



From the Reliability Professionals
at Allied Reliability



ARE YOU DOING TOO MUCH PM?

**16 Ways to Save Time and Money on
Preventive Maintenance**

**A Must-Read Guide for
Maintenance and Reliability Leaders**

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Are You Doing Too Much PM?

16 Ways to Save Time and Money on Preventive Maintenance

Unless you've been living on another planet for the last fifty years, you already know that the case for doing preventive maintenance is watertight.

Done right, preventive maintenance will preserve, protect and extend the life of your equipment – and boost overall return on assets.

So here's the question: Why are most maintenance and reliability professionals so unhappy with their PM programs?

Surprisingly enough, according to the consultants at [Life Cycle Engineering](#), just 22% of maintenance managers are satisfied with their current programs. Here are the two biggest complaints:

PM Consumes Too Many Resources

Many maintenance managers believe their PM program is simply bigger than it should be. They feel like they don't have enough manpower to manage all of their PM's along with the other important maintenance work, too.

Lack of Results

Despite all of the time and money being spent on preventive maintenance, there are still way too many unexpected equipment failures.

Case in point: During a recent chemical plant tour, the frustrated maintenance manager said, "We just PM'd that machine, and it failed a short time later anyway. So why didn't we catch the problem with the PM?"

Why indeed.

So in a nutshell, the problem with preventive maintenance is that it takes too much time and produces too little results.

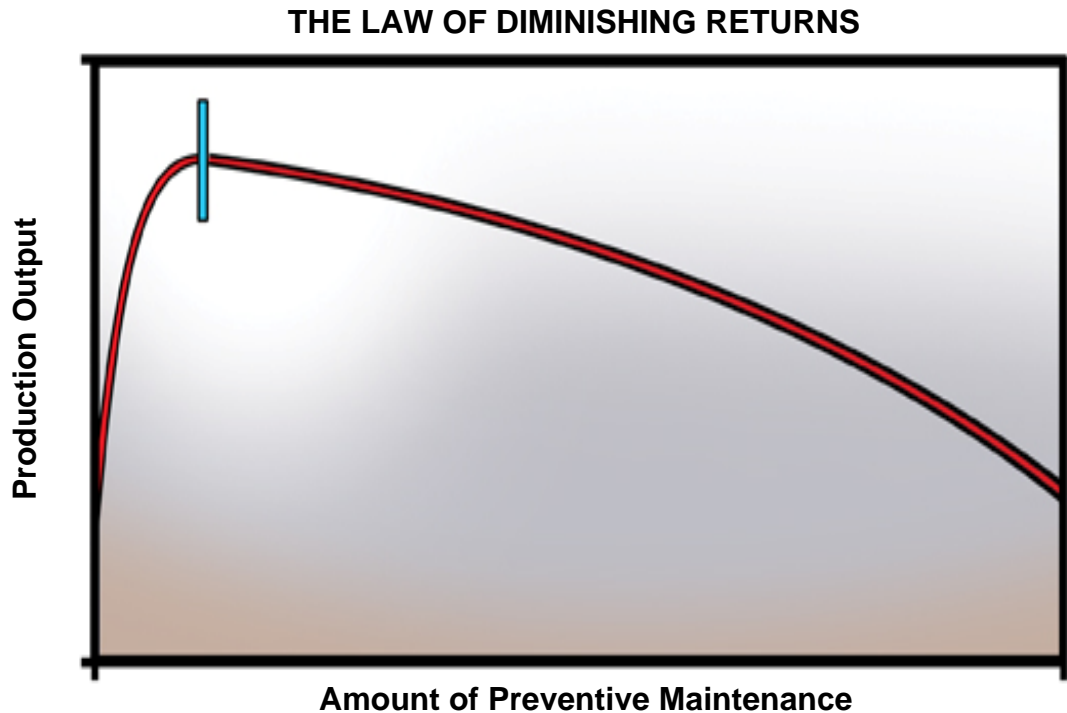
That's why we decided to publish this special report. So let's press on.

1. The No. 1 Law You Should Know

The number one law of economics you need to know is based on a principle discovered over 200 years ago. You've probably heard of it – it's called the **Law of Diminishing Returns**.

