MAINTENANCE, REPAIR AND OPERATIONS

BEST PRACTICES
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MAINTENANCE, REPAIR AND OPERATIONS (MRO) BEST PRACTICES

A good maintenance storeroom is a well-oiled machine. Imagine 99.9 percent service levels for critical spares or window wait times under 10 minutes 95 percent of the time. A great storeroom gives you the capability to figure out what unidentified parts actually are or to know when your special order parts hit the receiving dock.
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Good or great maintenance, repair and operations (MRO) stores deliver the following benefits to the organization:

- Higher production by reducing efficiency losses due to part lead time.
- Higher quality and safety because the correct original equipment manufacturer (OEM) parts are used instead of “will fits” or substitutions.
- Reduced risk due to more elements of maintenance work being immediately accessible.
- Higher morale due to fewer unfinished jobs, higher uptime and better quality.
- Increased overall cost efficiency and profitability.

The Reliabilityweb.com® Maintenance Management Benchmarking Survey (http://reliabilityweb.com/best-practices-maintenance) shows that a good number of companies have successful and capable storerooms. The survey also shows a wide variation that includes firms with little or no expertise in maintenance spare parts management. This report explores the self-reported conditions of those storerooms and provides insight on the survey results.
There is a cost to greatness in stores management. Surprisingly, the primary cost is not measured in money, but in leadership and the will to make the storeroom workable. To have greatness, or even competence, there are four main conditions that must be met.

**THESE FOUR CONDITIONS INCLUDE:**

1. The business processes and procedures that run the storeroom and supply chain are well understood, properly followed and occasionally audited. The system is easy to use correctly and is used correctly.

2. Having parts usage, cost, lead time, vendor reliability and accurate data and accessible to analysis activity.

3. A global item master that includes manufacturer make and model, consistent description nomenclature, unit of measure (UOM), attributes and pricing; where possible drive toward complete bills of materials (BOMs) and exploded view diagrams.

4. Leveraging the whole organization with consistent language, nomenclature, vendor intelligence, understanding and linkage to the complete supply chain.
TWO SEPARATE ISSUES COME TOGETHER IN THE MRO STOREROOM.

1

One issue is the maintenance strategy as defined by reliability strategy development (Uptime® Element™ Rsd) activities. In these activities, the best way to support the asset is defined. This definition leads to the sourcing and stocking of particular spares.

2

The second issue comes into play when a part is selected to be stocked. Once the stocking decision is made, establishing the min/max, reorder point and order quantity is based on the criticality of the equipment and part to the equipment, lead time, cost and estimated usage. Once actual usage is known, the formulas should be adjusted.
Strong management of the spare part supply chain often translates to success for the maintenance department. Observations show 40 percent of the losses of maintenance tradespeople’s time can be attributed to spare parts. The Reliabilityweb.com benchmarking survey shows that some firms are doing pretty well. For example, 68 percent of the maintenance department respondents control what is stocked. Less than 20 percent can say they have their orders fulfilled 95 percent of the time. This means 80 percent do not.

This report explores what firms are doing and what can be enhanced. Interspersed is the logic based on asset management principles. As important as it is, the MRO function is only one tile in the Uptime® Elements™ Work Execution Management knowledge domain. But, in the Rsd tile, the maintenance strategy is developed. The maintenance strategy begets the stocking strategy.
The MRO stores operation has its roots in helping maintenance fulfill the AIM (i.e., mission, vision, values) of the organization. All performance, all metrics and all policies and procedures are directed toward the AIM.

Before you can even discuss the inventory, you must look at the goals and objectives of the organization. You should determine the AIM of the company or organization to ensure the goals of maintenance spare part management are in alignment. This inquiry would be specific for the organization.

**AS AN EXAMPLE, LET’S SAY YOUR MISSION IS TO:**

1. Manufacture a high quality product,
2. at a reasonable cost.
3. Make a long-term profit for financial stakeholders.
4. Conduct business with integrity and have respect for the communities we work in, for employees, customers and vendors, and for the planet.

