

THE 10 STEP METHOD FOR BECOMING A  
**RELIABILITY LEADER**

*by Ricky Smith and Brian Pertuit*

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## Preface

*This book was designed to provide SMART <sup>(1)</sup> (Specific, Measurable, Achievable, Relevant and Time-based) steps with succinct guidance to industry practitioners seeking to become Reliability Leaders. Being a true "Reliability Leader" is far more than simply studying for and passing an exam, or gaining a title someone has granted you on a certificate or in a job description. It's a peer to peer respect level that must be earned through a body of work that hard working people are striving to achieve through their concerted efforts around the globe. We are learning from each other, every day and on every job. Benchmarking and sharing best practices in safety, environmental awareness and reliability has never been practiced at the levels we are now experiencing throughout a broad spectrum of industries. It's through our desire for continuous improvement in asset and work management that we achieve stellar uptime performance while becoming more efficient and less wasteful. The added benefits of reducing injuries, our carbon footprint and repair expenses while leaving our environment better than we found it is at the heart of it all, unbeknownst to many. It is therefore a fertile time for Reliability Leaders to strive for Operational Excellence in everything they do within the span of their control and beyond. Those of us who have come to understand this also have a responsibility to mentor the younger talent within reach, and help mold our future Reliability Leaders.*

*Ricky Smith and Brian Pertuit both served the United States of America in the U.S. Army throughout varying Battalion Maintenance Operations (BMO) assignments while on active duty. They've both learned asset and work management principals at an early age utilizing a Preventive Maintenance Checks & Services (PMCS) system approach, once considered "best practices" in both military and industrial applications. Today, our industry would consider Reliability Centered Maintenance (RCM) in the same regard. Having lived through, learned, practiced and taught the evolving asset and work management best practices since then, they were poised to co-author and release this book in the [Reliabilityweb.com](http://Reliabilityweb.com) "Keeping it Simple" series as a guide for others who may desire to become true, process driven Reliability Leaders.*

(1) From [Wikipedia](https://en.wikipedia.org/wiki/SMART_criteria), the free encyclopedia:

SMART is a mnemonic acronym, giving criteria to guide in the setting of objectives, for example in project management, employee-performance management and personal development. The letters S and M usually mean specific and measurable. The other letters have meant different things to different authors, as described below. Additional letters have been added by some authors.

SMART criteria are commonly attributed to Peter Drucker's management by objectives concept.[1] The first-known use of the term occurs in the November 1981 issue of Management Review by George T. Doran.[2] The principal advantage of SMART objectives is that they are easier to understand and to know when they have been done.

## About the Authors



**Ricky Smith, CMRP, CPMM, CRL** is a well known expert in Maintenance and Reliability Leadership as a writer, speaker, and trainer. He's trained hundreds of Maintenance and Reliability Leaders in the U.S., Australia, New Zealand, Canada, Belgium, Italy, Saudi Arabia, Oman and many more locations throughout the globe. He has authored and co-authored many books in Proactive Maintenance and Reliability Best Practices which have taught millions of readers the fundamentals of Proactive and Optimized Reliability in over 18 countries around the world; many of whom are considered Maintenance and Reliability Leaders today including Brian Pertuit, his co-author of this guide to becoming a Reliability Leader. This book was therefore written from the perspectives of both teacher and student Reliability Centered Maintenance subject matter experts intended for those seeking to become reliability leaders.

Other books Ricky has co-authored include: Rules of Thumb for Maintenance and Reliability Engineers, Root Cause Analysis Made Simple, Lean Maintenance, Planning and Scheduling Made Simple, Preventive Maintenance Made Simple, Lubrication 101, Metrics/KPI's 101 and many more.

Ricky is a U.S. Army decorated Iraq War Veteran, having recently served overseas as a Maintenance Company Commander. Ricky began his maintenance career in 1972 in the U.S. Army as a Maintenance Professional which established his foundation in Proactive Maintenance at a young age. Ricky trained new officers in leadership skills for 3 years as a tactical officer at Officer Candidate School. Ricky has worked as a Maintenance Professional for Exxon Company USA (Maintenance Technician), Alumax Mt Holly (Maintenance Technician), and Kendall Company (Global Maintenance Engineer), and other assignments as both an owner representative and a consultant.



**Brian Pertuit, CMRP** is the Manager of Reliability & Maintenance Planning for the Louisiana Offshore Oil Port (LOOP LLC). Brian's Department partners with Operations & Maintenance in ensuring uptime of highly critical equipment at LOOP and LOCAP including large rotating equipment, electrical systems, metering equipment and more. LOOP won the Uptime Award for Best Work Execution Management at the International Maintenance Conference in 2014 based on related successes after achieving 99.75% uptime on the main oil line equipment and reducing repair expenses significantly. Brian, along with LOOP's Vice President of Engineering & Technology, Chris Labat, CMRP, co-authored a Striving for OpEx in Work Execution Management article in the April / May 2015 edition of Uptime Magazine. LOOP later won the 2016 Best Green Reliability Award based on additional environmental and energy efficiency successes which was presented at the International Maintenance Conference in December 2016. Brian and Chris again published a related article which was featured in the June / July 2017 Uptime Magazine. LOOP has a great culture with top industry professionals and technicians focused on continuous improvement. The Supervisor of Reliability Planning in Brian's Department is David Martin, CMRP; who also co-authored the aforementioned Lubrication 101 and Metrics/KPI's 101 books with Ricky Smith.

Like Ricky, Brian is also a U.S. Army veteran having served stateside and overseas in Battalion Maintenance Operations (BMO). He started as a soldier and Diesel Mechanic over thirty years ago in 1986, was stationed in Germany and later returned home to Louisiana to attend college while working as a technician and serving in the U.S. Army's Ready Reserve. He graduated in 1993 from the University of New Orleans with a Bachelor of Science degree in Electrical Engineering and received an Honorable Discharge from the U.S. Army in 1994. After graduation, his career toggled from the oil field to power and back within the energy industry; both as a consultant and an operator representative focused on equipment design, QA/QC, reliability, work and asset management.

## Foreword

While we realize anyone in an organization can be a Reliability Leader, and it takes a team with a shared mindset to make a difference, this book is intended for those who are seeking guidance in becoming a true, certified Reliability Leader while gaining peer to peer respect for a body of work above and beyond their certificate. If this thought motivates you, please read on and enjoy. In taking on this challenge, you must know that becoming a Reliability Leader means being willing, ready and able to help move the culture of your organization to become a pro-active, results oriented business with a clear focus on reliability centered maintenance, uptime and continuous improvement on multiple fronts.

To help facilitate a positive cultural shift often means change, and change must be managed. Management takes leadership, and thus you are called to lead. By the time you finish reading this book, we hope you'll gain the confidence to do just that along with a plan. If you are already a leader, we can only hope that we've given you a new view shed of your leadership responsibilities and some helpful ideas regarding goal setting for yourself and other leaders in your work groups for continuous improvement.

The ten steps offered in this book are not sequential, but rather building blocks to help structure your leadership development. Thus, many of these steps can be performed in parallel, simultaneously streamlining your path to reliability leadership.

The Forbes "Quote of the Day" on March 31, 2016 when we began writing this book was very relevant:

*"There is nothing like knowing you have a real opportunity to affect the future in a positive way."*

*by Tisha Johnson*

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**CHAPTER I**

**Step 1 - The Motivation, Why become a Reliability Leader?**

### **i. Benefits and Rewards {WIIFM}**

In today's world, we tend to focus on "What's In It For Me?" (or WIIFM). Often, however, employers view this as a negative attribute as it seems self-centered. As it pertains to choosing and developing a career path, it is an appropriate question one must ask. We create our own destiny, and planning is a vital step that is often missed or not well thought out. Like a ship's Captain, we must plot the course before we set sail with a clear direction. This chapter focuses on the reasons one should consider reliability leadership in their career path. If you are indeed motivated by the related potential, plot your course accordingly.

