/Download/True_Downtime_Cost.pdf

2 http://www.spe.org/ogf/print/subscribers/2013/06/07_IRM.pdf



At its core, asset management depends on four main components: work identification and prioritization, planning and scheduling, work execution and review, and materials management. This paper will discuss the significance of building a firm asset management foundation, as well as provide strategies for climbing the pyramid and becoming a best-in-class maintenance organization.

Building a Firm Foundation for Management

Work identification and prioritization

Work identification and prioritization are central elements in gaining control of the work process, yet they are often overlooked because of the erroneous assumption that all work is of equal importance. For example, what is the difference between a broken pump and a broken pump that leads to a refinery shutdown? The latter will cost the company significantly more money. As a rule, any piece of equipment that could result in increased production costs upon failure is considered critical in the process. By giving equipment a criticality rating and setting up guidance rules, you can help ensure that your maintenance and engineering efforts are appropriately focused. To learn more about equipment criticality and the prioritization of work orders, [read this blog post](#).

Emergency break-in work costs at least three times more, takes three times longer, and is three times more likely to fail than planned work³. On average, up to 80% of equipment failures cannot be predicted based on age alone⁴. Therefore, developing a comprehensive plant maintenance and risk management strategy is mandatory for any efficient production process. With equipment properly ranked for criticality and vulnerability, schedulers are able to prioritize and execute maintenance orders with minimal disruption to each of the six steps within the work order life cycle (Figure 2). Given the cost of downtime, it's understandable why equipment maintenance is a major area of concern for oil and gas producers. The potential savings of employing planned maintenance practices and reducing reactive work can be immense. By properly identifying and prioritizing work, companies can concentrate maintenance efforts to maximize equipment uptime and availability.



Figure 2: The Work Order Life Cycle

3 <http://www.reliableplant.com/Read/3740/maintenance-outsourcing-model>

4 <http://www.lifetime-reliability.com/training/online-courses/predictive-maintenance-strategy/PdM-course.html>



Planning and Scheduling

Planning is the ‘what and how’ of work. Planners are responsible for ensuring that all the materials, equipment, permits, and resources are available prior before a job is scheduled. Scheduling is the ‘who and when’ of work. Schedulers should ensure various trades are available to complete a planned job during the schedule duration. They should also communicate the work plan and any changes across the organization.

To maximize uptime and equipment reliability, planners and schedulers must focus first on getting the most work out of the fewest resources and then on establishing practices that will reduce reactive maintenance. Craft time can be wasted during an average day when:

- Materials and tools are not available at the job site
- Safety measures are not taken prior to the start of a job, causing craft personnel to wait around until safety measures are completed
- The schedule is not posted or communicated well
- Break-in work interrupts routine maintenance activity in mid-cycle

A well-executed planning and scheduling process can eliminate these time wasters and provide visibility to all involved personnel. Developing a focused improvement plan may include:

- Improving the bill of material quality
- Enhancing visibility and coordination with production
- Improving the communication of assignments to personnel
- Ensuring materials and tools are available
- Verifying that work package and instructions are readily available
- Protecting maintenance time by creating an emergency break-in team
- Scheduling resources to 90% capacity

Effective planning and scheduling is the cornerstone of a successful maintenance organization—once in place, you can become more specific with asset planning and measuring reliability. This process will help increase worker productivity, ensure knowledge transfer between the experienced workforce and new hires, and enable cross-functional collaboration. By following these best practices, planners and schedulers in the oil and gas industry can concentrate on the ultimate goal, improving production time and in effect generating greater profits for the business.

Work Execution and Review

Formulating a strategy is only the beginning. The real challenge lies in implementation. First, make sure every department is actively using a single CMMS, such as SAP. Then eliminate any third-party software that requires removing data from SAP. This is vital because all aspects of the plant maintenance process (contractors, operational status, relationships, BOMs, etc.) build upon one another. Forfeiting visibility of



any aspect of the process makes it nearly impossible to align the organization, track work and resources, and measure successes and failures.

Competing priorities across different departments can be a challenge. To remedy this, work together with various units in your organization to define your overall goal (Figure 3). Likely, this goal will demand that both maintenance and operations take equal responsibility for creating the product in the most economical manner possible. To improve efficiency, there must be cross-functional coordination with common goals and objectives, and this must be a top-down initiative.