With this AIM in hand, you can establish some objectives for the storeroom. You can also align the goals of the storeroom with the AIM of the organization.
FOR EXAMPLE:

- Provide the parts needed to minimize downtime for maintenance (pertains to mission statements 1, 3, 4);
- Ensure you buy the appropriate quality parts (mission statements 1, 2, 3, 4);
- Provide parts to avoid safety or environmental incidents (mission statement 4);
- Use inventory to minimize the costs of acquisition of the parts consistent with the goal to minimize use of cash to meet this goal (mission statements 2, 3);
- Be sure to use all parts purchased and do not allow parts to be damaged or spoil (mission statements 2, 3, 4).

The stockroom has its own objectives to support the AIM in its own unique way. These objectives are internal to the stockroom and should also cascade from the company’s AIM.

FOR EXAMPLE:

- Know where everything is.
- Service the people at the issue window within XX minutes.
- Institute a disciplined change control process to ensure the appropriate approved parts are what is in stock.
- Receive, inspect and notify requester of parts within XX minutes of when they come in.

- Keep accurate counts - Closed storeroom with 24x7 service should have 98% inventory accuracy; open storeroom (generally no guarantees, but 80% accuracy is reasonable).

- Protect parts from spoilage, theft and damage.

- Be sure to use a proven stocking methodology so inventory is held in appropriate quantities to support the maintenance strategy.
Look closely at the bunch of bins in the storeroom. Note if any have more than one part.

Write down any bins that are empty. Check if the parts are on reorder and if they are expected soon.

Do you have a storage area for “hot shot,” expedited parts, or air freighted parts? If so, check the dates they arrived. Note the number of packages there over two days.

Look at the number of stock outs per month and especially the number of stock outs of important parts causing downtime. Ask maintenance for specific jobs that were delayed due to parts. Check them out and answer why.

Random sample the waiting time at the window, reporting the average and standard deviation.

Determine how many parts didn’t move at all in the last year. Are they critical parts?

Are the warehouse basics and their numbers well known: Value of stock (by category), number of SKUs, turnover, accuracy, etc.?
Finance demands the most efficient use of funds. Reduced funding requirements with similar or greater output shows progress and a less wasteful operation. As such, it requires reduced levels of MRO inventory. This is a desirable goal.

Maintenance and operations demand the lowest downtime possible (and occasionally even beyond that). This is also a desirable goal. Sometimes, spare parts that are critical for the safe operation of critical equipment are stocked for long periods of time without use. Good inventory practices say to dispose of any part not used for years.

**Q** How do you resolve this battle between two desirable outcomes that are in direct conflict?

The answer is always to return to the AIM of the organization and see how that informs the decision. Is potential downtime (i.e., some risk that has a cost and a probability of occurrence) more valuable than the certain savings from disposal of all old stock? If the chance of a fatality or environmental incident is added to the mix, the calculation is more complicated, but still must be done.
The stockroom makes a service agreement with maintenance to stock certain parts in quantities adequate to supply maintenance needs. A stock out occurs when the stockroom runs out of a stocked part when it is needed. The measurement of this service agreement is stocking level.

Different parts should have different stocking levels. A common part available locally is less critical to hold than a long lead time OEM replacement part on a critical asset.

Key performance indicators (KPIs) flow directly from the AIM of the organization. They are a subset of performance indicators (PI), which may or may not be “key” indicators. KPIs are the few measures that keep you in action with your continuous improvement (Ci) effort.

How do you measure this inventory when most of the well-established KPIs were developed to manage the inventory of retail stores, not storerooms? If you segment the inventory appropriately, you can use these traditional metrics.
In keeping with the theme that the storeroom services the maintenance department and the maintenance department is in a leadership position in mitigating the risk of downtime, then the first metric is service level, as shown in Table 1.