The decision to become a Reliability Leader should only be made, however, after significant research in the field of Reliability Centered Maintenance is performed and a candidate is comfortable with the subject matter enough to make an informed decision. This decision has proven to be a very sound one, and for many of us has resulted in becoming better employees who are self-motivated to facilitate continuous improvement through stellar asset and work management practices along with other leadership initiatives that benefit from a similar proactive approach.

Some benefits and rewards of becoming a Reliability Leader include;

- becoming a successful leader, proven through metrics and KPIs (e.g., reduced repair cost, improved uptime, PM schedule compliance, etc...) thereby adding value to your company
- improving system efficiencies and reducing waste, thereby increasing related profit margins (there are many of these win-win opportunities throughout industrial facilities)
- leading your organization on the right path in pertinent programs such as asset utilization and optimization, equipment safety, energy efficiency and environmental stewardship
- researching and adopting the latest technological advances in condition monitoring and asset health management
- obtaining positive results in assignments from other leaders and self-implemented programs, adding justification for employment retention



- improving your proactive skill sets and credentials making yourself attractive to employers when seeking employment, and/or other departments when seeking promotion or transfer
- gaining the respect of your peers and colleagues, not only within the inner circles at your company, but throughout your organization and potentially throughout industry
- creating job security, and the foundation for a solid career
- your aspirations and dreams can unleash unlimited advancement, **control your own throttle!**

## ii. Drive, Passion and Strong Work Ethics

A Reliability Leader must possess these traits to become a true leader. They will help you succeed in all aspects of life, however, not just with your career. Throughout your lifetime others will watch and learn your behaviors, regardless of whether they're good or bad. A leader creates a pull environment by giving positive examples, thereby leading others to follow in performing those same positive behaviors. Becoming a true Reliability Leader will drive you to develop and cultivate these traits further, thereby improving your individual performance. Others will in turn follow your lead, improving the overall team performance. This is what leaders do.

Billy Cox (a famous professional baseball player from 1941-1955) was quoted as saying "*The two things in life you are in total control over are your attitude and your effort*". Possessing a drive to succeed, being self-motivated to improve processes, being passionate about your efforts and having a strong work ethic are all pertinent traits of successful leaders in all aspects of life. This is especially true in Reliability Leadership, as it's based on a pro-active approach to asset health management that is results oriented and has a continuous improvement component that cannot be ignored or avoided. Status quo is never acceptable, as today's success often becomes tomorrow's stalemate due to improved technology, changes in operational context and/or aging assets and systems. We cannot stand aloof while our critical assets run themselves to failure. Thus, having a strong drive, passion and work ethic is required or you'll burn out before you can even make a significant impact.

Transforming lessons learned from failures into corrective actions to prevent future, repeat failures requires leadership. Thus, a successful reliability program requires a leader that motivates others to pay attention to detail in failure

reports and PM / PdM enhancements to identify and prevent these common failure modes on like assets. Needless to say, this type of program will die on the vine without leadership at every milestone along the journey.

There are leaders in your work groups who are leading by example every day through their hard work, sense of urgency and attention to detail. Their call to duty each morning drives them to success. These are the ones who will make the best Reliability Leaders, bar none, and many currently are; even if they're not deemed as such by others. Emulate their work ethics in your work assignments. Become a high performer, and help to make others better through your own examples and work practices. Envision yourself as a leader, and stay on course to lead with a positive example when opportunities arise. Often times, this means taking the time and energy to be self-taught on many fronts. If there are reliability centered maintenance topics you're weak on, buy related books and read them with focus. Develop a thirst for knowledge, and study the areas you are not sure about to gain confidence. Always be sure to carry the book learning to the field or shop application that it's relative to, so you get a horse sense about the topic. Implement improvement initiatives as you learn more about them and/or find such opportunities. Be sure to establish metrics to track related improvements.

In Step 9 of this book, Continuing Education, we discuss "When to Learn What and How Often". Knowing what you don't know (or figuring that out through conferences, seminars, webinars, magazines, books, the internet of things and other media) and focusing your learning on areas that will strengthen you as a Reliability Leader through proven results in the field is the key to unlimited potential.

Some leaders may debate the point that the elementary leadership traits of drive, passion and strong work ethics are attributes that are not coachable. Thus, from a SMART goal perspective they would argue that you cannot set a timeline to attain them as one has to somehow be born with them or raised a certain way. We believe, however, that through hard work and dedication to duty everyone can do whatever it is they set their mind to do (*recall the Billy Cox quote regarding attitude and effort being within our control*).

#### **STEP 1 - S.M.A.R.T GOAL**

**Set a goal to improve your drive, passion and work ethics towards becoming a Reliability Leader (as needed in your own assessment) within**

**six (6) months of reading this book.** You'll be amazed at what clear focus and self-awareness can do to improve your performance as a developing leader. Put yourself in a fish bowl within your own mind each work day. Watch how you interact with others, as well as how timely and efficiently you and your team are completing work assignments given to you or your group. Continuously strive to improve as a leader, seek to remove waste from your processes and streamline work activities to gain efficiency. Become more proactive and less reactive, and coach others to do the same. Consider developing and tracking related metrics or Key Performance Indicators (KPIs) to assist you when you find such opportunities. Become self-taught in reliability centered maintenance topics that you are anemic in, and attend training when possible to gain both knowledge and confidence.

Implement what you learn, and teach others. Unleash the Reliability Leader within you, and lead by example daily. Inspire others to follow in your footsteps, as that's what leaders do characteristically.

## **CHAPTER II**

### **Step 2 - The Preparation, What will it take?**

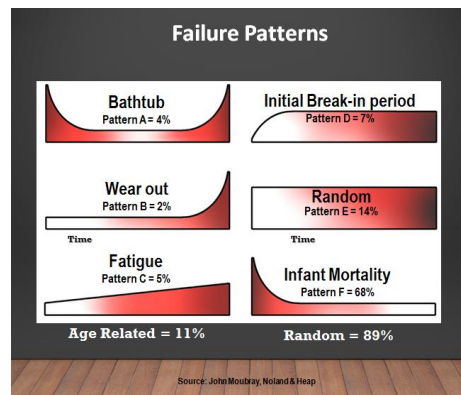
### i. Skill Sets and Credentials

From a skill sets perspective, we cannot emphasize enough the importance of understanding the assets you are charged with managing as a Reliability Leader. Being in person at the factories, in the field and at various repair shops to experience first-hand the following asset related activities is invaluable:

- asset and system design
- design purchasing specifications
- equipment manufacturing, assembly and testing
- equipment installations and precision alignment
- pre-start up safety reviews (PSSR)
- bench marking, and on-line condition monitoring
- preventive maintenance
- troubleshooting
- root cause failure analysis
- teardown inspections
- failure reporting
- turning lessons learned into corrective actions

These crucial activities help build the foundation of your ultimate success as a Reliability Leader. If you have not had opportunities to perform any or all of these asset related work activities, we recommend you start to participate and learn the intricacies involved when possible and within your work schedule.

One key to being a good reliability leader is understanding failure patterns. There are various failure patterns as depicted in this chart by [John Moubray](#).



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As you get involved and familiar with the recommended asset related work activities, you'll come to understand these failure patterns at a detailed level.

