Process Plant Reliability

and

Maintenance

for

Pacesetter Performance

by Rex Kenyon

PennWell®

Contents

Preface

This book is written at the request of our clients. They have asked many times, "Is there a book we can read that explains what you are doing to help us? Is there something we could read that pulls it all together? There should be something out there."

My response has always been, "We have not found one yet, but let me draw you a picture of how we see it all fitting together." One picture is our simplified model for routine maintenance work processes included in this book.

This book focuses on maintenance, reliability, work processes, and the appropriate metrics. Regardless of your particular business focus, you need to understand the basics of your business if you are in it for the long haul. If you understand your business well, you can develop a simplified business model for it and chart your path forward.

This book covers very basic concepts. It should not take more than an hour or two to read. I would also recommend that after reading through the entire book quickly, you then study the concepts and think about the model we have presented.

The book is pretty simple, but someone needed to write it. It represents one path torward attaining maintenance and reliability pacesetter performance in the manufacturing arena.

How To Use This Book

If you choose to make the suggested improvements on your own, I would recommend that you quickly read through the entire book. I would then recommend that you reread the section on benchmarking (chapter 1) and use that information to determine where your largest gaps exist relative to attaining pacesetter performance. Contact external benchmarking services if you do not know how your performance relates to that of your competitors.

Once you have benchmarking data, reread and follow the guidance in the various chapters that align with your largest performance gaps. These are areas where you have the largest opportunities to reduce costs and increase reliability.

With each gap you attack, make sure you reread the appropriate chapter that addresses the gap as well as the chapter on metrics (chapter 5). Monitoring metrics relative to these gaps will drive the behaviors and work processes that will generate the desired results.

Make sure that you identify the work processes that will deliver the results you desire. Make sure the work processes and metrics are not only necessary, but also that they are sufficient to give you the results you desire.

Once a work process is in place, begin gathering the data for the metrics to monitor performance and reinforce the necessary work processes that will drive your desired results. The work process metrics will be the bellwether indicators for the results you desire. Do not forget to track the results metrics.

Should you go it alone? Sometimes it is necessary. Sure—we could probably help you go faster, and we would do so if you requested, but our services are expensive. Your size of the prize has to be large to get us involved.

Are there any concerns on my part? Not if you follow through. We know that results will come if you follow our process and stay the course. We have guided many organizations and facilities through our process, so we know it works. That is one of the significant benefits we bring to our clients. My only concern is that you might not have

the confidence in the process and might not stay the course long enough to see the results. If you have questions or concerns, call us. Our phone number is (909) 288-7027. (If you call, please remember that we are in the Pacific Standard Time.)

Introduction

Fortunately for most people, we are not talking about rocket science in this book. Top performance in any activity requires that those involved do the things they already know should be done. Unfortunately, too many people just do not seem to have the time to do the right things at the right times. We hear comments like:

- "I think it is the *meetings*."
- "It's *meet-o-rama*."
- "I'm the *meeting-meister*."
- "*Meet-o-mania*."

The discussion in meetings is not important. It is the *doing* that is important…whatever *it* is. That is pretty much the case in all we do in life.

Industry now has meetings for everything. A client (manager) told me one time, "You get to do the fun things—making it happen—and I am tied up in the office all day in meetings. I wish we could switch jobs!"

Table 1–3 Sample Benchmarking Data: Turnaround Maintenance (Cost Data)

	Benchmark Data							
Production Plants/Lines	Unit Size (M#/Hr) (MB/D)	Avg. Age (Years)	Mechanical Availability	Annualized Turnaround Maintenance (M$)	Last Actual Turnaround Cost (M$)	Annualized Last Actual Turnaround Cost (M$)	Next Turnaround Planned Cost (M$)	Next Turnaround Annualized Cost (M$)
Unit A-1	75	24	97%	$2,000	$ 9,000	***$3,484***	$ 7,000	***$ 2,710***
Unit A-2	90	24	97%	$2,400	$ 5,500	***$2,276***	$ 5,300	***$ 2,193***
Unit C-1	50	19	94%	$5,000	$17,000	***$6,182***	$13,000	***$ 4,727***
Unit C-2	60	19	94%	$6,000	$23,000	***$8,364***	$21,000	***$ 7,636***
Unit C-3	70	19	94%	$7,000	$21,000	***$8,400***	$33,000	***$13,200***
Unit D-1	45	15	98%	$1,200	$ 4,300	***$2,150***	$ 3,400	***$ 1,700***
Unit D-2	35	15	98%	$ 933	$ 2,700	***$1,350***	$ 3,100	***$ 1,550***

Notes:

1. *Fall-downs or short duration turnarounds are included in the routine maintenance category, not the turnaround costs.*
2. *Annualized data is calculated by taking actual maintenance costs or projected maintenance costs and dividing it by the number of years between turnarounds (intervals).*
3. *Data for the intervals comes from the previous table for turnaround durations and intervals.*

inactivity for an operator—especially during the nighttime hours and weekends. If you have an opportunity to go into a control room of an industrial facility, take a look around and you will see what I mean. Pacesetters attempt to minimize these inherent inactivity periods by implementing total productive maintenance concepts.

EMERGENCY REPAIRS

Industry data indicates that work completed on an emergency basis is the most expensive way to do routine maintenance. It also has the lowest reliability of any repair that is made. An emergency repair will more likely require rework than a job that is well planned and staffed appropriately with the right people and correct repair parts.

EXCESSIVE REPAIRS

Excessive repairs are sometimes due to rework from emergency repairs and to what we refer to as *worst-actor equipment*. We discuss the concept of worst actors in chapter 4, "Reliability." The issue regarding worst actors is the need to eliminate the

actual maintenance activities. Many operator activities can overlap the maintenance activities if the critical path schedule looks at the entire feed-out to feed-in processes. Focusing on this area can provide significant potential for reducing total facility downtime.

It is important for a facility to have a turnaround philosophy in place to cover how the facility will conduct its turnarounds (including the plan, schedule, execution, and capturing any lessons learned). It should address the use of benchmark data and objectives include the following:

- Strive to attain longer runs for processing units (longer intervals between turnarounds).
- Do not open equipment on a turnaround to "just take a look." Have valid reasons to open equipment as this will only extend turnaround duration and add to the manpower resources required for the turnaround.
- Analyze all failures and repair them appropriately to prevent recurrence.

at a site. And during these debates, they have not started to address a single worst actor since they cannot agree on a definition.

We also see clients that are 6–12 months into implementing a reliability computer program and are gathering data to identify their worst actors. They are usually a couple of years away from starting to address their worst actor equipment while they wait for the data to accumulate for their analysis!

Whatever computer program you choose, we suggest that a parallel effort be established to select your worst actor equipment. We would recommend that you ask your operators and mechanics for a list of the worst actor equipment—the things that bother them the most. Their list will probably contain 80–90% of the worst actor equipment. Then, get on with solving some of the problems while you begin to gather more accurate data with your new computer system. You will be a couple of years ahead and impact your plant reliability now if you take our advice and follow Nike's slogan—"Just do it!"