**Table 1: Guide to Performance Indicators for MRO Storerooms**

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Level by SKU</td>
<td>Service level for critical spares 100% unless a business decision is made; Other categories can be lower, such as Routine Spares - 95%, Consumables - 80%, etc.</td>
</tr>
<tr>
<td>Service Level by Work Order</td>
<td>&gt; 95% for all&lt;br&gt; &gt; 99% for critical spares</td>
</tr>
<tr>
<td>Jobs Waiting (by reason)</td>
<td>Approximately 50% of the backlog work orders are waiting for some reason. The level is trended to look for changes.&lt;br&gt; &lt; 25% for parts</td>
</tr>
<tr>
<td>Turns, also turns by inventory category</td>
<td>For the entire inventory, 2 times per year&lt;br&gt; If you exclude critical spares, 4 to 5 times per year</td>
</tr>
<tr>
<td>Variance Report by SKU</td>
<td>&lt; 2%-3% Major company initiated a storeroom audit when level hit 3%</td>
</tr>
<tr>
<td>$ Value, S Value by Category, $ Value by RAV*</td>
<td>Good metric to monitor overall amount of money to support assets; Value by category helps identify where the action is taking place.&lt;br&gt; If their ratio $ value per RAV is too different from peers, these values inform managers if there is a structural problem or advantage.</td>
</tr>
<tr>
<td>Average Number of Window Visits per Day</td>
<td>Help the storeroom build lean programs, and waste reduction and defect elimination projects</td>
</tr>
<tr>
<td>Average Wait Time</td>
<td>Define transaction density, which helps with crew and tooling (e.g., scanners, automation, etc.) decisions</td>
</tr>
<tr>
<td>Number of SKUs (line items in inventory)</td>
<td></td>
</tr>
<tr>
<td>Number of Shipments the Storeroom Receives Each Month</td>
<td></td>
</tr>
</tbody>
</table>

* RAV: Replacement asset value or today’s cost to replace all assets
Typically, you want a 95 to 97 percent average service level. This means that 95 times out of 100, the storeroom has the parts they should have. Some firms calculate service level on a work order basis. Out of 100 work orders needing parts, how many are turned away due to any part missing? This metric is more indicative of what the maintenance department feels.

Some organizations divide the parts by category to get service level by category. This results in several service levels, such as divide by criticality of asset (would include insurance policy spares), locally available spares, standard spares (bearings) or consumables. Service levels for other spares can be lower. Critical spares for critical assets should be 100 percent, if possible. Unless a business decision is made to NOT stock and accept the consequences, consideration should be made to care for the parts since they might be on the shelf for a long time.

Here are some examples of service levels:

- **90-95%**
  - OEM spares for less critical assets

- **85%**
  - Items available locally

- **80%**
  - Consumables
This measure is a count of work orders that cannot be executed because something is missing. This is not purely a MRO storeroom metric, but jobs waiting due to parts is. The number of jobs waiting for something should be tracked and trended. All major contributors to jobs waiting, such as waiting for parts, should be broken out on the same display.
Turns expresses how fast the value of the inventory is consumed compared to what is on the shelf (i.e., inventory value/annual purchases). This is a metric where it is useful to not include critical or insurance policy parts. These expensive and long lead time parts are purchased to manage risk. If you end up using them before the life of the asset is up, then you’ve had a failure in your preventive maintenance (PM) or precision maintenance program.

Once the critical parts are removed, the turns should look more like an industrial distributor, with turns of two to four per year. On fast moving items, your turns can be quite a bit higher because you can stock fewer items and have frequent replenishment.
**OTHER MEASURES**

THAT ARE PERFORMANCE INDICATORS, BUT NOT NECESSARILY KPIs:

1. **DOLLAR VALUE OF STORES BROKEN DOWN BY CATEGORY:**
   This is useful to see changes in usage or usage mix. If you stop using a part due to a change, you must also get rid of or use up the inventory.

2. **DOLLAR VALUE OF INVENTORY/ REPLACEMENT ASSET VALUE (RAV):**
   This metric is useful for a company that has several similar plants. With all other things being equal, RAV should stay the same, within some variation for age, product mix and other variables.