If you are currently seeking employment and considering the Reliability field for the first time, search for job listings that have these roles and responsibilities as they will most certainly set you up to succeed as a Reliability Leader down the road. Whether you're seeking a new related position, or working now in the Reliability / Maintenance realm, look for leaders who possess these skill sets within your circle and ask them to mentor you.

While some in industry today believe that back in the "old days", operations ran equipment until it broke then maintenance fixed it (so there is limited pro-active knowledge you can learn from the old timers in their minds), this couldn't be further from the truth. Only with the help and insights of the experienced field personnel have we improved our pro-active approach to asset health management by predicting and preventing failures. You basically have to know how equipment breaks before you can fix it properly. You also have to know how it works to understand how it breaks. The *au jus* is figuring out how to prevent it from failing in the first place. That's euphoria for reliability leaders.

There is a plethora of knowledge in the minds of hard working Maintenance Technicians, Supervisors and Field Operators that we'll lose when the baby boomers retire if they don't take younger workers under their wing and teach them these common sense aspects to maintenance and repair. In essence, you should study how the various assets (*especially critical assets*) in your facility work, then strive to gain a better understanding of how these same assets fail. Don't stop learning until you, or a team of you, succeed in preventing repeat failures on all like assets.

There is also the engineering aspect of how equipment is specified and designed to operate within its operating context. Some have named this concept as designing for reliability. There's another important aspect in designing for maintainability; when possible installing stairs and landings with hand rails in lieu of caged ladders, for example. Studying design drawings, operations and maintenance (O&M) manuals and possibly your companies maintenance manual, as well as spending time with both field and design staff are all opportunities to gain knowledge and understanding of the equipment within your span of control. Use common sense, and never underestimate the knowledge of others and their ability to add value to your understanding of asset reliability.

Once you've gained a good understanding of how your equipment is designed, how it works and how it fails, the next challenge is to verify that related Preventive Maintenance (PMs) procedures are in place to address these failure modes for all like assets. This historically has been the key to success in asset health management from a "preventive" measure stand point.

Things like proper lubrication using ultrasonic greasing and improving oil quality (*notice I didn't say oil changes, as filtering techniques have come a long way in using oil for longer run time intervals by improving its quality – check into oil condition monitoring and quality improvement programs using modern filter carts*), standard PM intervals recommended by the O&Ms, cleaning contacts and other such activities are all routine preventive maintenance measures designed to prevent failures. Audit your PMs to verify they're not simply repeating intrusive maintenance tasks that do not prevent failures. Eliminate the waste, and lean out the process for your Preventive Maintenance Program. Learn how to properly maintain the equipment in your facilities to prevent failure.

Today's best practices take asset health management a step further with the onset of condition based monitoring and predictive maintenance procedures (PdMs). Refer to the asset life cycle and Potential for Failure (P-F) curve in Appendix i. We now understand that assets can fail while in service by not performing as designed within their operating context prior to reaching full functional failure. Performance testing (e.g., flow rate for a pump, timing test for a breaker) and condition based monitoring techniques (e.g., vibration analysis, oil analysis, thermography, ultrasound, etc...) help to identify early signs of failure. This allows operators to act by preventing failure before it occurs.

Thus, gaining credentials in predictive analysis is essential to becoming a true Reliability Leader. Keeping up with on line condition monitoring technology, leading programs to improve asset uptime and prevent failures are success stories that many leaders in our industry share in common.

Applying related lessons learned to address like assets in all systems, and/or facilities, within your span of control is where you really hit pay dirt. Reference one of Ricky Smith's (*co-author*) books which was written with Bill Keeter titled FRACAS (*Failure Reporting, Analysis and Corrective Action System*) for tricks to the trade. Understanding and implementing this system is a key credential you'll need to possess as a true Reliability Leader in today's ever-changing world of asset health management.

## **STEP 2 - S.M.A.R.T GOAL 1**

**Set a goal to gain some or all (*as needed in your own assessment*) of these recommended equipment reliability fundamental skill sets and credentials along with a good understanding of how your equipment works and fails within two (2) years of reading this book.**

Participate and lead factory, field and shop asset health management activities as often as possible to gain understanding of how the assets in your span of control are manufactured, function or work, break, are repaired and installed properly. Seek to improve purchasing, design and repair specifications, soft goods and/or metallurgy specifications, preventive maintenance and predictive applications. Apply FRACAS when appropriate, and gain a sound foundation for becoming a true Reliability Leader.

### **ii. Education and Experience**

The benefit of advanced, secondary education (e.g., from colleges and/or technical institutions, etc...) versus on the job experience or training (OJT) is often debated. A great answer to the question "*Do you get more out of advanced education or OJT?*" is YES! The confused look that results is the opportunity before you to explain yourself, as they're both great learning opportunities for different reasons. Both secondary education and work experience contribute greatly to the knowledge base for Reliability Leaders, in general.

Some employers actually equate four or five years of OJT to a year of college, so an employee with say twenty years of relevant experience in mechanical equipment may be considered for a mechanical engineering position though they don't possess an engineering degree. Other employers are more careful with the word "Engineer" in a job title for liability concerns, but may consider years of experience when filling Specialist and Technician positions.

The U.S. Army has a rank titled Warrant Officer, given to soldiers who've earned the rank through years of OJT as enlisted personnel and who have become technical experts, promoted through the enlisted ranks and served with dedication to duty and exemplary service but may have never been to college. They're hand selected because of their technical expertise, and are invited to



attend Warrant Officer Candidate School (WOCS). All other “Officers” in the U.S. Army have graduated college and successfully completed Officer Candidate School (OCS). This shows how important OJT is for the U.S. Federal Government, as they’re willing to promote candidates as Officers without a college degree due to their technical expertise, having become a subject matter expert (SME) of sorts in their field and proving themselves as very valuable to the organization.

As you may have caught in the tongue and cheek answer to the related question earlier, we believe that both education and experience are needed for true Reliability Leaders to be successful. Technical institutions teach a wide variety of skills that directly relate to asset health management. There are also fully accredited colleges today, such as the University of Tennessee (UT) and others, who offer elaborate Reliability Curriculums that many of us didn’t have the privilege of attending, but wish we did. We believe, therefore, that this type of curriculum and degree would be a great foundation for Reliability Leader candidates to consider, though a 2 year technical degree in the field of choice is not a bad decision either. Engineering curriculums help as well, in particular the Mechanical Engineering, Electrical Engineering, Petroleum Engineering (*for oil field or petroleum product careers*) and Industrial Engineering disciplines. Just as with Leadership Certificates, however, degrees of any type are pieces of paper representing your ability to learn. Applying relative knowledge in field applications, learning from the OJT you gain before, during and after secondary education is where leaders are born.

Brian Pertuit (*co-author*), once worked with a Human Resources representative to change a credential requirement in job opening descriptions for Reliability Specialist in his Department to state that a college degree in Engineering was “preferred but not mandatory” where it once was a requirement. This opened the door for recruiting, interviewing and considering existing employees and external candidates who had significant OJT and could add value to the group, but did not possess an Engineering degree.

The skill sets and credentials described in Section i. of this Chapter are mostly OJT obtained, though these concepts and methodologies are also taught at modern Universities such as UT, both as a degreed curriculum and in short term training courses and boot camps. There are many training seminars and conferences throughout the world that help educate and cultivate Reliability Leaders. We suggest you attend as many as possible within your work schedule.

The key to success in training, education and experience is to understand that we never stop learning. We learn every day, and on every job or assignment. We learn from our successes and our failures alike. Never assume you know it all, as none of us do. Be thirsty for knowledge, and hungry for experience. The bottom line, is to prepare yourself to add value in all you do.

