



Society for Maintenance & Reliability Professionals

Process of Maintenance Performance Management and Its Imperatives Within the Offshore Petroleum Industry

(Part III): Integration of Maintenance Performance to Corporate Value Process

By Jayantha P. Liyanage and Uday Kumar

The following is a continuation of our series addressing the principles of a new concept termed Value-based maintenance performance management. We advocate that the starting point for any measurement system, in the current business environment, is the need to move away from a classical cost and profit perspective to a more value-based perspective. In this paper, we discuss the integration of maintenance as a value delivery process rather than a cost center. This intends to be a thought-provoking new concept to substantiate development of operations and maintenance performance indicators for industrial asset maintenance. This is in line with an on going joint industry project on development and implementation of maintenance performance indicators for the petroleum industry in Norway.

Integration of Maintenance Performance to Corporate Value Processes

A detailed process map can largely be used to elucidate critical activities in the process, and enable the maintenance personnel to identify the "hot spots" in the process, which eventually facilitate the diagnosis of value-added activities from that of non-value-added ones. Likewise, it is a prelude to map the maintenance inherent value-stream, and its contribution to the main stream corporate value process. This transforms the widely known physical process, to more of a value delivery process, as illustrated in Figure 1.

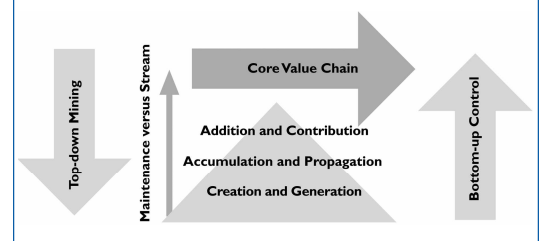
In order to realize the maintenance value stream, the attention is drawn to four important areas:

- value added - how do we express the value-added or the value delivered to the corporate value process
- value drivers - in which form process-specific values are accumulated and propagated to add certain values to the main business

- value attributes - where the process-specific values are created or generated in each value driver
- performance indicators - how do we get a good grip of value generation and creation in each value driver at the root of the process

Answers to these questions are a preamble to build up the maintenance specific value-stream and to support asset maintenance decisions and maneuver subsequent actions in a value-based perspective.

Figure 1. Maintenance Value Stream



Essentials For A Measurement System For Operations And Maintenance In Oil And Gas Producing Assets

Any measurement system, e.g., a scorecard, which is meant to fulfill the needs of operations and maintenance processes in the petroleum industry should concentrate on certain critical, strategic areas determined by the nature of the business, business concerns and obligatory, statutory, and regulatory requirements imposed by the relevant authorities. These critical areas could best be highlighted as seen in Figure 2.

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SMRP's MISSION is to be the global leader that facilitates information exchange through a structured network of maintenance and reliability professionals, supports maintenance and reliability as an integral part of business and asset management, presents a collective voice on maintenance and reliability issues and advances innovative reliability practices, promotes and supports maintenance and reliability education for people, production and quality processes to improve the work environment.

Back Issues: The current issue and back issues of SMRP Solutions newsletters can be downloaded from the library area of the SMRP Web site. Original versions of the current issue and some back issues of the newsletter are available by contacting SMRP Headquarters (\$5 per copy for members, \$10 per copy for non-members).

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CHAIRMAN'S message



Bruce Winkler, SMRP Chairman
Engineering Group Manager, Manufacturing Reliability and Maintenance Operations, General Motors Corporation

Wow! The Tenth Anniversary for the Society for Maintenance & Reliability Professionals has just past. Growth from 32 to 160+ executive members and 200 to more than 1,000 individual members highlights some of the pattern and potential for SMRP. It is truly amazing to realize that we have barely tapped this potential! I ask the basic question, "Is the glass half empty or half full?" After you reflect on this, I hope that you agree with me that we have a tremendous upside for our profession.

As I stated in last quarter's SMRP "Solutions", "One of the most exciting aspects of the Society's growth and success is that the society was initiated by and has been sustained by practitioners." Lots of hard work and dedication went into this. Many thanks go to the original organizers and their respective companies for the dedication of time and effort needed to lay the foundation for SMRP to be built to what it is today.

SMRP has evolved. This is evidenced by the organization of SMRSCO (Society For Maintenance and Reliability Professional Certifying Organization) and the wildly successful Certified Maintenance & Reliability Professional (CMRP) certification. This is also evidenced by our recent formal alignment with the Maintenance Engineering and Society of Australia (MESA).

Let's pause, re-evaluate our roots and acknowledge our accomplishments. However, while we congratulate ourselves, we still realize that much is left to do. We must continue to grow, to get stronger, to voice our concern for our profession and its integral part in the manufacturing enterprise.

This is also a year of transition. A year that can best be described as "uncharted." New officers, a new business agent, new norms and learnings. We are getting good at managing CHANGE! Good people can flex and grow with change. Much thanks goes to the officers and directors of SMRP for this year. Look at the list of officers/directors in this issue. Look at their companies and join with me in thanking them for their effort. We continue to be dedicated to our mission that SMRP be a global leader that facilitates information exchange, that supports business and asset management by advancing innovative reliability practices and that promotes and supports maintenance and reliability education for people, production and quality processes to improve our work environment. A job well done! Thanks.