As any good MBA student can tell you, this law states that as one production factor increases while the others remain constant, overall production decreases after a certain point.

In plain English, it means as you increase preventive maintenance, production output eventually decreases. The following chart illustrates:



You see, there's a fine line between doing too much, too little and just the right amount of preventive maintenance. Clearly, there's a point at which increasing PM hurts the bottom line.

The reason? Simple. Most PM procedures require that the equipment is shut down. That means uptime goes down, so production output eventually goes down too. Meanwhile, maintenance costs go up.

So how much preventive maintenance is too much?

According to a private study, best practice programs generate 15% of their maintenance work from PM inspections. Another 15% is corrective work identified by those inspections.

So preventive maintenance should account for about 30% of your total maintenance workflow.

2. The Real Truth About PM

By definition, all PM's are time-based. That means either calendar time or operating time dictates when an asset should be inspected, cleaned, adjusted, replaced or reconditioned.

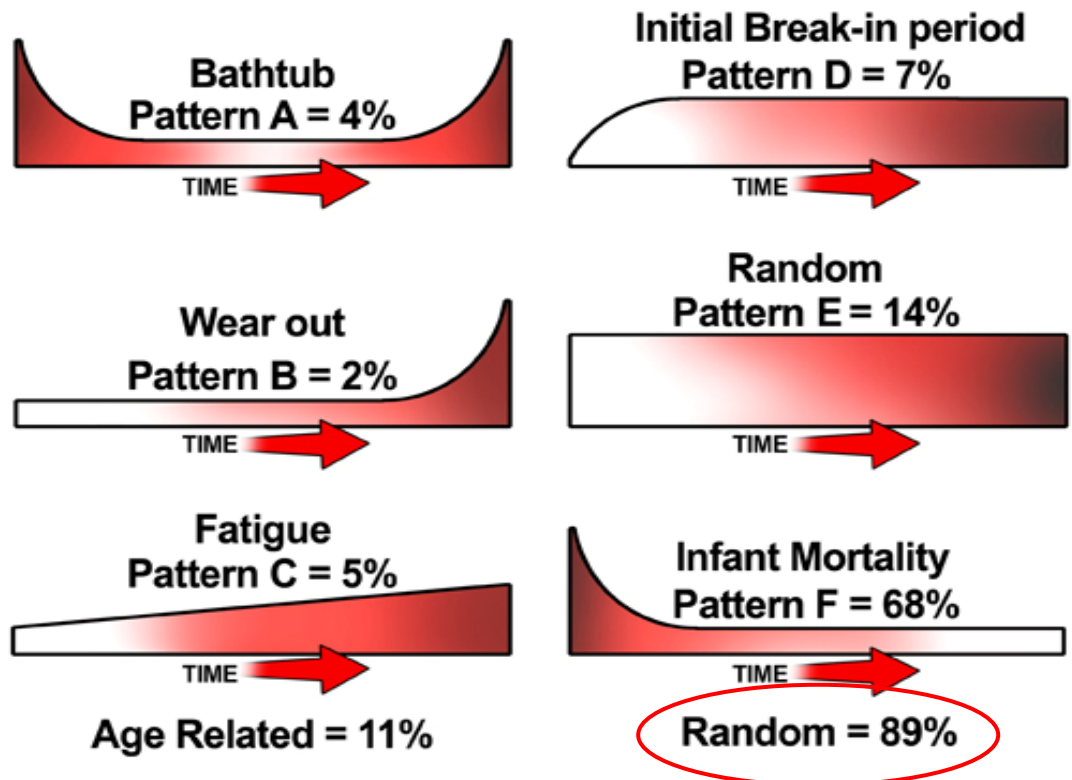
But is there really a direct relationship between the time equipment spends in service and the likelihood it will fail?

In short, the answer is no.

The truth is, most equipment failures are not age-related. In fact, for complex systems, the majority of failures will occur at random.

Consider the facts. The following graphs demonstrate failure probabilities relative to the age of the equipment itself:

FAILURE PATTERNS



First, it's important to understand this data comes from the airline industry, where maintenance and operations standards are exceptionally high. That gives us a true picture of how equipment fails when it is maintained and operated correctly.