### **STEP 2 - S.M.A.R.T GOAL 2**

**Set a goal to obtain both educational knowledge and on the job training (as needed in your own assessment) within four (4) years of reading this book. Seek to learn something relative to becoming a Reliability Leader every working day.**

It's important to note that all learning is relevant, and furthermore that you "get out" what you "put in" regarding your education. Whether it's class room learning or field / shop experiences for those of you currently in the work force, you must be engaged and in the moment at every step of the way to expect to take away something value added from each session. Therefore, treat every situation throughout your career as if it's your last opportunity to get something out of it thereby adding to your arsenal of relevant skillsets and credentials.

If given the opportunity, shadow Maintenance and Operations in the field and learn from existing leaders within your organization. Remember the quote about your attitude and effort; remain positive, motivated and pro-active.

### **iii. Certifications**

As described in the *Preface*, the intention of this book is to teach Reliability Leader candidates what it takes above and beyond a certification, a degree a passing grade on an exam or two to be a successful leader. However, there are various certifications within reach of many candidates that they should consider to help validate their skill sets, credentials, education and experience among their peers, employers and/or potential employers. Often, while studying for these exams, candidates learn invaluable information about reliability leadership they may not have been exposed to prior to embarking into preparation. As stated previously, you should strive to take something valuable away from every educational experience, and preparing for an exam most certainly applies.

We've listed several related certifications in alphabetical order (*so they're not listed nor weighted by any priority or significance*), for reliability leadership candidates to consider pursuing.

- CMRP – Certified Maintenance & Reliability Professional
- CMRT – Certified Maintenance & Reliability Technician
- CRE – Certified Reliability Engineer
- CRL – Certified Reliability Leader

The internet is a great source of information for these certifications; how to pursue them, resource materials, related venues and workshops to prepare for and take the related exams. Here are a few related websites for your convenience. We apologize for any we've left out of this listing, and encourage the reader to research all of the latest websites via your normal search engines.

CMRP – by SMRP (the Society for Maintenance & Reliability Professionals)  
<http://smrp.org/Certification>

CMRT – by SMRP (the Society for Maintenance & Reliability Professionals)  
<http://smrp.org/Certification>

CRE – by ASQ (the American Society for Quality)  
<https://asq.org/cert/reliability-engineer>

CRL – by AMP (the Association of Asset Management Professionals)  
<http://www.maintenance.org/pages/crl>

CRL – workshops by Reliabilityweb.com  
<https://reliabilityweb.com/events>

### **STEP 2 - S.M.A.R.T GOAL 3**

**Set a goal to make a decision to obtain at least one Certification listed above (*as needed in your own assessment*) within one (1) year of reading this book. Seek to learn something relative to becoming a Reliability Leader while preparing for the related exam(s). These exams are often offered after or during an asset management related conference. Thus, seek to gain industry knowledge in asset management while you prepare.**

Always remember that how you are perceived as a Reliability Leader has way more weight in industry than the piece of paper that you may earn to validate your knowledge, or your ability to learn. The integrity you display in your business interactions, your efforts to add value to asset uptime and repair cost reduction and how you lead (*and treat*) others will always be weighted more-so than all other accomplishments including your certifications. Through it all, you must remain trustworthy, first and foremost.

## **CHAPTER III**

### **Step 3 - The Fundamentals, Blocking and Tackling**

## **i. Funding Initiatives through Justification**

Gaining the necessary funding for asset health management and your reliability centered maintenance initiatives is truly the key required to unlock doors that may be restricting your organization from uptime improvement and repair cost reduction. Running critical assets to failure, then spending repair expenses after the failures occur to restore the equipment back to service is obviously not the best way to fund necessary repairs as many maintenance personnel and accountants would agree with. So we should strive to identify which are our critical assets then address pending failures early, and prevent them from occurring. Parts of the equation include criticality ranking sessions, obtaining critical spares, and an overall asset strategy. Regarding the use of critical spares, we often have to perform a “swap and shop” to refurbish a failing but in service asset and return it as the new critical spare while minimizing downtime. All of this takes planning and budgeting for the necessary funds. Criticality ranking is also a key component of any good critical sparing program. Work with other cross-functional stakeholders at your facilities to determine what assets are truly critical, and spare up accordingly.

Often maintenance personnel in a reactive organization will ask, “...*how do we gain the necessary funding to move forward and properly monitor and manage our assets?*”. The trick is to simply listen to what the assets are telling you using predictive tools. Study trending in mean time between failure (MTBF), vibration analysis, oil analysis, thermography, ultrasound, performance tests and related PdMs. Please refer to Ricky Smith and David Martin’s book entitled “*Metrics/KPI’s 101*” also offered in the Keeping it Simple Series of Reliabilityweb.com books. The bottom line is to justify your asset improvement needs based on the trends you’re seeing in asset condition. Sometimes, the accountants want you to provide rate of return calculations to further justify your asset condition improvements. You can find IT tools on the internet to help by searching the web for acronyms like *IRR*, and/or *ROI* to accomplish this if and when necessary for those who’ve never had to perform this type of calculation. Asset failures that occur randomly inevitably cause unexpected production downtime, unplanned repair costs and reputational impacts. Some cost may be hard to measure, but should be discussed or presented in the case for improvement funding.

Focus on the big picture, and elevate yourself to 50,000 feet above your facilities for a bit. From a philosophical point of view, we further recommend

taking your asset health management funding initiative to both a short term prioritization and a long term view shed to help with your organization's cash flow projections. In order to do this, we suggest that you initiate an Asset Management Plan (AMP) with some fixed duration (e.g., 3, 5, 7 or 10 years) if your company doesn't already have a similar program in place. Your AMP should have a risk assessment and mitigation component as well. Justify your asset spending needs by stating "we are asking for X dollars to mitigate a risk that may cost us Y dollars if we run this asset to failure, or we are mitigating the risk of an environmental spill and/or downtime to this magnitude", etc... Be sure to factor in lead time for replacement equipment in your downtime projections, assuming you have no related critical spare. It may be the critical spare that becomes your back up plan if funding is not approved initially.

### **STEP 3 - S.M.A.R.T GOAL 1**

**Set a goal to create and deliver an Asset Management Plan within your companies budgeting process timeline, with both time and risk components included (as needed in your own assessment) within two years (2) years of reading this book. Remember to utilize KPIs and Metrics as well as Risk Assessments and Mitigation as supporting documentation for funding approval requests.**

#### **ii. Planning the Work**

*"Give me six hours to chop down a tree and I'll spend the first four sharpening my axe".*

*by Abraham Lincoln*

It's an understatement to merely state that you should plan your work when it comes to reliability centered maintenance. [Doc Palmer's Maintenance Planning & Scheduling book](#) is a very helpful guideline to today's related best practices. The efficiency gained through proper planning helps with the quality of the work performed, the time spent performing the work, the repeatability of the work tasks among various workers and the reduction of the necessary downtime of both the assets being maintained and the interconnecting systems that may be impacted.

Once the necessary work has been funded, a work order process should be followed to initiate all planned work activities. We won't elaborate on

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Computerized Maintenance Management Systems (CMMS), as there are many books that teach related best practices and many software products to choose from. The point here is that obtaining funding and opening a Project or Work Order prior to commencing work are some early steps in the planning process.

Creating a Work Plan prior to scheduling asset related work is often performed by Maintenance Planners and Schedulers or Maintenance Supervisors. Reliability Engineers and Specialist often review the related Work Plans, or draft them if the work being performed is within their area of expertise. Work Plans can be drafted in a document format, or stored in the CMMS system as PMs and/or PdMs.

PMs should be written in clear, step by step format providing maintenance technicians or specialists with all of the asset related materials and equipment they'll need for their planned work. This is an iterative process, however, and taking a printed copy of the PM procedures to the field with a red pen for mark ups is recommended. Carrying these redlines back and having the revisions vetted by supervision then documenting comments regarding the work performed in the Work Order closing process are keys to success in asset health management, an industry wide best practice.

