

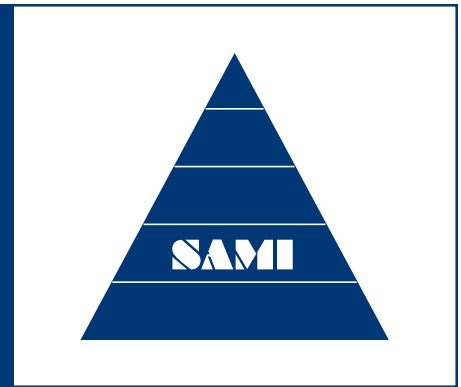
We Deliver Change!

The SAMI Times

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The President's Corner

The SAMI Production Triangle

All of our clients are concerned with the question: "Are our operators doing the right things?" Frequently it appears their concern is one of following procedures, or if the procedures themselves are correct and effective.

We agree with these concerns. The solution, however, is more than reviewing the procedures and auditing the adherence to them. Why? Because procedures usually consider a static environment, whereas in reality, all of our clients operate in a dynamic environment.

To make an analogy to the maintenance environment, our clients are usually concerned with the skills of the craftsman. Here the mental model of maintenance is, "Get a call (1), and go fix it (2)". When things go bad, as they inevitably do in this environment, the focus is on craft skills. "He appears not to be able to repair the pump properly". Unfortunately they are not aware of the barriers the craftsman faces. These barriers include:

- Lack of proper identification of the problem or the specific equipment. "Pump broke in the boiler house" doesn't allow for planning the job
- Emergency work. Craftsmen are meant to work in an assisted environment. That assistance includes planning for the parts, the preparation and isolation of the equipment, coordination with other crafts (e.g. electrical disconnection); troubleshooting advice from engineers or supervisors; and a complete job documentation package from a planner. Can an individual craftsman do the job as well as a thoughtful and coordinated team? Of course not.
- Computer barriers. A craftsman is unlikely ever to be a master of SAP (most popular maintenance system for our large clients). He once again needs involvement from a planner to help get a job scoped, to be sure that the parts used are the ones for the job, and to assure that the tools will be available.

We never find that craft skills are a core issue once we have institutionalized the planned maintenance process. Most organizations have sufficient craft skills when jobs are planned and good advice is available. Moreover, they are then able to specifically identify deficiencies in a specific craftsman and get the necessary attention to correct those deficiencies. It's not a global issue then. Instead it is a matter between the craftsman and his supervisor.



S. Bradley Peterson,
CMRP
SAMI President

Likewise the SAMI production triangle focuses on the process of plant operations, rather than the task of the operator. For in the best case, the operator works within a system. The system is this:

Stage 1: Planned Operations

Planned Production helps us get control of the variables involved in production to assure we are prepared to set and meet targets. Most production variances can be traced to a handful of causes:

1. Unavailability of input materials of the right quantity and quality
2. Equipment and control systems fail to meet the manufacturing process requirements or are unavailable for the process
3. Unclear specifications (process variables, volumes)
4. Operators unprepared or unwilling to assure all aspects of process fulfilled
5. Lack of coordination within all parties to the production plan

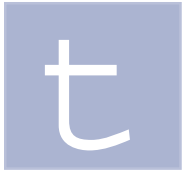
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We are a consulting group for industrial organizations working to improve profitability, efficiency and equipment reliability. Our Mission is to improve our clients' production equipment health, by tapping the desire, creativity and dedication of all plant staff, and our vision is to be the firm consistently chosen by companies serious about making change; because our values of integrity, content knowledge, advanced practices and compassion for the workforce match the values of our clients.

The Operational Reliability Maturity Continuum: Part 12 Metrics

By Dave Army, CMRP



And Now for Something Completely Different

In the past, I have discussed KPIs (Key Performance Indicators) as essential elements in measuring the success of any Asset Healthcare endeavor. Relevant Stage 1 metrics are; total maintenance costs, contractor costs, overtime, backlog, schedule adherence, resource loading, etc. Stage 2 metrics are closely aligned to specific component and system metrics, along with overall facility availability and/or reliability. Implementation metrics are tied to project milestones, training, and sustainability metrics.

In most cases, companies determined to improve or monitor their Asset Healthcare processes use some or all of these metrics. While we may choose to argue over what constitutes a backlog, or what the targets should be, we do agree that knowing the size of the elephant is important. The source and structure of the measurement becomes the focus of heated interactions with IT (Information Technology) groups. Wow, the “World Class” discussion gets even heavier.

Let’s go back a few steps. Companies commencing the journey down the Asset Healthcare highway need an easy way to show where they’ve been, what’s achievable short term and finally what an constitutes an ultimate goal.