The reality is, 89% of equipment failures are not age-related. Therefore, there's no amount of time-based preventive maintenance which can manage these failures effectively.

That's why using time as the primary basis for your maintenance strategy is inherently flawed. It will have very little impact on overall reliability.

From a risk standpoint, it's much safer to assume that equipment failures can happen at any time.

3. If It Ain't Broke, Don't Fix It

Many PM's are highly invasive procedures which can disrupt and disturb stable systems.

Take a pump, for example. Here are the five most common mistakes that can happen whenever a pump is taken apart and put back together again for the purpose of preventive maintenance:

- Bearings get damaged
- Shaft is not properly aligned
- Pump is not bolted down properly
- Seals are not properly installed and adjusted
- Lubricants get contaminated

As a result, when the pump is turned back on, bad things can happen.

The dirty little secret in maintenance is that a significant number of equipment problems are caused by maintenance itself.

Stated a little differently, preventive maintenance can trigger the very same failures it's intended to prevent.

That's why it's important to avoid excessive tinkering.

4. Beware of "PM Creep"

The vast majority of preventive maintenance programs were not properly planned, designed or engineered up front. Quite simply, they have evolved over time.

Consider what happens whenever a critical piece of equipment fails. Frequently, the boss says, "Make sure this never happens again!" In order to do that, maintenance adds more PM's: more cleaning, more lubrication, more inspections ...

Another failure? Another PM. Before long, the PM program is bigger than it needs to be.

Unchecked, PM creep is a major source of waste and excess costs.

The solution? Have a team that regularly reviews and removes unnecessary PM's from the system.

5. The First Question to Ask About PM

All PM's are not created equal. In fact, you might be surprised to learn how much preventive maintenance is done every day that doesn't add any real value. According to Forbes magazine:

"One out of every three dollars spent on preventive maintenance is wasted."

You see, you can get really good at doing PM's that don't add value. So here's the question to ask yourself:

"Does this PM help us preserve, protect or increase our manufacturing output?"

If the answer is no, and it's not required for safety or administrative purposes, stop doing it.

By simply recognizing and eliminating waste, you can free up the time and money you need for the maintenance activities that really do add value.

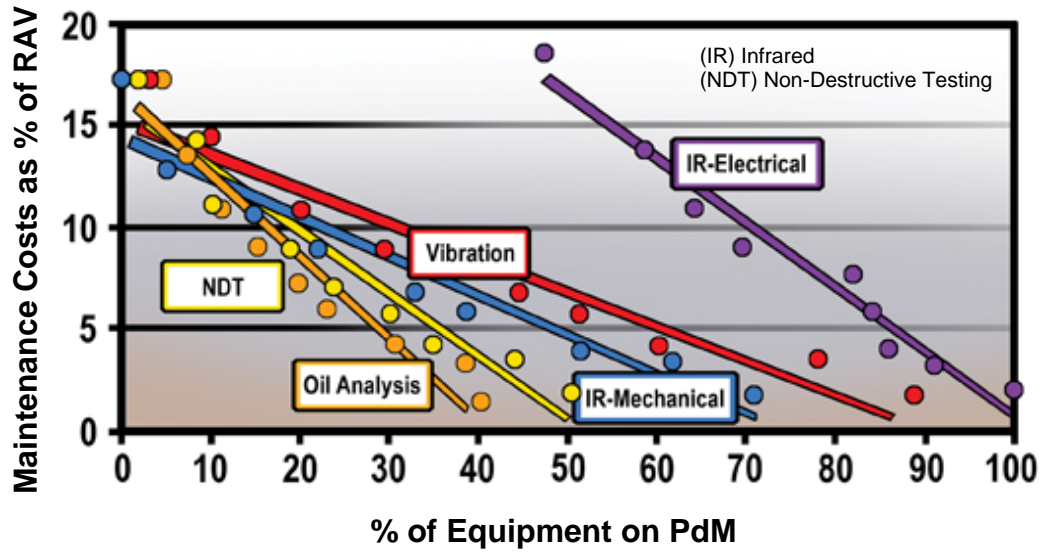
6. Consider PdM First

No matter what kind of industry you're in, predictive maintenance (PdM) is almost always more cost-effective than people as your first line of defense against equipment failures.