Planning work leads to scheduling work, and proper scheduling requires a good time estimate in man-hours to perform the related work plan. Factors considered in the schedule and duration of the work to be performed include the lock out / tag out and reverse lock out tag out time, in the event of pressurized systems there are drain downs and filling and venting to consider, the actual wrench time to perform the work (including simultaneous operations) , the volume of workers on hand at the necessary skill levels per discipline, travel to and from the warehouse or store room (if applicable) for parts and pre-job safety meetings as well as meals and breaks.

Preparatory work, including pre-outage work, should be maximized to minimize the downtime necessary to perform the work at hand. This should include, but may not be limited to, getting all necessary parts, tools and equipment to the job site prior to taking downtime, a work plan review with all company employees and contractors and a pre-job safety kick off meeting. On the day of the work, a JSA (Jobsite Safety Analysis) or JSEA (Jobsite Safety & Environmental Analysis) should also be performed at which time the job hazards are identified along with mitigative measures to prevent incidents. If a repetitive,



planned job continuously running longer or shorter than scheduled, a red line of the required man-hours should be considered.

While most PMs and repair work plans involve equipment downtime, predictive PdM routes are typically performed while the assets are on line and running. Vibration routes, thermography, ultrasound and more are planned activities similar to PMs but aren't intrusive to the assets and don't require downtime. The plans should focus more on the "routes" for capturing the most data you can obtain in a work day, at a work facility or in a process unit, given the predictive tools and quantity of reliability technicians available. On-line condition monitoring doesn't typically require work plans, but installation of related instruments do justify some level of a plan. If the data trends towards failure, a planned downtime should be scheduled for troubleshooting though some level of troubleshooting must be done while the asset is on-line. Work with field experts to learn these matters and best practices at a detail level, and prepare yourself to lead as soon as practical.

For Reliability Leaders, the most important thing for planned PMs and PdMs aside from the safety of the personnel is that the equipment failure modes are being addressed and prevented during the related work that is being performed. If not, the redlining process should apply and possibly follow up Work Orders when necessary, addressing relative failure modes.

### **STEP 3 - S.M.A.R.T GOAL 2**

**Set a goal to create or improve your work plan process (*as needed in your own assessment*) within one year (1) of reading this book. Involve stakeholders including supervision, maintenance technicians, reliability technicians and operations in the planning process. Perform an audit of your existing PMs and PdMs annually thereafter.**

#### **iii. Working the Plan**

More often than not, contractors or internal maintenance crews are actually working the plan as far as field work regarding asset health improvements. The Reliability Leaders are often the job facilitators who verify the work is being performed as planned.

Let's revisit the phases of asset related work as described earlier in the Skills and Credentials section, and summarize what the Reliability Leader should actually be responsible for overseeing at each segment of the asset life cycle. Through it all, good communications with all stakeholders is the key. Operations and maintenance leaders must know that the Reliability Leader is trustworthy, and will take care of all matters within his/her span of control.

- asset and system design – *the Reliability Leader must verify that assets and systems are designed for reliable service; check drawings, calculations, specifications and field conditions for accuracy and maintainability*
- design purchasing specifications– *the Reliability Leader must verify that assets are specified with good quality metallurgy and soft goods, sized to meet the design capacity in the proper operating context, and sometimes dictate the proper rigging during transit to prevent damage*
- equipment manufacturing, assembly and testing– *the Reliability Leader must verify that source QA/QC has visited the factory during critical manufacturing, assembly and testing milestone milestones to ensure the quality and performance of the equipment prior to delivery (he/she may self-perform this task, delegate or outsource as needed)*
- equipment installations and precision alignment– *the Reliability Leader must verify that the Work Plan addresses precision alignment of rotating equipment (when applicable), and furthermore that during installation the field QA/QC inspector is present and the proper tools (laser alignment or the specified technology) are being utilized*
- pre-start up safety reviews (PSSR) – *the Reliability Leader (or Project Manager if a major project) must verify that all pertinent operations and maintenance stakeholders participate in a PSSR meeting prior to commissioning assets to ensure safe and reliable service*
- bench marking, and on-line condition monitoring– *the Reliability Leader must verify that start up condition monitoring is performed for bench marking vibration, temperature, full load current, ultrasound (when applicable) which helps tremendously in future trending*

- preventive maintenance – *the Reliability Leader must verify that proper PMs are in place to maintain the equipment prior to start up*
- troubleshooting – *the Reliability Leader must verify that assets are delivered with necessary Operations & Maintenance (O&M) Manuals to support troubleshooting of failure modes, and should either self-perform or verify a competent subject matter expert (SME) is resourced to troubleshoot failure modes*
- root cause failure analysis– *the Reliability Leader must self-perform or verify that all asset failures undergo a root cause failure analysis identifying the cause of failure which should be saved in the equipment files for future reference*
- teardown inspections – *the Reliability Leader must verify that SMEs are present at repair shops during teardown inspections, or in the field when conditions allow for such work to take place*
- failure reporting – *the Reliability Leader must verify that all asset failures are followed by a detailed failure analysis identifying failure modes along with lessons learned and corrective actions*
- turning lessons learned into corrective actions – *the Reliability Leader must verify that all lessons learned from asset failures are properly communicated, and that corrective actions are applied for all like assets (FRACAS)*

### **STEP 3 - S.M.A.R.T GOAL 3**

**Set a goal to improve your efforts to work the plan throughout all phases of asset related work (*as needed in your own assessment*) within two (2) yearS of reading this book. For this goal, you do not need to self-perform every aspect of the asset related work activities, but verify that SMEs are in place to do so at each step along the journey. If you are aspiring to be a Reliability Leader, simply learn from others charged with this responsibility in preparation for the day you are called to serve in this way.**

#### iv. Managing Metrics / Show the Score Board

Metrics are truly the topic of an entire book, or volumes of books, for industry Reliability Leaders. Reference one of the books Ricky Smith co-authored with David Martin (co-worker at LOOP with Brian Pertuit), Metrics/KPI's 101 for relevance and further insight.

This saying has been stated many different ways and may be over a bit over-used, but is very pertinent here; *we must measure things we intend to manage, and likewise we must manage what we measure or simply stop measuring the things we don't intend to manage.* When we say *things*, we are referring to Mean Time Between Failure (MTBF), Mean Time to Repair (MTTR), Schedule Compliance, Asset Health Condition (Equipment Uptime), Maintenance Repair Cost, etc...

While Reliability Leaders may use many metrics captured throughout his/her facilities, two of the most important metrics in their direct span of control are the Asset Health Condition (Equipment Uptime) and Repair Cost associated with the assets he/she is charged with overseeing. Every Reliability Leader should strive to improve equipment uptime, and reduce repair cost.

By showing the score board, we are recommending that Reliability Leaders manage and share metrics associated with asset uptime and repair cost throughout the organization. If the numbers are trending negatively, he/she must work with stakeholders in engineering, operations and maintenance to improve uptime and reduce repair cost. If the numbers are trending positively, attempt to learn from the successes that are taking place and share those success stories throughout the organization to improve enterprise wide using similar programs and tactics.

In Appendix ii., refer to the various types of functional metrics, KPI's and Score Boards (or Dashboards) recommended for Reliability Leaders to consider.