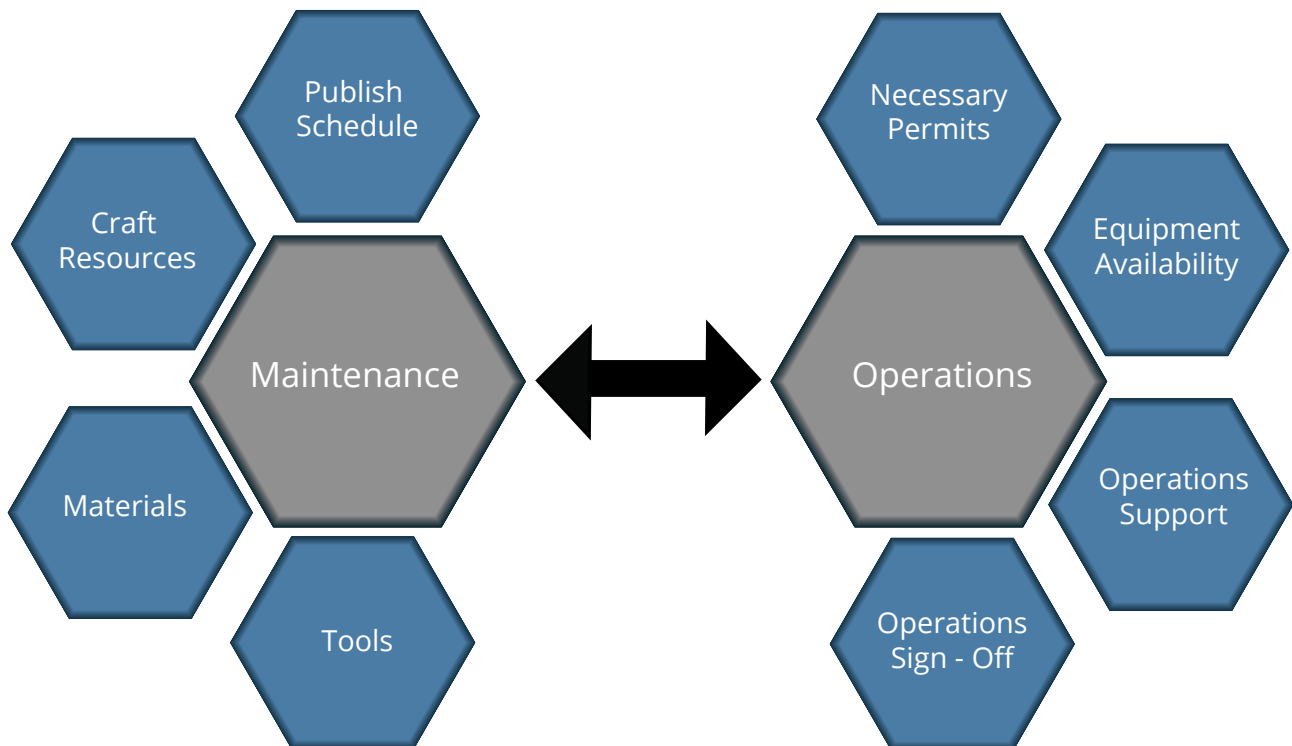


Figure 3: Alignment of Maintenance and Operations

Finally, change your way of thinking, and encourage others in leadership roles to do the same. After achieving goal alignment, it's important to shift focus from "who is responsible for interrupted or slowed production" to "why did this happen." Nothing dissolves teamwork faster than providing a catalyst for blaming others. Instead, keep track of critical problems (i.e. problems that jeopardize safety, increase cost, or stop production) and then prioritize. Assign a person or a team of people to each problem, and record and share the solution after it's resolved⁵. This approach doesn't waste time pointing fingers, but instead solves problems and creates a framework for handling future issues. Aligning goals, processes, and tasks and streamlining your CMMS will pay dividends throughout your implementation of a successful asset strategy.



Materials Management

Material or inventory management is about ensuring items are in the right place at the right time. It sounds basic, but this is a major and costly struggle for asset intensive organizations, and the problem compounds as the organization expands. A study by the Society of Petroleum Engineers indicates that on average, maintenance, repair, and operations (MRO) storehouses and supply chains are lacking critical equipment spares and are overstocked by 20%⁶. This data indicates critical parts may not be available when a failure occurs, further extending downtime and forcing crafts to wait around until parts and materials become available. Companies may pay taxes while that inventory sits idle, and cash tied up in inventory is cash they cannot touch.

Idle inventory may be the result of mistakes or a poor process. For example, due to outdated information, procurement orders a part that is not needed, which ends up sitting in inventory year after year or materials are purchased in bulk for a project and only a few are used. Unused materials continue to pile up because of a lack of visibility into material availability and job requirements. This goes hand-in-hand with poor communication throughout the organization - and especially in the case of material management - depletes the company's coffers.