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RELIABILITY SPECIALISTS

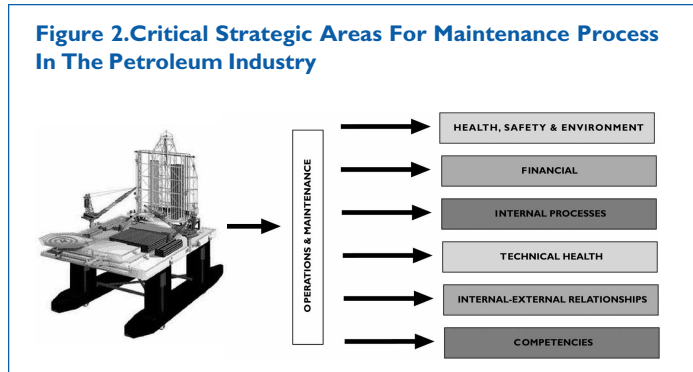
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Process of Maintenance Performance Management and Its Imperatives Within the Offshore Petroleum Industry

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Figure 2. Critical Strategic Areas For Maintenance Process In The Petroleum Industry



The health, safety and environmental (HSE) issues for process industries, particularly for petroleum, have been specified and documented by HSE executives. Environmental taxes have been imposed due to growing environmental concerns. The financial worries have become ever significant due to restricted capital and operational expenses. Attempts are continuously underway to cut down the costs, in order to control the cash flow to maintain an appropriate profit margin. Accordingly, organizations are more cautious on Return On Investments (ROI). There are growing concerns on internal processes, which reflect how effective management is, and the subsequent performance of the maintenance process in the pursuit of business goals and consequent business achievements. Management of business-specific processes (e.g., maintenance, production, logistics, etc.) and their integrity has been critical for the overall corporate performance. The main and sub processes of each of the business-specific process have to be visualized in order to use the best of capacities and capabilities. A true image of each process reveals the critical interfaces between them, their interactions and interdependencies. The technical health of the plant has two main concerns, the plant integrity and the technical condition. Internal and external relationships address existing ways and means of being connected, associated, communicated, and partnered between different stakeholders. Emphasis could be placed on vertical and lateral relationships between teams and individuals, lateral relationships between internal processes and further relationships between the company concerned and third-party contractors. Concerns on relationships could be further expanded by taking into account social and professional contents of particular relationships. Competencies both in professional and social aspects play a critical role, from the part of the personnel involved in the operations and maintenance processes. The impact and potential consequences of core competencies are multifaceted, and often referred to as the brain of the driving forces of business.

Certain issues should essentially be taken into consideration during the process of development of any measurement system. These typically include:

- strategies and actions
- critical-strategic-areas
- interactions and interfaces
- cause and effect relationships
- lead and lag indicators
- drilling down
- decision process
- establishment and commitment

A logical approach in developing a performance measurement system should be a top-down process, beginning at the more strategic level of the corporate structure.

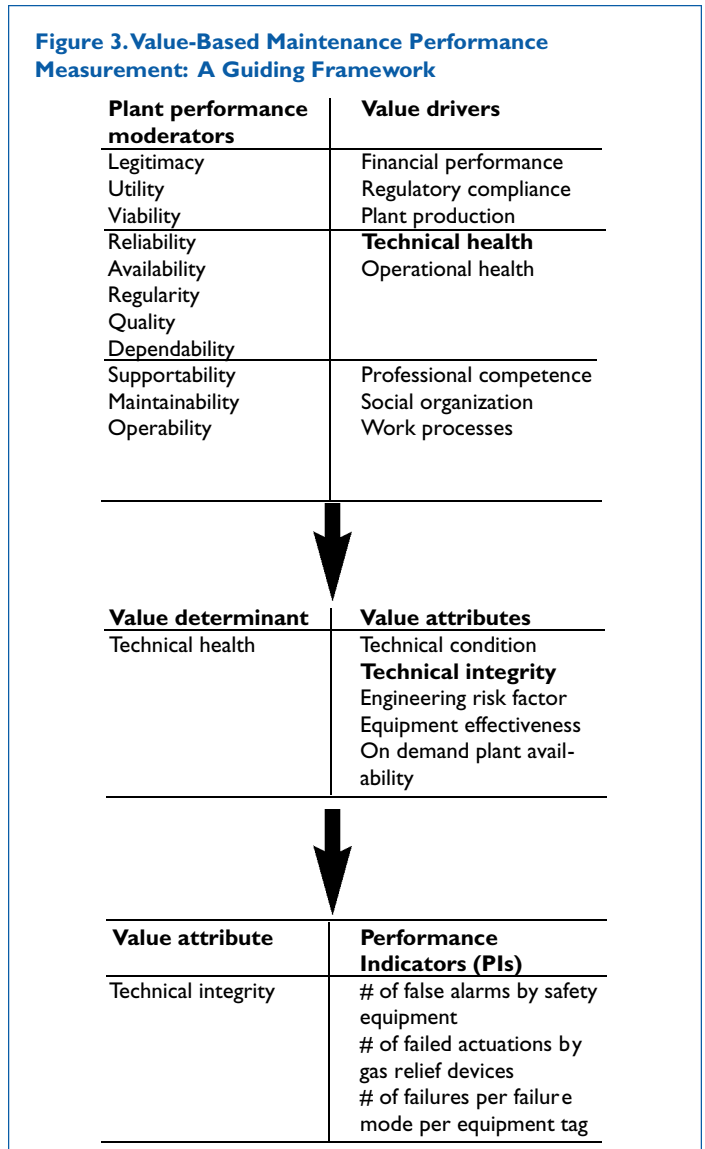
Development Of The Maintenance Performance Measurement System