Like others, I have struggled over the years finding a way to clearly demonstrate the benefits of Stage 1 Asset Healthcare improvements, without the distraction of a host of charts and tables. Thanks to the hard work of my friend and colleague Ralph Hedding, I think the answer has been found. We call it the PWCi™ or Proactive Work Capacity index. It combines three metrics in an easily decipherable graphic that even the furthest removed managers can easily understand. The three components are as follows:

1. Wrench Time - Wrench time is determined during DILO (Day in the Life of...) studies undertaken during the Assessment phase of the engagement.
2. Schedule Attainment - The percentage of work scheduled accomplished during the week, based on the schedule published the previous week.
3. Resource Loading - The percentage of available resource (discounting training, vacations, etc.) assigned to scheduled activities published the prior week.

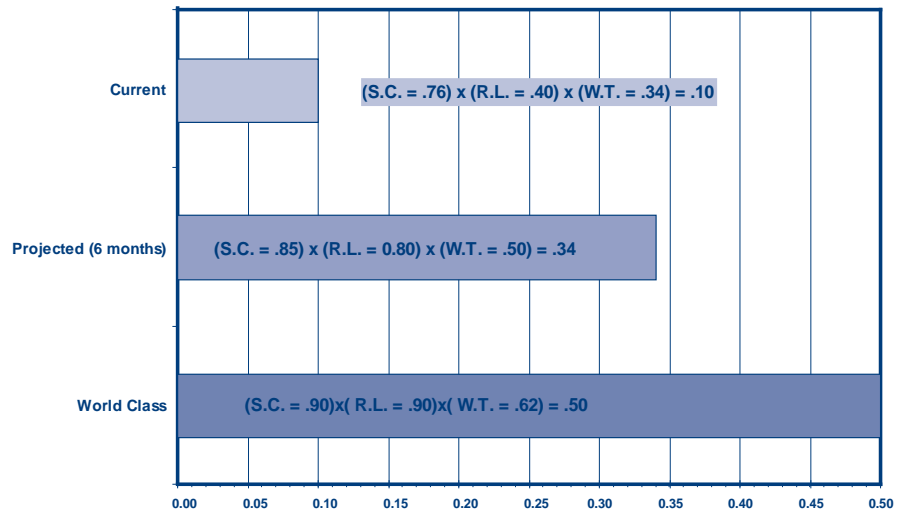
Multiplying the results of the three metrics establishes the PWCi™ We have determined, from experience, that World Class Stage 1 performance looks like this:

- Wrench time = 62%
- Schedule Compliance = 90%
- Resource Loading = 90%

Using these metrics, World Class performance would have a PWCi™ of **.50**.

Typically, with our clients starting down the Stage 1 improvement path a PWCi™ of **.10**, or only 20% of World Class performance. However, six months after the commencement of implementation our clients can and do attain a PWCi™ of **.34**, a three fold improvement!

Proactive Work Capacity Index (PWCi) (Schedule Compliance)x(Resource Loading)x(Wrench Time)



What I really like about this metric is the fact that it is understandable. In addition, the data is easily obtained, if an assessment has been performed. We like to have the client develop the Wrench Time estimates. The PWCi™ is updated weekly; however, the Wrench Time is developed quarterly. That means that once a quarter, a team of plant personnel conduct a series of DILOs to create a new Wrench Time standard.

This is a quick and easy way to demonstrate progress. It reinforces new behaviors in the organization by focusing on Proactive activities. Monthly goals can be set, similar to United Way, by showing progress vertically.

I feel that if you can achieve a PWCi™ above **.30**, you are firmly on track to your ultimate goal of gaining control of your work and increasing the work capacity of your workforce. You will be ready for Stage 2, “Gaining Control of the Equipment.”

I’m interested in your thoughts about this metric.

Dave Army is the Vice President of Results Delivery for SAMI. His expertise includes analysis, design and implementation of maintenance and operations solutions for numerous industries. He currently oversees all SAMI implementation activities. davea@samicorp.com