3. **VARIANCE REPORT (E.G., INVENTORY ON SHELF / QUANTITY ON HAND (QOH) / QUANTITY IN SYSTEM):**
   You are interested in the accuracy of your processes. This variance report is important to see if there are holes in the process or system. Get your variance to one or two percent, or lower.

4. **COST OF POSSESSION REPORT, ALSO KNOWN AS COST OF OWNERSHIP:**
   A summary of all the costs to hold stock, including labor, management, insurance, depreciation, damage, pilferage, cost of money, etc.
THINGS TO MEASURE
THAT MIGHT LEAD TO WASTE ELIMINATION:

- Average number of window visits per day
- Average wait time
- Number of SKUs (i.e., line items in inventory)
- Number of shipments the storeroom receives each month
MAINTENANCE INVENTORY AND PURCHASING

SURVEY RESULTS
MATERIALS IN STORES WHEN REQUESTED

As you can see in the graph, the top quartile averages 95 percent or better in stocking level. This is the average of critical spares (should approach 100 percent) and common items (85 percent might be fine.)

One issue is when you have a maintenance job that requires several to many spare parts. If the job requires 15 parts and the stocking level averages 97 percent, the chance that all parts will be there when you start the job is only 63.3 percent (this is called conjunctive probability).

This scenario is a big argument for kitting maintenance jobs in advance. That way, the kitter can ensure parts are in stock before the job is scheduled.
Any item that is in the storeroom also should be found in the stores catalog. Organizations should have an ongoing effort to add stocked items to the catalog because anything not in the catalog will be difficult to find for maintenance workers. Not surprisingly, the top third of the firms responding to the survey have 90 percent or better coverage. What is surprising is that 26 percent of the firms have less than 60 percent coverage.

Low coverage means parts are direct purchased and may be going around the system, and often at a higher cost. It is difficult to derive usage, lead time and other data from direct purchased parts.
Who controls what, who says what the stocking level is and who “owns” the inventory are less important questions than whether the business process is followed faithfully. In the survey, over 68 percent of the respondents’ maintenance department controlled what was stocked.
A well-known stereotype is when maintenance controls the storeroom, the value of the inventory skyrockets. The other stereotype is when finance or purchasing manages the storeroom, the value plummets. The right balance is a storeroom that has reasonable rules for stocking and serves the AIM of the organization at the lowest practical cost.

The important issue is how parts are identified to be stocked. If the business process considers the criticality of the asset, the criticality of the part to the function of the asset, the lead time and the maintenance strategy, then it does not matter who controls the stockroom.

By the same token, organizations will argue about the stocking level (i.e., quantity kept on hand). If the business process considers how many parts are used at a time, safety stock, lead time and criticality, and runs a daily report (sometimes called an MRP report) of items that have hit the reorder point and issues a purchase order to reorder, then whatever the quantity stocked is fine.
The maintenance stores catalog is produced by:

- **57.40%** Alphabetic and numeric listings
- **22.42%** Catalog is incomplete or non-existent
- **14.35%** Numeric only
- **5.83%** Alphabetic only
The maintenance catalog is an integral part of an effective storeroom. The catalog allows maintenance personnel to shop for parts, supplies and consumables and gives the stores person valid and accurate part numbers and descriptions. It is the difference between asking for a 3-inch bearing and a 32-34291 bearing with the appropriate description.

A good catalog reduces the number of mistakes made. Since mistakes are defects, the catalog is part of your defect elimination program.

The survey asked whether the parts are listed numerically or alphabetically. The catalog in a world-class storeroom is organized numerically by stores part number and alphabetically by standard description and asset. Having exploded bills of material for every accessible asset and pictures/drawings of each part is an increasingly essential system functionality.