Mining for maintenance value deliverables necessarily includes four levels of stepwise, top-down analysis leading to:

- identification of plant-specific maintenance value drivers
- listing of all value attributes for each value driver
- development of performance indicators for value attributes
- assessment of value added by maintenance process

An illustrative example is given in Figure 3.

Figure 3. Value-Based Maintenance Performance Measurement: A Guiding Framework



...continued on page 4

Process of Maintenance Performance Management and Its Imperatives Within the Offshore Petroleum Industry

continued from page 3

The fourth component, value-added by maintenance process, is typically the challenging part. According to our arguments, value-added has two branches, which we call accountable value and non-accountable value. Accountable value refers to tangibles, for instance the cost savings (if you refer to maintenance as a cost center) or profit increments (if you treat maintenance as a profit center). The other channel comes from improvements in plant condition, employee competence, outstanding health, safety and environmental records, etc., (Figure 4). Indeed these are intangible by nature, but they possess a finite value for a finite period of time, during which they continuously contribute to the accountable value. The problem is how do we capture and express this finite value in monetary (\$) terms for a finite period (say 3-4 years) of time. For additional information refer Liyanage & Kumar (2001a, 2001b).

Performance Rationalization

The rationalization process follows a certain logic of its own based on process inherent cause-and-effect relationships in performance. Some of the motives for such a causal structure has been discussed in detail, for instance by Kaplan & Norton (1996). See further Tsang & Brown (1998), Liyanage & Kumar (2000a, 2000b, 2000c). Rationalization and development of a performance matrix is to constantly ensure traceability of performance, to enable logical interpretation of outcomes, and to provide a concrete baseline for performance tracking efforts.

Rationalization of performance management based on causalities has an added advantage, since one of the motives behind development of performance indicators is to identify the "hot spots" (where strengths and/or weaknesses lie) in the process to realize opportunities and to make improvements where necessary. For this purpose, it is vital to visualize how these performance indicators lead the process to an observed level of front-end performance, when aggregated. Besides, a structured cause-and-effect relation always enables management to trace back to the root causes to validate performance deviations. To start from the first principles, causalities can be built-up in three different levels:

- level 1: causalities between value drivers
- level 2: causalities between value attributes
- level 3: causalities between performance indicators.

An applicable form of causalities for level 1, is illustrated in Figure 4. It is worth noting, however, these relationships can further be classified into three distinct levels namely, strong, moderate and marginal, depending on the degree of influence they possess over resulting performance. A similar procedure is recommended for level 2 (value determinants) and level 3 (performance indicators) of performance measurement structure.

Performance Matrix

The need of the performance matrix or maintenance scorecard is to facilitate reporting, on-line information management and continuous reference. This includes certain detailed strategic elements of individual performance indicators. It is meant to render a stringent reference base, which will be easy to refer to, and be meaningful and consistent. An ideal performance matrix is to follow the format of a scorecard, but yet with some additional information framed as required. An applicable form of a performance matrix is illustrated in Table 1.

This concludes a series of three articles which provided an overview of certain issues of an applied research project in Norway. It illustrated the role that the maintenance process plays in determination of performance of the plant and business prospects. We constantly emphasize the need for a new outlook for managing maintenance process performance, in line with current management trends, for healthier plant management to ensure

Figure 4. An Illustrative Performance Rationalization

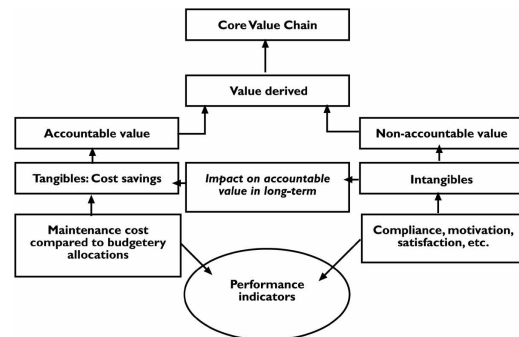


Table 1. An Illustrative Performance Matrix With Strategic Elements. A Scorecard For Maintenance