#### **STEP 3 - S.M.A.R.T GOAL 4**

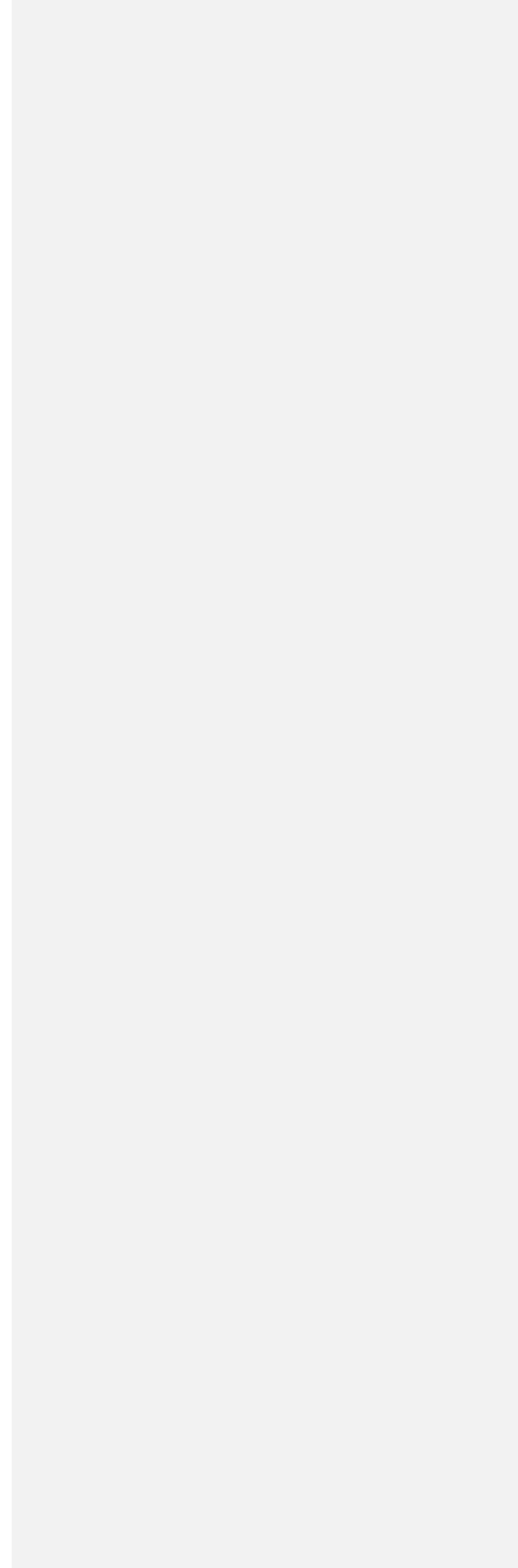
**Set a goal to create, audit and improve asset related metrics (*as needed in your own assessment*) within six (6) months of reading this book. Involve stakeholders including supervision, maintenance technicians, reliability technicians and operations in the audit and improvement process.**

## **CHAPTER IV**

### **Step 4 - Being the Best that you can Be**

**i. Choose a Path or Multiple Paths**

**ii. Consultant and/or Trainer**



**iii. Owner / Operator Representative**



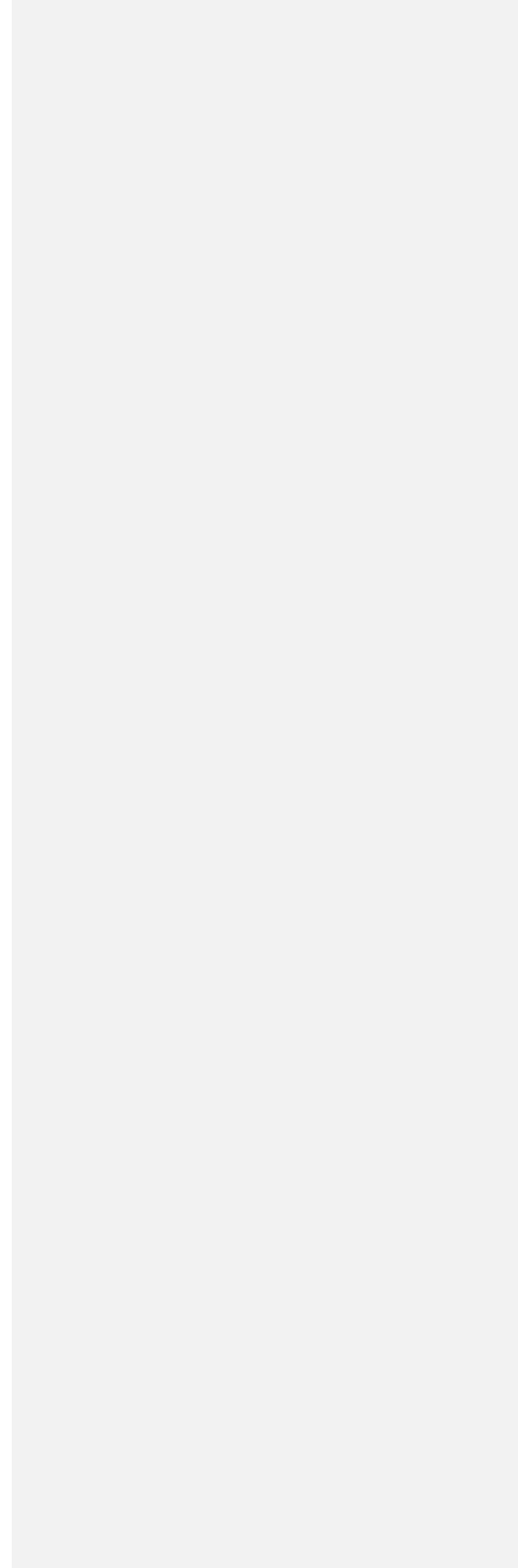
## **CHAPTER V**

### **Step 5 - Work / Life Balance**

**i. Why is What I do Outside of Work so Important?**

**ii. A Leader must Allocate Work**

**iii. The Pitfalls of Micromanaging**



**iv. Strategic versus Tactical Objectives**

## **CHAPTER VI**

### **Step 6 - Plan/Do/Check/Act for Reliability Leaders**

### **i. Plot the Course {Plan}**

Setting a vision and strategy, as with many endeavors in life, is the key to becoming a successful leader. The strategy, however, can die like fruit left too long on the vine if it does not lead to relevant tactical objectives and goals. Reliabilityweb.com [Reliability Leadership](#) travel guide states that "*Reliability Leadership involves managing value delivery and the functional assurance of assets while minimizing the effects of risk and failure*". Let this be your vision, and set your strategies and tactical objectives in support of this end goal.

**ii. Perform the Work {Do}**



**iii. Lookback on the Body of Work {Check}**

**iv. Turning Lessons Learned into Corrective Actions {Act}**

## **CHAPTER VII**

### **Step 7 - Being a Leader, not just a Boss**

### **i. Lead by Example / Actions over Words / High Integrity**

In Chapter I, Section ii., we foreshadowed the importance for a Reliability Leader to lead by example characteristically, which is certainly de facto mandate for leaders of all kinds. This section will focus a bit more on some ways in which we can and should do just that.

The old adage of “*do what I say, not what I do*” for parents trying to guide their children otherwise though they’ve watched them drink too much alcohol, smoke tobacco products or heard them curse too often comes to mind. Statistics show that these children in turn often become alcoholics, chain smokers or tend to abuse foul language. Another relevant saying is that “*the apple doesn’t fall far from the tree*”, which is very true when we consider the impacts of leading by example (good or bad). The point we’re making is how we interact with our executive management team, direct reports, peers, colleagues, customers, vendors and contractors will most likely be emulated by our direct reports. Saying and doing the right thing isn’t always easy, but if we strive to be as consistent as we can in doing so others will follow our actions.