Almost 80 percent of survey respondents had some kind of catalog and the overwhelming majority, 57 percent, had both alphabetical and numeric listings. Unfortunately, 22 percent of respondents were without even a rudimentary store catalog. This lack will cost them both in wasted time for the maintenance workers and increased downtime.
Once the catalog is in place, the next barrier is an intelligent, logical layout. Parts should be easily and consistently locatable. As the storeroom becomes more organized and the names of the bin locations are pinned, a unit-shelf-bin locator becomes important. It is used to both shelve incoming stock and locate parts for issuance.

World-class storerooms have well-thought-out numbering that is consistently applied to both work orders and receipts of parts.

This best practice allows people to find critical spares on an emergency basis when the stockroom is not covered. It also facilitates in training new stockroom team members.
In an ideal world, 100 percent of all items are charged to a work order, overhead account, or production account. In practice, the situation is quite a bit more complicated. A big example is open bin parts, such as low cost nuts and bolts or fittings, which are neither tracked nor individually managed.

More than 50 percent of the respondents do a decent job of assigning costs to work orders or accounts. This is important because maintenance decisions need to be based on facts and data that is complete and accurate. If a third or more of the SKUs are not tracked to the work order, then the cost of maintenance for those assets will be inaccurate.
Statistical inventory control balances the costs of stock outs with the cost of holding the inventory if applied correctly and based on reasonably accurate usage data. Many firms estimate the minimum and maximum levels and wonder why the system doesn’t keep the stock level up or why the stockroom is bursting at the seams with surplus parts.
There are several simple formulas to get started. For example, the safety stock (SS) level is a simple version that works only with typical inventory.

$$SS = (U_{\text{max}} - U) \times L,$$
where $U_{\text{max}}$ is the maximum probable usage.

The safety stock ensures against stock-out even when demand or lead times vary.

$$\text{ROP} = (U \times L) + SS$$

ROP is the re-order point when a material requisition is issued.

It includes the lead time (L) and the variation in lead time ($U_{\text{max}}$).

- **U** - Average one week usage
- **$U_{\text{max}}$** - Maximum probable one week usage
- **L** - Lead time in weeks

These would be the simplest starting points. Most computerized maintenance management systems have calculators for managing the inventory that are more sophisticated than this.

Minimum or reorder point, safety stock and order quantity are calculations based on usage data, lead times, item costs and internal costs to process the order. The safety stock is based on the variability of the usage over the lead time. All major systems can help the inventory analyst calculate these numbers.
As previously noted, service levels for critical spare parts should be 100 percent. Generally, in a production department, the cost of downtime vastly exceeds the cost of stocking the parts. It is usually easy to justify inventory when there is a high downtime cost.

What percent of the critical maintenance materials is stocked in the warehouse or in a location readily accessible when the material is required?
Being sure to record both receipts and issues in near real time is important. The lead time for each part contributes to the size of the safety stock and the order quantity.

So, if you have to add two or even three days from the time of the receipt to the posting of the receipt, you will have to carry higher stock levels to maintain the same service level.
Non-updated issues of parts can get the stockroom into a world of trouble. If the issues accumulate and an update run is performed weekly, you could be near a stock out of critical parts without knowing about it.

Between the issues and the receipts, you can be adding a week or more to the lead time.
What percent of the items are checked for at least one issue every six months?

- Less than 50%: 38.57%
- 50 to 69%: 13.00%
- 70 to 79%: 21.08%
- 80 to 89%: 14.35%
- 90% or more: 14.80%
Typical financial reporting requires annual physical inventories or cycle counting that result in all parts being counted at least once a year. Special categories of parts could be cycle counted twice a year or more often, such as with critical parts, fast moving parts, etc.

The people doing the counting should be careful to count even the item in the back of the shelf. They also want to take off and discard plastic wrap, strapping and shrink wrap. When reshelving the items, care must be taken to avoid getting limited life span spares in the wrong order.

In this case, the world-class number is not the highest one. Fewer than 50 percent of the parts should be counted twice a year, while the rest can be counted once per year.

**GOAL 1** is the finance department identifying and tracking the asset value of the organization. Knowing the accurate number of parts and the prices paid provides an accurate snapshot of the inventory value.