However, with complete visibility into material assets, companies can make smarter decisions regarding how much inventory to purchase and when to retire materials and equipment. Users will have information available about where materials are located, who needs them, and when. Furthermore, visibility of in-house inventory across plants enables the reallocation of materials and tools from previous work orders to future work orders - a huge time saver for planners. Knowledge is power, and control over these variables will allow companies to curb downtime by protecting maintenance time and keeping craft personnel productive.

Rounding out the Foundation

Once planning and scheduling best practices are in progress, teams can implement the "90-10" rule for planned maintenance⁷. This is 90% planned work with 10% contingency built-in. As with safety, this level of planned and scheduled work requires a zero tolerance policy. To reach the pinnacle of asset management and become a best-in-class maintenance organization, maintenance time must be protected.

The managing system should encompass the planning and feedback system employed by a plant or manufacturing site. This cycle follows the simple path of plan, perform, measure, review, adjust, and begin again. The key is having data from each step in the cycle easily accessible in a single CMMS so that it may be harnessed as needed throughout the work process. Such intelligence around alignment will allow your organization to support the goals and strategies required to meet or exceed performance targets.

5. <http://www.idcon.com/resource-library/articles/operations-and-maintenance/517-operations-maintenance-1.html>



To round out the foundation, user adoption of the CMMS should become standard across the organization, with the average user entering and extracting data as needed. Training on the navigation of the CMMS and how to schedule work, track materials, and utilize task lists and BOMs must be implemented. Additionally, data should be collected and examined to track progress and determine where improvements can be made.

Climbing the Pyramid

Work identification, planning and scheduling, work execution, and materials management cast the foundation for a controlled, yet progressive, asset-intensive infrastructure. In fact, improvements at this level can lead to staggering results.

A study by SamiCorp found that advancements in these four areas account for a 50-100% improvement in work efficiency⁸. As companies evolve, leaders can shift their focus to developing strategies that encourage effective leadership and allow for greater control over equipment and resources. These strategies promote organizational excellence, proactive maintenance, and reliability.

Exceptional organizations have several factors in common⁹:

- Leadership that encourages open communication and establishes clear goals and processes for achievement
- A work force dedicated to productivity and further knowledge attainment
- Skill-based performance is rewarded with career progression and success
- Performance results benefit stakeholders and employees alike

Proactive maintenance incorporates intelligence around equipment condition. In addition to performing regular maintenance on equipment, proactive maintenance narrows the focus by identifying defects and correcting them before they become major problems.

Engineered reliability uses data on equipment dependability, standardization, and vendor quality to justify the cost of maintaining equipment and develop life cycle goals and plans prior to purchasing new equipment. The goal of engineered reliability is to achieve a state of equipment maintainability and standardization.

Reaching the Pinnacle of Asset Management

Above all, a best-in-class maintenance organization is one that has created a cooperative work environment where the priority is communication and alignment among operations, maintenance, and management. When the entire organization is working towards the common goal of optimizing the

6 http://www.spe.org/ogf/print/subscribers/2013/06/07_IRM.pdf

7 <http://www.plant-maintenance.com/articles/PathForward.pdf>

8 & 9 http://www.samicorp.com/index.php?option=com_content&view=article&id=57&Itemid=108

manufacturing process in a way that creates value, it has reached the pinnacle of asset management. At this level, at least 80% of work is planned, and safety and discipline drive performance.

Reaching the pinnacle is absolutely possible, and many manufacturing organizations have already achieved this level of efficiency or are taking the steps to do so with the help of Prometheus Group’s solutions. Prometheus enables companies to execute on their asset strategy by helping them build a rock solid foundation and providing tools that allow businesses to focus on asset planning and execution. Prometheus solutions impact these key areas (Figure 4):

- Improved Availability** – Customers have seen a 1-3% improvement in availability through improved downtime and increased production capacity.
- Reduced Risk** – The more mature a company’s planning and scheduling process, the safer the operation; backlog reduction indicates that work is completed as planned.
- Minimized Cost** – Improved wrench time leads to reduced overtime and outsourced labor.