Avoid giving “lip service” to others by saying what they want to hear when you’re not sincere. If we “say all the right things” when in meetings, then go behind the walls of the conference room and downgrade those we were just kind to in front of our direct reports, we can expect that they will in turn do the same thing. If we feud with leaders of other Departments in the office, we can expect that those we’re charged with leading will in turn butt heads with those same Departments in the field.

Reliability Leaders, on the contrary, should strive to treat all personnel in all venues with respect and professionalism. Lead by example in a positive way, always. We must partner with Maintenance, our vendors and contractors to meet the needs of our internal customers in Operations. We should be open minded to the ideas of others, respect their opinions and not downgrade them to others. It’s okay to debate topics when it comes to equipment reliability, but we’re encouraging you to do so respectfully and professionally.

A Reliability Leader must also have High Integrity as a strong, unwavering trait. We must tell the truth, regardless of the outcome. Being the bearer of bad news is not always the popular thing to do especially with highly critical equipment health matters, so we often strive to offer both a problem and a solution whenever possible. If we shoot straight on all fronts, our peers,

colleagues, partners, direct reports and customers will all know exactly where we stand. Full disclosure goes a long way to a leader's proven integrity.

## **ii. Teamwork & Collaboration**

Reliability Leaders must create a fertile environment for teamwork and collaboration within their group and throughout their organizations across Departmental lines. This is especially true as it pertains to continuous improvement. Often, that means looking at our equipment performance closely, or even at our own group's performance, finding existing problems that must be addressed then leading a team effort to address those problems after communicating the plan to all stakeholders.

**CHAPTER VIII**

**Step 8 - Successful Business Relationships**

**i. Effective Communication Methods, Listening Skills**

There is an old adage reminding us that “*God gave us two ears and only one mouth for a reason*”. The relevant point for becoming a strong Reliability Leader is in order to be effective at communicating with your peers, direct reports, partners and Executives, you must be able to listen.

Speaking succinctly is another trait that is often under rated.