**GOAL 2** is accurately knowing the quantity on hand (QOH) to reconcile it with the system record’s QOH. A variance of less than two percent is acceptable, with increasing discomfort as the number gets higher.
Rooted in MRO storeroom operations, Synovos (formerly Storeroom Solutions) is well versed in the pitfalls and best practices involved in MRO supply chain management.

IN A RECENT SURVEY LIKE THE ONE DISCUSSED IN THIS REPORT, SYNOVOS FOUND THREE KEY TAKEAWAYS INVOLVING MRO OPERATIONS:

1. Companies lack planning and tracking processes, with more than half of those surveyed reporting that the MRO storeroom frequently caused reliability issues or downtime.

2. Little to no communication exists between the storeroom, purchasing and the rest of the company, with more than half saying maintenance and purchasing do not work together.

3. Technology is underutilized or nonexistent. Nearly a third of companies said they had less than half of the needed MRO materials in their ordering system.

Now comes this research report mirroring some of those findings, specifically that 25 percent of companies have less than 60 percent coverage of items in the stores catalog, closely correlating to the third point above. Such low coverage equates to higher costs for direct purchased items, while losing visibility to usage, lead time, and other data.
Little has changed since Synovos’ earlier survey. Companies remain poised to fail, or at the very least, fail to reach potential because of inefficient processes surrounding MRO storeroom operations and plant reliability information management (PRIM) (download the PRIM framework and original survey white paper at www.Synovos.com).

The solution involves establishing, measuring and evolving consistent processes without restricting resources. Part of that solution is technology, specifically an enterprise asset management (EAM) system, one that brings value to the process while improving maintenance efficiency and effectiveness.

SYNOVOS

MICHAEL WEINBERG

Chief Marketing Officer and Senior Vice President of Corporate Development

Synovos provides comprehensive supply chain, asset, data and EAM technology services that drive increased productivity, profitability and global competitiveness. Its global solutions enable companies, manufacturers, large institutions and others to streamline MRO/indirect materials management while improving overall maintenance effectiveness and asset reliability.

www.Synovos.com
Procurement management software is key to helping manufacturers purchase maintenance parts and supplies more efficiently and at lower prices. It is also essential in maintaining an up-to-date inventory database through integrations with computerized maintenance management systems (CMMS) and enterprise asset management (EAM) software.

**FEATURES**
- Workflow that supports AIM-centric business processes and procedures.
- Purchases and returns that automatically update maintenance inventory levels.
- Accurate and detailed product catalog.
- Reporting on a wide range of metrics including vendor performance and inventory turnover.
- 3D printing support for critical maintenance materials.

**BENEFITS**
- Fewer parts outages resulting in higher uptime and more reliable assets and equipment.
- Fewer emergency shipments resulting in lower shipping costs.
- Fewer risky “will fits” and substitutions.
- Lower inventory levels resulting in both lower depreciation expense and working capital utilization.
- Lower purchase prices resulting in a lower overall maintenance spend.
- Time saved and more accurate inventory information through the elimination of tedious, manual work.

Contraqer is cloud-based software built to provide transparency and clarity in procurement. Contraqer ties what you need to run your business with the vendors you buy from and automates the entire process from initial requests through fulfilment.

www.contraqer.com
RESOURCES

BOOKS

- *Kitting in Maintenance Made Simple*
  by Daniel DeWald and Jeff Shiver (Reliabilityweb.com, 2014)

- *Maintenance Storerooms and MRO Made Simple*
  by Daniel DeWald (Reliabilityweb.com, 2012)

- *Maintenance Strategy Series Volume 2, MRO Inventory and Purchasing*
  by Terry Wireman (Reliabilityweb.com, 2011)

- *Outsourcing MRO Finding a Better Way*
  by George Krauter (Reliabilityweb.com, 2016)

- *Smart Inventory Solutions Second Edition, Improving the Management of Engineering Materials and Spare Parts*
  by Phillip Slater (Industrial Press, 2005)