President's Corner *(continued)*

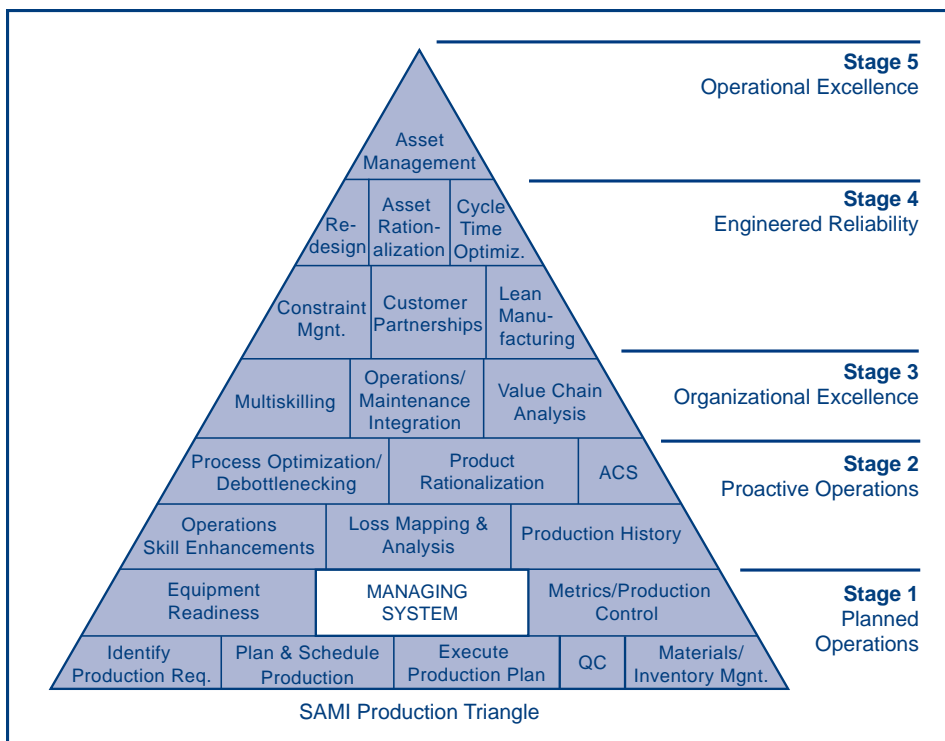
The SAMI Production Triangle

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In most instances clarity of pre-planning and specification can alleviate resultant variances. Coordination of purchasing, production planning and scheduling, operator teams, maintenance and engineering are designed into this stage to assure each party knows their responsibilities and expectations. These are documented in procedures that are “best in class”, according to the readiness of the organization, and in specific outcomes (quality, timeliness, volumes, etc.). Variances are tracked, reviewed, and changes identified to constantly improve the manufacturing process.

work on improving and standardizing production process parameters (which often vary by preference between shifts). This is a good time to implement control system improvements, because our mastery of base processes is understood and documented, and we know where our shortfalls are. Now that we know what we should reasonably be able to produce on each shift, we can look to optimize production throughput by adjusting equipment and process. Finally, we are able to identify methods to continuously optimize product mix according to market pricing.

By the time that Stage I is fully implemented, we now know what work we have, what our backlog is, and the types of skills we need to enhance in quality and quantity.



Stage 3: Organizational Excellence

Organizational Excellence explores resources optimization within production, maintenance and engineering to improve production reliability. In most cases operators can play a far greater role in managing equipment health than they do. By Stage III there is enough control of the work and the equipment that decentralizing some of the maintenance staff is valuable. Teams of operators and craftsmen increase the effectiveness of all the area work and the operators learn to accept and perform some of the work that was performed by the craftsman.

We now find an opportunity to cross-train operators with operators, and operator and craftsman. We can reduce total staffing by substituting from within other areas during peak usage time or high absence time like vacation season.

By Stage III we have made significant progress, and it is now most appropriate to look outside the plant (or mill or mine) for models of excellence, and external benchmarking may have a significant impact.

Stage 2: Proactive Operations

Proactive Production builds upon the success of Planned Production. Based on our refined measurement and history of events and variances, we now work on these on a Pareto basis. We can do this because we have a functional production process with fewer interruptions and expediting activities. Finding the root cause of high value interruptions and slow-downs increases throughput and takes pressure off production target attainment. These interruptions we may find to be poor communications and scheduling, operator error (commission or omission), equipment failure, control system defects or maladjustments, etc.

Because we know the nature of our issues, we can work on solutions. We improve our operating procedures and mastery where issues exist. We can

Stage 4: Engineered Reliability

Our intention in Engineered Reliability is to proactively eliminate both failure modes and the need to operate against failure modes. We are actively reducing causes of failure for operators through RCM, visual factory, and behavior safety programs.

Because we are consistently efficient in our operations and our equipment failures are dramatically reduced, eliminating WIP and intermediate product storage becomes feasible. We can review the overall product flows in the plant and identify sources of waste. Overall Plant Optimization becomes our goal, using tools such as:

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- lean manufacturing
- 6 sigma
- major debottlenecking
- asset rationalization
- cycle time optimization
- synchronous manufacturing
- supply chain integration

Operators are involved in RCM and MORS (maintainability, operability, reliability and safety) teams identifying possible failure modes, frequencies, causes and consequences. They are part of the teams that take corrective action to eliminate both routine maintenance and equipment failure modes.

Stage 5: Operational Excellence

Those companies who choose to distinguish themselves by being outstanding operators recognize that advanced manufacturing practices depend on reliable people, processes and equipment, all working to optimize the value of production in a real time environment.

In this stage, we develop a comprehensive approach to asset management. SAMI's approach, which we call Strategic Asset Management™, integrates the cycle of annual business

planning with the conditions necessary for each unit to meet the requirements of the business plan. Manufacturing under SAM has little mystery or guesswork in it. We have developed operating specifications for all systems and components, and developed a zero-based cost strategy for each manufacturing element in the plant. Operations minimizes contingency worked into costs, because of a complete understanding of process and equipment condition, and the specifications required to maintain these conditions. Virtually no event can happen of consequence where we haven't prepared and eliminated risk.

Upcoming SAMI Events & Speaking Engagements

Lean Management Solutions Conf.....	9/7-11
AISE Annual Convention.....	9/29-10/1
Process & Power Plant Reliability Conf.....	10/20-23
TAPPI Technical Conf.....	10/26-30
SMRP Annual Conf.....	11/2-5