**ii. Conflict Management and Team Alignment**



### **iii. The Importance of Clear Roles & Responsibilities**

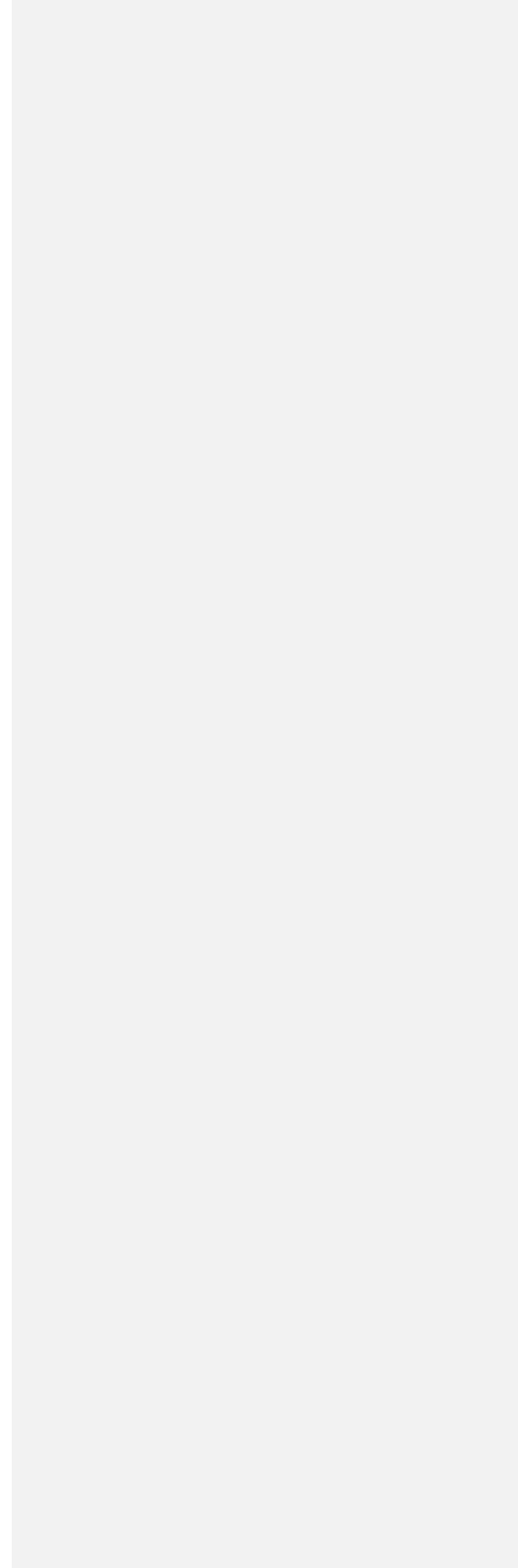
**CHAPTER IX**

**Step 9 – Continuing Education and Conferences**

**i. When to Learn What and How Often?**

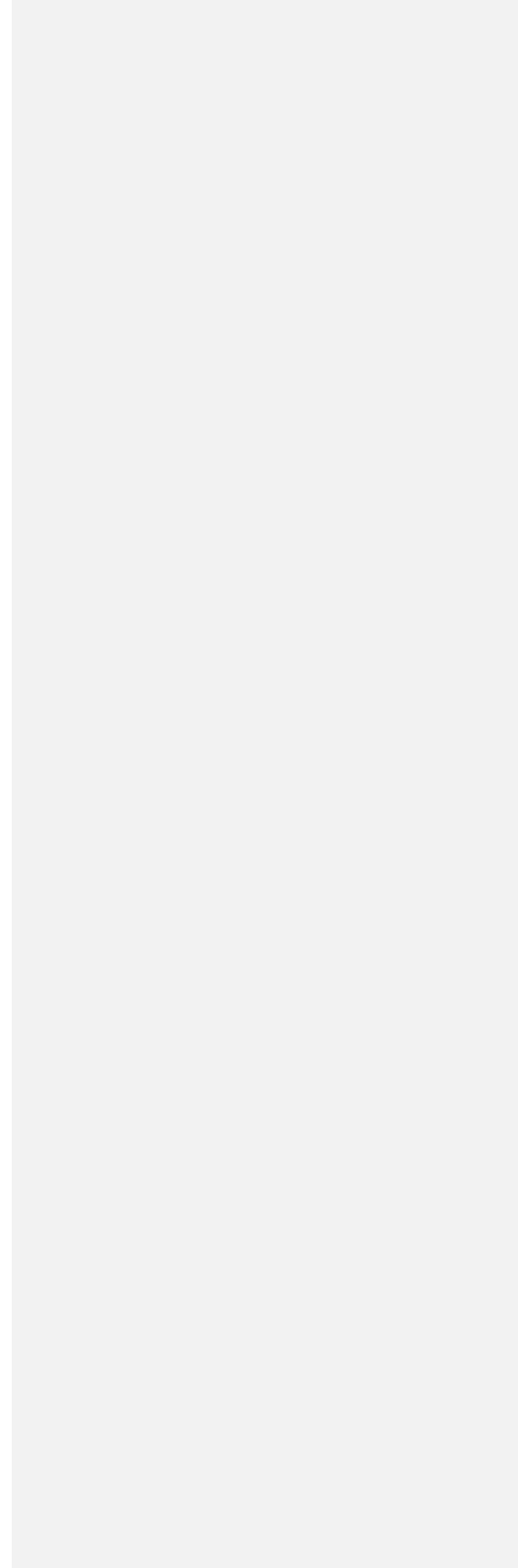
**CHAPTER X**

**Step 10 – A Successful Journey ends with Sharing**

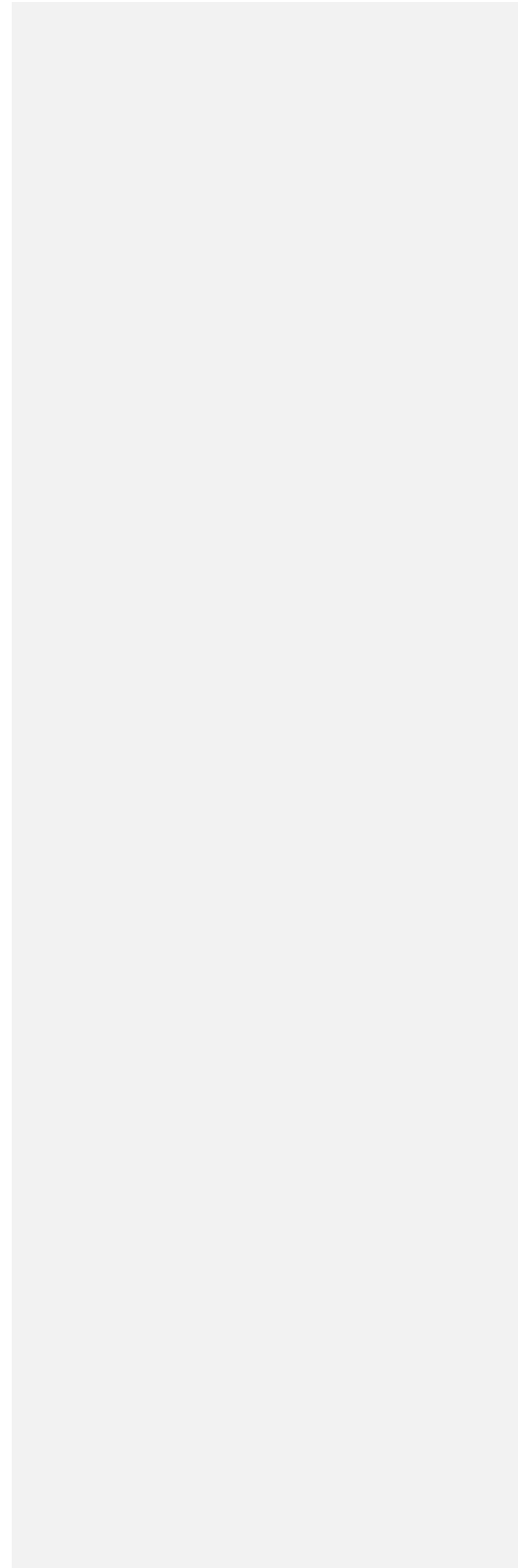


**i. The Lifecycle of a Reliability Leader**

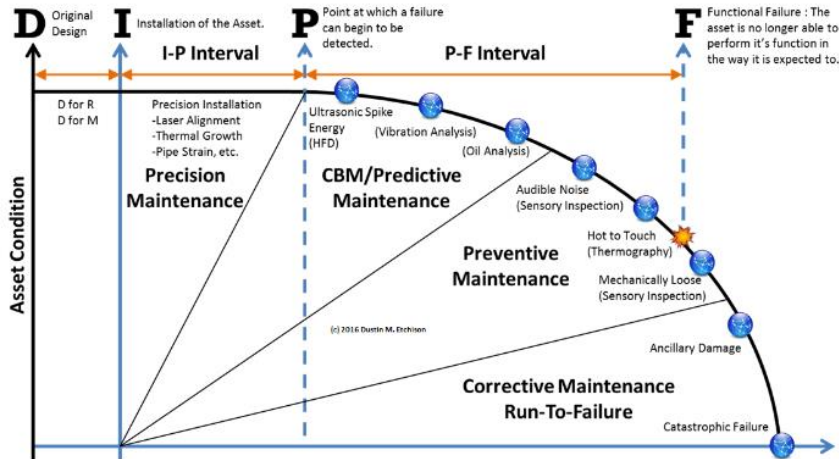
**ii. Leave a Legacy**



## **Appendices**



## i. Potential for Failure (P-F) Curve



In this graph, we see that involvement of reliability leadership begins during initial asset design, indicated by the D for R (Design for Reliability), and D for M (Design for Maintenance). This includes overseeing specifications to meet both standard design and operational context, related purchase order documents, metallurgy, oil type and soft good selections when applicable, manufacturing or source QA/QC inspections and of course factory acceptance or witness testing. Reliability Leaders should remain involved throughout the life cycle of the asset as well, from how to properly secure the asset during delivery to offloading to initial installation where precision alignment is so important throughout the PM and PdM cycles.

The key is to know when the asset will fail functionally, and pull it before it fails – often swapping it for a critical spare while the asset is refurbished in the shop (*assuming its repairable*), thereby resetting the clock to time zero on the asset life cycle and returning it as critical spare in climate controlled storage when possible. This methodology, known in some circles as a “swap and shop” program, not only wins the battle but helps true Reliability Leaders win the war of asset health management by reducing downtime for repair and increasing uptime and theoretical capacity.



**ii. Functional Metrics / KPIs / Score Boards**

### iii. Recap of Suggested S.M.A.R.T Goals by Step

#### STEP 1 - The Motivation, Why become a Reliability Leader?

##### **STEP 1 - S.M.A.R.T GOAL**

Set a goal to improve your drive, passion and work ethics towards becoming a Reliability Leader (*as needed in your own assessment*) within six (6) months from the time you started reading this book.

#### STEP 2 - The Preparation, What will it take?

##### **STEP 2 - S.M.A.R.T GOAL 1**

Set a goal to gain some or all (as needed in your own assessment) of the recommended equipment reliability fundamental skill sets and credentials along with a good understanding of how your equipment works and fails within two (2) years of reading this book.

##### **STEP 2 - S.M.A.R.T GOAL 2**

Set a goal to obtain both educational knowledge and on the job training (as needed in your own assessment) within four (4) years of reading this book. Seek to learn something relative to becoming a Reliability Leader every working day.

##### **STEP 2 - S.M.A.R.T GOAL 3**

Set a goal to make a decision to obtain at least one Certification listed (as needed in your own assessment) within one (1) year of reading this book. Seek to learn something relative to becoming a Reliability Leader while preparing for the related exam(s). These exams are often offered after or during an asset management related conference. Thus, seek to gain industry knowledge in asset management while you prepare.

#### STEP 3 - The Fundamentals, Blocking and Tackling

##### **STEP 3 - S.M.A.R.T GOAL 1**

Set a goal to create and deliver an Asset Management Plan within your companies budgeting process timeline with some time component to your budgeting program (as needed in your own assessment) within one (1) year of reading this book. Remember to utilize KPIs and Metrics as well as a Risk Assessment as supporting documentation for funding inquiries.

**STEP 3 - S.M.A.R.T GOAL 2**

Set a goal to create or improve your work plan process (as needed in your own assessment) within one (1) year of reading this book. Involve stakeholders including supervision, maintenance technicians, reliability technicians and operations in the planning process. Perform an audit of your existing PMs and PdMs annually thereafter.

**STEP 3 - S.M.A.R.T GOAL 3**

Set a goal to improve your efforts to work the plan throughout all phases of asset related work (as needed in your own assessment) within two (2) years of reading this book. For this goal, you do not need to self-perform every aspect of the asset related work activities, but verify that SMEs are in place to do so at each step along the journey. If you are aspiring to be a Reliability Leader, simply learn from others charged with this responsibility in preparation for the day you are called to serve in this way.

**STEP 3 - S.M.A.R.T GOAL 4**

Set a goal to create, audit and improve asset related metrics (as needed in your own assessment) within six (6) months of reading this book. Involve stakeholders including supervision, maintenance technicians, reliability technicians and operations in the audit and improvement process.