| | |
|---|--|
| Value determinants | Technical condition |
| Value attributes | Equipment effectiveness Etc. |
| Performance indicator (PI) | Availability Etc. |
| PI identification code | |
| PI definition OR formula | |
| Acceptance criteria | > 98% |
| Variables need to compute PI | Downtime, Total production time Equipment failure report, |
| Sources of data to capture variable value | Production run time Monthly, and average over 1 year |
| Frequency of measurements | Strong |
| Effect on Value attribute (Strong/moderate/marginal) OR weighting factors | |

process profitability, while confronting the increasing challenges from internal business concerns, as well as other partners who bear stakes of a given asset. It is urged that the management should continuously monitor internal processes, excel in process performance through appropriate control techniques, and "hot spots" are timely and adequately attended. This is practically complex, if not impossible, in the absence of a performance measurement system. Maintenance performance indicators in this context are critical in the continuous effort to ensure an acceptable level of plant health (technical and operational), but are an ever challenge in many different industries. In this paper we advocated two new concepts, concurrent maintenance performance assessment leading to value-based maintenance performance management (VBMPM), to deal with this complex issue in an adaptive manner. Further studies will be carried out to detail this process into depths, and thus to develop a consistent performance measurement system for asset maintenance.

Acknowledgement

Authors of this paper acknowledge the fruitful contribution from the members of the project consortium who took part representing different organizations in Norway, including, ADB Systemer, AS Norske Shell Operations, BP, Det Norske Veritas, IFS Norge, Industrial Communications, Norsk Hydro AS, Norwegian Petroleum Directorate, Philips Petroleum, PriceWaterHouseCoopers, RC Consultants, Saga Petroleum (former), Statoil AS, and Tieto Enator.

References

For a full list of references used in this series, please visit www.smrp.org.

Refresher Course In Membership Benefits

To ensure that SMRP members have the opportunity to take full advantage of the benefits which come with their membership, the following is an outline of the types of membership available and the benefits associated with each.

SMRP offers two types of membership—individual and executive. Both are sold for a 12-month period and begin on the day your membership is processed and expire exactly one year later. Members will be sent a notice prior to membership expiration. Renewing your membership will take only a simple phone call or on-line communication.

Individual memberships are offered at a cost of \$125 per person, per 12-month period. Benefits offered exclusively to SMRP individual members include:

Speaker's Bureau Database. An excellent planning guide either to meet the informational and training needs of yourself or perhaps a group within your plant. Located on the SMRP website at www.smrp.org, the database lists a host of pertinent topics and fields related to maintenance and reliability. Simply choose your topic of interest, click, and you will access a multitude of contact information on companies and individuals offering information related to these topics.

Membership Directory. Ever wonder how someone else in your position is handling a certain situation or just wanting to start some dialogue with a fellow reliability professional? Upon request, you will be forwarded electronically an Adobe Acrobat® file containing contact information on all SMRP members. It's a great way to locate old friends and make new ones.

Networking Database. Interested in how other SMRP plants operate? The networking database compiles data on other participating SMRP practitioners. Age of facility, work environment, job rotation, how maintenance is organized and how maintenance is performed are some of the areas addressed. In addition, you will find what processes are being utilized and the level at which individual processes are being performed. To receive this information, simply call the home office at 1-800-950-7354 and

request a Networking Information Form. Upon its completion, the entire networking database will be forwarded to you via an Excel spreadsheet.

Quarterly Newsletter. Four times a year you'll receive "Solutions." It's the web that ties us all together. Considering SMRP membership is located all over the U.S., Canada and the world, it's the sole way we have to communicate uniformly to everyone. Things change and keeping in touch in a uniform and consistent manner is the only way to ensure that you are aware of the opportunities available to you through SMRP.

Annual Conference. Held each Fall, this is the place to energize your maintenance program. Filled with more than 25 technical sessions, plant tours, workshops, exhibition, certification opportunities and more, it's a great opportunity to feel the pulse of SMRP and the maintenance industry.

Educational Workshops. Three workshops are hosted throughout the year at various locations and dates, and feature venues customized to fulfill the needs expressed by membership. Past topics have included Reliability Engineering Principles and Life Cycle Costs, Maintenance Planning and Scheduling, Planning and Managing An Asset Reliability Improvement Program and Preventive Maintenance Program Optimization, to list just a few. The seminars are available to members at a break-even price, which means the cost is a fraction of the price to experience this type of information outside of SMRP.

Discussion Network. Care to chat? SMRP will be offering a new and revised bulletin board. This is the place to go if you want some "immediate" input!

Executive Memberships are offered at \$1,250 per 12-month period and include membership privileges to five designated individuals. Executive members are entitled

to all the benefits available to individual members and in addition are entitled to:

Benchmarking Program. How do you measure up? This is an excellent opportunity, offered once per year, for executive members to measure where they are to better plan where they'd like to go. The program offers standards for best practices that represent a wide range of industries and a broad spectrum of expressive indicators, and is available free of charge. (Not available to supplier, consultant or non-profit trade organization members.)

Executive Member Meetings. No doubt some of our best learning opportunities come from networking one on one with other people whose experience base is similar to our own. Executive member meetings provide the perfect venue to listen, see and learn. Hosted by an SMRP Executive Member, you will travel to the member's plant where you will learn more about the site's reliability and maintenance practices and tour their facility. (See American Crystal Sugar on page 8.) Attendance is free.