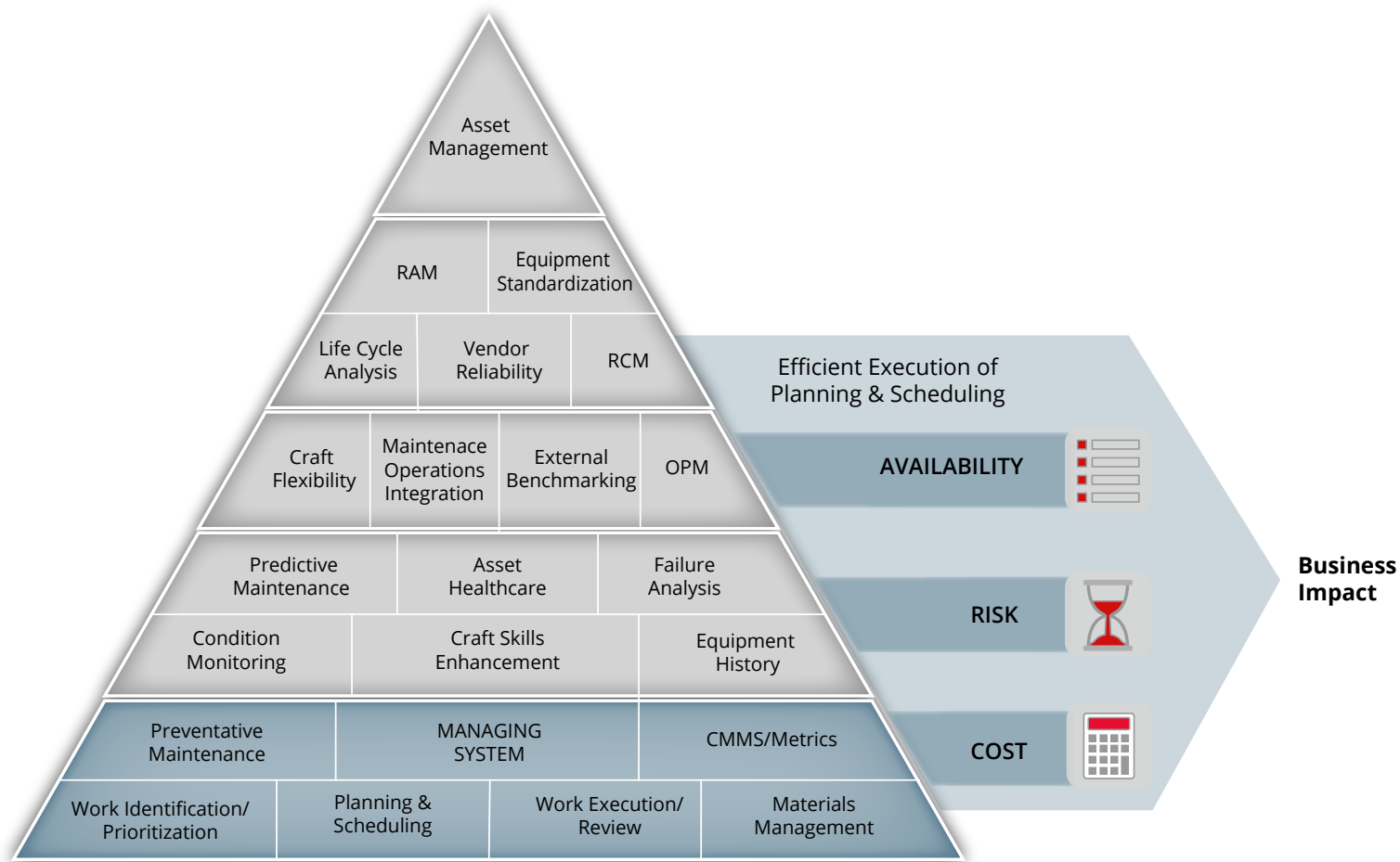


Figure 4: Efficient execution of planning and scheduling impacts availability, risk, and cost



Prometheus Group's solutions are unique because they are built entirely inside of SAP, so there is never a need to export data. Planners and schedulers can focus on managing commitment dates to production, building accurate bill of materials to better manage inventory, and implementing programs to improve downtime and wrench time. By ensuring accurate data, reports can be easily generated in real time. This means companies can focus on aligning the organization and taking steps to reach the pinnacle of asset management.

Prometheus solutions are SAP certified, written in ABAP, and use the standard SAP transport process. All changes to the SAP master data are handled in real-time, resulting in a single source of information to ensure system data integrity. Improved data, visibility across functional groups, reduced downtime, improved reactive work, safer operations - that's the impact that Prometheus solutions can deliver. The result is a simpler, faster, and more cost effective plant maintenance operation.

About Prometheus Group

Prometheus Group is an enterprise application software company specializing in the usability and user adoption of SAP Plant Maintenance. Developed jointly with end users, our software enhances the customer experience with intuitive functionality, graphical visualization, and simple processes. An SAP Partner, Prometheus Group is committed to developing certified applications that extend and add value to SAP solutions across industries and business processes. For more information, visit www.prometheusgroup.com.