- *Spare Parts Inventory Management, A Complete Guide to Sparesology®*
  by Phillip Slater (Industrial Press, 2016)

- *Surviving the Spare Parts Crisis*
  by Joel Levitt (Industrial Press, 2016)

ARTICLES

- *Key Performance Indicators for Stores and MRO*
  [http://reliabilityweb.com/articles/entry/key_performance_indicators_for_stores_and_mro](http://reliabilityweb.com/articles/entry/key_performance_indicators_for_stores_and_mro)

- *The Importance of Organizing MRO Inventory & Purchasing*

- *Reliability vs The Capricious MRO Storeroom*
  [http://reliabilityweb.com/articles/entry/reliability_vs_the_capricious_mro_storeroom](http://reliabilityweb.com/articles/entry/reliability_vs_the_capricious_mro_storeroom)
Joel Levitt, CRL, CPMM, is the Director of Reliability Projects for Reliabilityweb.com. Mr. Levitt is a leading trainer of maintenance professionals and has trained more than 17,000 maintenance leaders from 3,000 organizations in 25 countries in over 500 sessions.

Joel has 30 years of experience in many facets of maintenance, including process control design, source equipment inspector, electrician, field service technician, maritime operations and property management. Prior to that, he worked for a CMMS vendor and as an owner/manager in manufacturing.

Joel is a frequent speaker at maintenance and engineering conferences and has written over 10 popular maintenance management texts. He has also published more than 200 articles on the topic. In the past, Mr. Levitt served on the safety board of ANSI, Small Business United, National Family Business Council and the executive committee of the Miquon School. He is currently a member of the Association for Facilities Engineering (AFE) and Vice President of the Philadelphia chapter.
Created in 1999, Reliabilityweb.com provides educational information and peer-to-peer networking opportunities that enable safe and effective maintenance reliability and asset management for organizations around the world.

**ACTIVITIES INCLUDE:**

- **Reliabilityweb.com** (www.reliabilityweb.com) includes educational articles, tips, video presentations, an industry event calendar and industry news. Updates are available through free email subscriptions and RSS feeds. **Confiable.net** (www.confiable.net) is a mirror site that is available in Spanish.

- **Uptime® Magazine** (www.uptimemagazine.com) is a bi-monthly magazine launched in 2005 that is highly prized by the reliability and asset management community. Editions are obtainable in both print and digital.

- **Reliability Leadership Institute® Conferences and Training Events** (www.reliabilityweb.com/events) offer events that range from unique, focused-training workshops and seminars to small focused conferences to large industry-wide events, including the International Maintenance Conference, MaximoWorld and The RELIABILITY Conference™.

- **MRO-Zone Bookstore** (www.reliabilityweb.com/bookstore) is an online bookstore offering a maintenance reliability and asset management focused library of books, DVDs and CDs published by Reliabilityweb.com.

- **Association of Asset Management Professionals** (www.maintenance.org) is a member organization and online community that encourages professional development and certification and supports information exchange and learning with 50,000+ members worldwide.

**A Word About Social Good**

Reliabilityweb.com is mission driven to deliver value and social good to the maintenance reliability and asset management communities. Doing good work and making profit is not inconsistent, and as a result of Reliabilityweb.com's mission-driven focus, financial stability and success has been the outcome. For over a decade, Reliabilityweb.com’s positive contributions and commitment to the maintenance reliability and asset management communities have been unmatched.

**Other Causes**

Reliabilityweb.com has financially contributed to include industry associations, such as SMRP, AFE, STLE, ASME and ASTM, and community charities, including the Salvation Army, American Red Cross, Wounded Warrior Project, Paralyzed Veterans of America and the Autism Society of America. In addition, we are proud supporters of our U.S. Troops and first responders who protect our freedoms and way of life. That is only possible by being a for-profit company that pays taxes.

I hope you will get involved with and explore the many resources that are available to you through the Reliabilityweb.com network.

Warmest regards,
Terrence O’Hanlon
CEO, Reliabilityweb.com