Advertising Opportunities. If you're an executive member, a new networking opportunity is now available. "Solutions" will be featuring a Professional Services Directory. Comprised of what is sometimes referred to as "professional cards," it is a great opportunity to remind membership of your ongoing support of its goals. (See Boost Your Image on page 12 for more details.)

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DIRECTOR reports...

For the latest information on member benefits and events.

Communication



Ray Oliverson, SMRP Communications Services Director
President, HSB Reliability Technologies

The theme of this issue is a focus on the value of membership in SMRP. I personally believe that the "Solutions" newsletter offers significant value in news, networking and learning.

In this regard, we will continue our closely focused approach in making certain that "Solutions" helps SMRP meet its mission to communicate with and educate SMRP members and the maintenance/reliability community at large.

We are in the process of implementing a business card type advertisement for our executive supplier members. We believe that this advertisement approach could offset the entire cost of your newsletter. This received final approval at the August Board of Directors meeting. (You can find further information on the program on page 12 under "Boost Your Image".)

Please help us with articles for your newsletter. We are not receiving enough articles. Please remember that it is your newsletter and it needs your support. We are still supplying SMRP polo shirts for the authors whose articles are published.

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Academic Liaison



Tom Byerley, SMRP Academic Liaison Director, University of Tennessee Maintenance and Reliability Center

I have recently been reading reports and evaluations of our UT maintenance and reliability interns' experiences in industry this summer. I am greatly re-energized as I see the significant experiences that these students have had, as well as read about both the students' enthusiasm with their work and the companies' enthusiasm about the students. It is gratifying to see so many others realizing that academia does have a role to play in the development of maintenance and reliability professionals.

However, it is also obvious that we need to greatly increase the number of academic institutions involved in this development of young professionals. A major step would be to draw more of our universities and other educational institutions into SMRP membership. Interacting with the SMRP practitioners would quickly point out the great demand for more engineering and business graduates with a background in the maintenance and reliability field. As I have said before, academia follows the same law of supply and demand that your company does - and the more you demand, the more they will supply.

We need your help. We need for you to interact with your local academic institution(s) and encourage them to become SMRP members. We need for you to help them understand the clear need for being involved in maintenance and reliability and producing graduates that can move into this field. We need for them to be guided by practitioners to help ensure that the graduates produced are what the industry needs.

A good first step would be to invite them to attend the SMRP annual conference. Another step would be to have them call me to discuss the opportunities for academia in SMRP membership. A third step would be to have them call SMRP headquarters for more information.

The bottom line is that we need to get more academic institutions involved with SMRP. Won't you help us do that? In doing so, you will also be helping yourselves.

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Best Practices



Joe Gilbert, SMRP Best Practices Director
Global Manager Reliability & Maintenance
Shell Chemical Co.

What are the barriers to the transfer of maintenance and reliability best practices in your company? As a leader of several global networks in Shell Chemical Company I have encountered many over the past few years and would like to offer a few conditions that would help remove them.

Barrier #1: "Not Knowing Best Practice Was There." This seems like a rather obvious item, but it's amazing how a best practice can exist in one department or plant and not be shared to all that could benefit from it.

Conditions needed:

- Knowledge of available best practice information and tools
- Organized communication structure with roles and responsibilities
- Accessible reservoir of best practices, easy to find
- Knowing the people involved so information can be shared

Barrier #2: "Implementation Resources." i.e., How does this fit with our priorities? I know that our company is constantly challenged to implement only the highest value practices. We will never have enough resources to implement all the good ideas.

Condition needed:

- Clear understanding of best practice benefits (quantified) and how they compare to the value of other activities; understand fit with resource constraints

Barrier #3: "Accountability for Best Practice Implementation, Sharing, and Receiving." This can be often overlooked. Have you answered the question of whether this is optional or mandatory?

Conditions needed:

- Best practice benefits clearly understood
- Business need exists/perceived to use the best practice
- Sharers and receivers of best practices feel recognized and rewarded for this work
- Roles, responsibilities, accountabilities are clear on best practice sharing
- End users of best practices are involved in the design of best practices implementation
- There are expectations that best practices be shared and applied at all levels
- There are no, or minimal, legal, technological obstacles for best practice transfer

Barrier #4: "Real Need To Improve." How do you know there is a need to improve if you don't know a better practice exists?

Conditions needed:

- Dissatisfaction with current results
- Requirements for closure of performance gaps so the organization chooses to accept and close gaps
- Requirement for thinking and understanding of gaps and how to close before acting

6

Phone Home

From SMRP Headquarters

Most Frequently Asked Questions

When registering for the certification exam to be held November 10, 2002 at the Cargill facility in Minneapolis, MN, do I make my check payable to Cargill or SMRP?

All payments should be made payable to SMRP.

Are the test results and rosters of those sitting for the SMRP certification exam in Maintenance & Reliability Management kept confidential?

Absolutely. No information is released regarding individual scores or who has or has not sat for the exam. If you sit for the exam and pass, your name will be released for print in "Solutions" only if desired. For complete privacy and convenient scheduling, you may wish to make an individual appointment at SMRP's home office in Knoxville, TN. (See Become Certified At Your Convenience on page 12.)

My company is interested in exploring the possibility of having numerous individuals sit for the SMRP certification exam. Are multiple discounts available?

Yes. If you are considering a company-wide endorsement of SMRP's certification in Maintenance and Reliability Management, we suggest you explore the possibility of taking advantage of the SMRPCO Sustaining Member Program. (For full details see SMRP Certifying Organization Sustaining Member Program on page 10.)

Where does SMRP plan on hosting their 2003 conference?

The 2003 SMRP annual conference will be held November 1-5 at the Westin Hotel in Indianapolis, Indiana. We know you'll be as impressed with the exceptional development which Indianapolis and the Westin have undergone over the past two years. Easy and convenient access, exceptional surroundings, and a desire to serve made it a hands down choice as SMRP directs their conference a little further north for 2003.

6

American Crystal Sugar's Maintenance Department Goes It Alone And Contributes Significant Dollars to Company's Bottom Line

By SMRP Staff

Maintenance for a plant that runs 250 days a year. It sounds, well, almost easy. But for American Crystal Sugar (ACS) and anyone in the sugar industry, it's 250 days 24/7 per year and then no production for the next 115. That's a little tougher. But then again, what maintenance professional wouldn't like to have 115 days to "repair" whatever's gone wrong in the preceding 250 days. Then again, just imagine the attitudes from production and people in general that would be generated under this type of situation:

We'll fix it later (next year)...

if we remember

if we have time

if we have money.

How easy it would be to forget the painful situations that arose the previous year...since pain and money are usually the drivers to get things fixed.

How strong the run-to-failure mentality would be...since you know you have to make it only a few more months and there will be loads of time (and money, yeah right) to fix it then.

This is precisely the situation that the maintenance function of American Crystal Sugar found themselves in several years ago. Every repair was a "band-aid." They lacked a good system for documenting all the work that needed to be done during an outage, and planning all the work that needed to be done in a four-month outage was a daunting task. There was no planning and scheduling process and since everything was a band-aid, why would you need one?

ACS is a grower-owned cooperative, owned by several hundred families. They process 9 MM tons of sugar beets each year in five plants located in North Dakota and Minnesota using 1200 employees of which 240 are in maintenance. The maintenance workforce is unionized and as many as 550 maintenance workers are employed during an outage.

Production is called a campaign. As sugar beets are harvested in the fall, some are taken to the factory for processing into sugar. However, most are stocked into piles outside for processing later during the year. The North Dakota area is blessed with one of the longest processing

seasons due to the cool temperatures. The beets freeze during the winter and are maintained at cool temperatures through various technologies into late Spring. However, once temperatures start to rise in May, the low temperature of the beet piles cannot be maintained, and any beets not processed will rot and be lost to production.

Sugar beets weigh 2-3 lbs. (0.9- 1.5 kg.), and some of the biggest byproducts to the early stages of the production process are dirt and rocks. Obviously, processing dirt and rocks is tough on equipment and leads to a variety of maintenance problems.

ACS realized, several years ago, that they were not maintaining their assets. In fact, they were decapitalizing their asset base. Maintenance budgets were held steady in dollar terms with the idea of absorbing inflation from year to year. With the help of a consultant, the ACS engineering and maintenance staff developed a strategy, which included a five-year plan for maintenance improvement. To develop this strategy, they did an assessment of each plant and realized they had deficiencies in:

- Staff Development
- Organizational Structure
- Planning and Scheduling
- Information Systems (CMMS)
- Equipment Database
- Maintenance Engineering

when compared to world class maintenance organizations.

The audits also showed that like most organizations, ACS had several strengths in the areas of:

- Cost Control (Budget Minded)
- Cost Distribution
- Need for Improvement was Widely Accepted
- Healthy Employee Attitudes
- Strong Cooperation With Production

As they started to prepare for the future, staff members attended the October SMRP conference. While there, they heard presentations from SMRP member companies that had made

significant progress and were performing at a world class level. Just as important to them, they also met other attendees who faced similar problems and had the same frustrations they did in communicating the need for change, getting investments for maintenance improvement, and implementing improvements in their information management systems.

They also visited the Alcoa Mt. Holly facility that has been recognized as having some of the best maintenance systems and processes in the world. A Phase I stage of staff education on maintenance was begun, and various attempts were made to generate awareness that changes needed to be made.

Armed with this information, an aggressive implementation plan was developed. The plan showed that significant improvements in production capacity could be made by eliminating downtime, resulting in greater revenue potential, plus savings in maintenance efficiencies of several million dollars spread over several years.

It sounds like ACS was on the road to a "typical" success story. They would start vibration and oil analysis, buy a new CMMS and generate the millions of cost savings they predicted.

The executive committee turned the proposal down flat and would not make any additional investments in maintenance. Unfortunately, sugar prices had dropped from 23.5 ¢ per lb. to 19.5 ¢ per lb. The executive committee felt like this was not a good time to make additional investments.

This could have been a situation in which the group who proposed a new paradigm for maintenance gave up or decided to wait until next year to make the same proposal. However, the ACS maintenance staff decided they could make significant improvements without capital investments. With the savings they generated, they could make investments in the technologies or processes they needed to make additional improvements.

ACS decided that they could really improve the planning and scheduling process with little or no investment. They calculated the savings from planning and scheduling would be sufficient to make investments in other maintenance technologies. Furthermore, the successes in planning and scheduling would build momentum for future efforts. Finally, the workforce would benefit from improved morale due to a better planned environment.

American Crystal Sugar's Maintenance Department...

ACS had five plants, according to the audits, two were considerably worse than the others, and therefore represented the largest opportunities for improvement.

ACS had people they called planners, like many facilities do. These positions were initiated with the introduction of the company's ERP system that was produced by SAP. In fact, each facility had one planner, but that planner was responsible for 40-80 craftspeople. The 40 were during a campaign (production) and 80 during a maintenance outage. The planners were also responsible for being the IS (Information Systems) support people and generating a variety of reports. They were considered to be the experts in the maintenance department on the company's CMMS. In reality, very little planning and scheduling took place.

In order to increase planning and scheduling capabilities, the responsibilities and capabilities necessary for the job had to be reestablished. A second planner was added at each factory. This person was taken from the maintenance crafts group, so there was no increase in head count. Some resentment occurred in the early stages over this decision. There was a perception that the planner position was "cushy." However as time went on, other craftspeople saw that the planners worked hard, and the resentment subsided. Planners receive slightly more pay/hour than craftspeople. At two factories, a third planner was eventually added. ACS continually evaluates "Planner Capacity" and performance.

The planning and scheduling group received a generous amount of training in order to increase their capabilities. They attended a week-long planning and scheduling course, learned about "coaching," and were trained on "Best Practices." Separate training was provided to crew leaders and supervisors who needed to understand and participate in the planning and scheduling process.

With a focus on planning and scheduling, the amount of scheduled work has increased by a factor of 2.5 at one site over a 5-year period. ACS has not conquered all of their reliability problems, however they've made huge progress. They still have some downtime during their 250 days of production, but they now schedule nearly 60% of their downtime hours as compared to only 10% a few years ago, and their downtime hours have fallen by a factor of three.

ACS has also improved their scheduling for outage periods. Before the emphasis on planning and scheduling, outages often resulted in missed start-up dates and budgetary issues. Then, ACS tried to schedule

three months of outage, but found this extremely difficult due to the huge number of variables over that period of time. Now, they use the same system as they do for maintenance during operating times. All projects to be completed during the outage are added to the backlog. The goal is to reduce the backlog to zero at the end of the outage. The outage is scheduled in 2-week blocks of time.

Planning and scheduling was not the only point of emphasis for ACS. They started several training programs to change their culture from reactive to proactive maintenance. Maintenance worked on changing its image within the company from "necessary cost" to "supplier of capacity." Maintenance technical basics were provided to craftspeople emphasizing "how and why" versus "that's the way we've always done it." The goal of the training program was to produce an attitude of maintenance excellence.

Other improvement initiatives included reduction of inventories, better use of their CMMS, development of metrics, and a maintenance engineering effort that would later implement predictive technologies, PM program development, lubrication programs, and root cause failure analysis.

As a result, ACS sees its costs declining, improved workforce morale, improved factory operations and reduced downtime. When downtime occurs, it is planned. While many maintenance organizations see short term increases in costs to attain greater results at a later point in time, ACS accomplished this without increases in their maintenance budget. It has probably taken ACS more time to reach higher levels of maintenance efficiency since their executive committee didn't allow them to make investments.

American Crystal Sugar's maintenance department realizes that they've got plenty of room for improvement in the future. In fact, they were concerned about hosting SMRP representatives from many world-class maintenance organizations at their facility because they didn't feel they measured up in every way.

Thank you ACS for sharing your story with us. It's a great one and illustrates how improving one basic maintenance element, planning and scheduling, can result in significant maintenance savings that can then be invested in other maintenance initiatives, and that if the maintenance leaders are dedicated to the goal of maintenance excellence, huge improvements can be made without increased maintenance cost and investment.

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Are You Fully Utilizing Your SMRP Membership Benefits?

Not unlike buying a new piece of software, you may have made your initial decision to purchase a SMRP membership based on fulfilling an immediate need. Like the software, once the immediate need was met, you may never have taken the time to investigate or utilize the other features of your purchase which most likely would result in a higher return on investment. For example, you may have initially joined SMRP to attend the annual conference. No doubt a great investment. But, have you fully utilized the other benefits that come along with your membership?

As most of you know, 2002 marks the ten year anniversary of SMRP. We've come a long way in building a strong membership base over the past decade. Now we'd like to see all of you become more involved in your association. Unlike some associations, SMRP grew from the grass roots level—a society built by practioners, for practioners. This statement defines the future of SMRP. The society is owned and operated by each of you. The success or failure of our group depends on your commitment. Commitment comes in many forms.

First, become *familiar with the benefits* that come with your membership (See page 5 for Refresher Course In Membership Benefits.) and make a commitment to participate as much as possible. If you only attended one workshop last year, make a commitment to try to attend two this year. Likewise with executive meetings. Why? Communication is essential to any healthy relationship, and two heads are always better than one. To grow stronger we need input. What's going on in your industry? What's going on at your plant? What can we do to make maintenance a better place to work? What would we like the future of maintenance to be? What can SMRP do to help us achieve these goals?

There's nothing more exciting than to *attend an executive meeting or workshop* and see someone make a comment that is the equivalent of lighting a slow burning fuse. You begin to see wheels spinning, one idea leading to another, and the end result can be a new initiative. Networking on a small level can do wonders for increasing your appreciation for your industry and your job.

Be proud of your association. Show your pride by listing the Society for Maintenance and Reliability Professionals on your resume. If you speak at a conference or publish a paper, be sure to list the association in your biography. It increases the association's exposure and elevates the level of importance of the Society in the reader's mind.

Share information. If you have information which you believe would be helpful to SMRP members, consider sharing it through the newsletter. Each issue of "Solutions" carries a feature article on a maintenance related topic. As well, we're interested in starting a column on pertinent happenings in the maintenance industry. Got news? Share. Time is probably an issue. That's where the SMRP staff at the home office can help. Just call (800) 950-7354 and ask for the news desk. They'll be happy to help you develop your article.

Encourage membership. Make it a goal in the upcoming months to encourage at least one other person to join SMRP. Word of mouth is the best form of endorsement. As our numbers grow so does our voice in the industrial community.

The poet John Donne wrote more than 300 years ago, "No man is an island, entire of itself; every man is a piece of the continent, a part of the main." We all live in a web of connections with other people. Within that web we have rights and responsibilities. Over the next days and months we challenge you to explore your rights and responsibilities as a SMRP member.

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SMRP Certifying Organization (SMRPCO) Sustaining Member Program

The SMRP Certifying Organization has developed a sponsorship program for companies or organizations wishing to provide support to the mission of SMRPCO. For an annual contribution of \$1000, the following benefits are offered to sponsoring organizations:

- A 20% discount is offered on certification examination and triennial recertification fees to all company employees. The fee for an employee exam will be \$200 compared to the regular fee of \$250. The recertification fee will be \$100 compared to the regular fee of \$125.
- Examinations may be held at company sites by funding only the cost associated with SMRPCO administration and travel expenses. Firm not-to-exceed pricing will be provided. If several employees at a site are interested in taking the exam, you will find this option very cost-effective compared to having employees travel off-site for examination at scheduled SMRPCO venues.
- A company representative is invited to serve on the SMRP Advisory Council. The Advisory Council is formed of SMRP Sustaining Members and the SMRP Board of Directors. The Advisory council meets annually to provide input and feedback into the future direction and goals of the SMRPCO certification process. The annual Advisory Council meeting is normally held in October of each year in conjunction with the SMRP Annual Conference.
- Your company will be recognized as a SMRPCO sustaining member in SMRPCO newsletters, Internet sites, and other appropriate industry publications if your permission is granted.
- An annual report of aggregated exam skill area results for your employees who have taken the exam will be provided. The data will be an aggregate of the results of all employees and should provide information about the strengths and weaknesses of your maintenance and reliability leadership development programs. A minimum of ten employees' data is required before this analysis is performed.
- In the future, results comparisons with your company and industry will be developed. Quartile data on skill performance will be provided once sufficient examination data is available to develop blind aggregate data that ensures the confidentiality of each individual company.
- A plaque, recognizing your company's support to SMRPCO will be provided for display at your offices.

For an application call 1-800-950-7354.

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Boost Your Image

As a demonstration of SMRP's ongoing commitment to expand opportunities for its members, we are proud to invite you to participate in our newly developed Professional Services Directory.

Offered to SMRP Executive Members exclusively, it provides suppliers, consultants and other applicable executive members with an excellent opportunity to remind the entire SMRP membership of your company and its support of SMRP.

The Directory will appear in each issue of the SMRP quarterly newsletter "Solutions." It will be comprised of what is sometimes referred to as "professional cards." (See page 2 for an example.) All insertions will be of uniform size—3 3/8 inches wide x 1 1/8 inches tall (86mm x 28mm). Insertions are limited to one, per issue, per executive membership. Cost is \$ 250 per insertion with a 10% discount if four insertions are purchased at once. Closing dates are: December 1, March 1, June 1 and September 1. Black and white only.

For insertion information call 1-800-950-7354.

Become Certified At Your Convenience

Have you missed the opportunity to sit for the SMRP examination for Certification in Maintenance and Reliability Management because of schedule conflicts? We've got the solution. Now you can sit for the exam at your convenience and in complete privacy at SMRP's home office in Knoxville, Tennessee. For complete information on remaining 2002 exam sites or to schedule your own private sitting call 1-800-950-7354.

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