Based on studies done in major industries including chemicals, paper, metals, automotive and power generation, something interesting happens as more equipment is added to the PdM program:

Overall maintenance costs go down. Here's what the data shows:

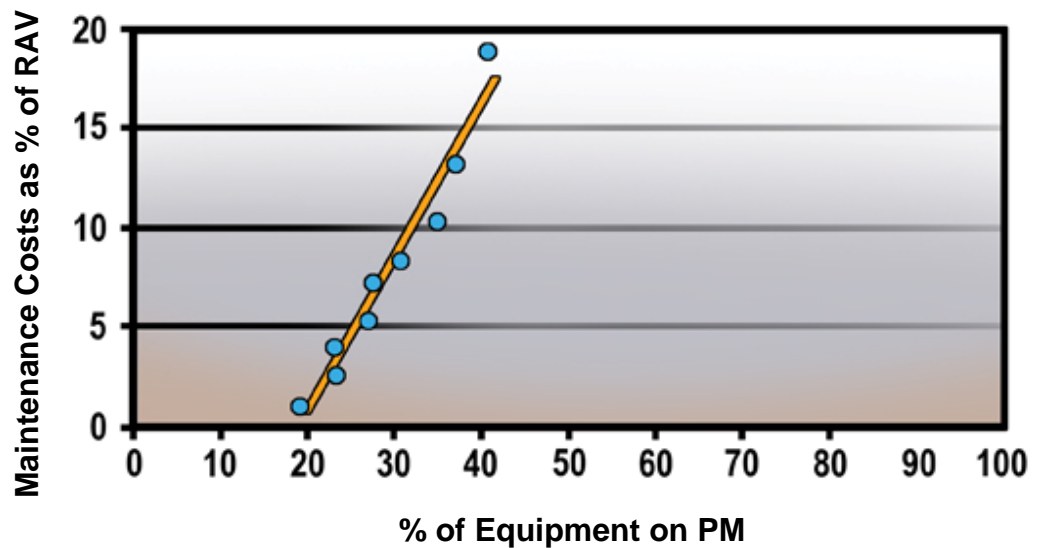
MAINTENANCE COSTS VS. PdM



As you can see, there is a direct correlation between high levels of PdM and low overall maintenance costs – measured as a percent of the assets’ replacement value (RAV).

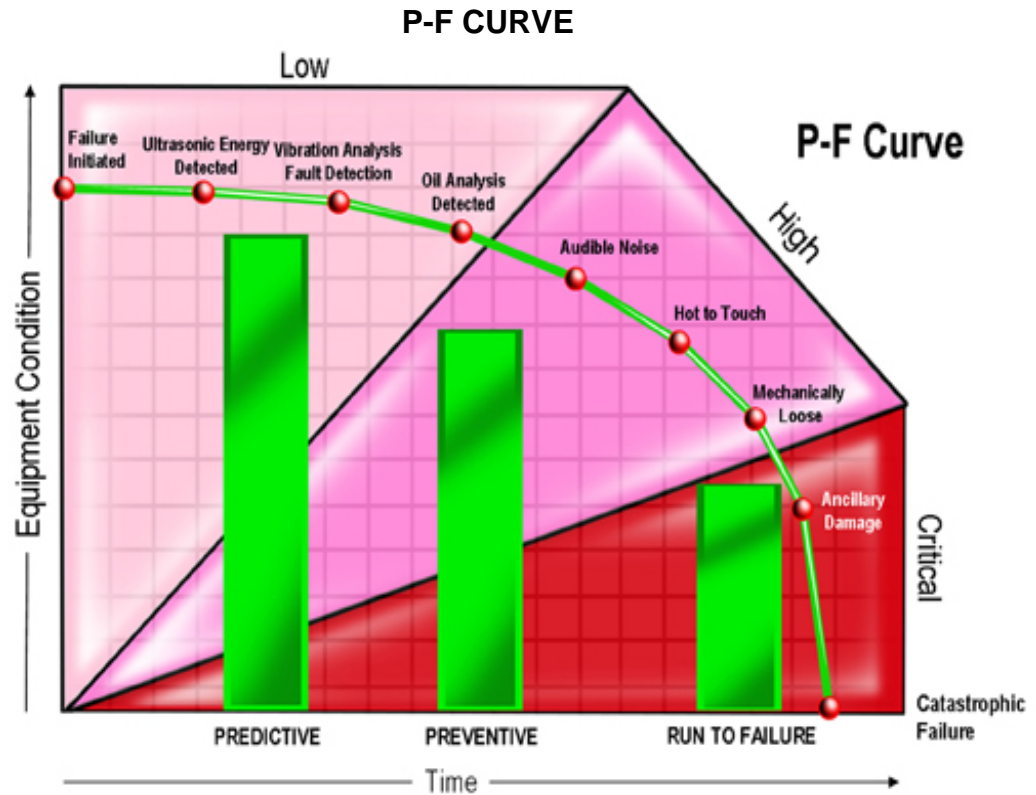
On the other hand, the data also shows that increasing the size of a PM program directly results in higher maintenance costs. The following graph illustrates:

MAINTENANCE COSTS VS. PM



Why is this the case? Consider the facts:

Predictive maintenance inspections can identify problems much earlier on the failure curve than preventive maintenance (see chart below). So PdM gives you more time to plan, schedule and make the repairs – and avoid unscheduled downtime.



And that's really the secret – predictive maintenance drives more planned work. What that means is:

- Jobs done faster, safer and at a lower cost.
- Studies show that a well-planned job takes only half as much time to execute as an unplanned job.
- Each dollar invested in planning saves three to five dollars during execution.

And don't forget, most predictive maintenance inspections require equipment to be up and running. That means downtime for maintenance is minimized – a key issue at plants where the value of downtime is \$5,000, \$10,000, \$20,000 an hour or more.

For all these reasons and more, make sure you consider PdM technologies first before adding more PM.

7. Get Data You Can Trend

In the past, maintenance was viewed simply as a repair function. Not any more.

Today, maintenance is a highly sophisticated process driven by one key factor: Information.

One of the primary goals of modern maintenance is to collect and analyze equipment information, and then decide when to intervene.

That's why preventive maintenance should provide you with real data you can trend and analyze over time. You want PM's which give you quantitative measurements you can do something with ... not just somebody's opinion.

So start with the equipment itself and ask yourself: "OK, this can fail. Can I measure it?"

If so, do it. Write it on the PM. Maybe you just need to record the voltage or the pressure. Or maybe you want physical measurements so you can see how equipment wears over time.

What you don't want are the PM's that say "Go inspect pump." That's where someone walks out in the plant, looks at the equipment and doesn't tell you anything.

Get rid of those and make them lean, mean, value-added PM's.

8. Check the History

Many PM's are performed on a rigid schedule, regardless of the asset's condition.

Case in point: One maintenance manager recently admitted his crews had just spent a full day replacing parts on a machine as scheduled – despite the fact that it had just been refurbished two weeks before.

9. Approach Vendor Recommendations with Caution

There are plenty of reasons to be skeptical about maintenance recommendations from original equipment makers. For example:

- Vendors usually aren't experts about your plant and production processes.
- Vendors don't know all the details of your plant's operating conditions.

- Vendors don't always consider the skill sets of your workforce.

So what do vendors know? Their equipment! As a result, they tend to over-prescribe maintenance to make sure their equipment makes it through the warranty period.

After all, they are not the ones paying for your labor. So it's easy to spend someone else's time and money on PM overkill.

And don't forget that selling spare parts is nearly always more profitable than selling the original equipment. So there's built-in motivation for vendors to steer you towards buying excessive spare parts.

10. Find Out the Reason Why

When PM's identify equipment problems, instead of asking "How fast can we fix this?" the question should be "Why did this break?"

Discover root causes, not just symptoms.

11. Do the Math

If the annualized cost of a PM activity – including the total value of labor, materials and downtime – exceeds the cost of a potential failure, it's the wrong PM activity.

Remember the value of downtime can be huge.

12. The Problem with "Pencil-Whipping"

The practice of pencil-whipping, or signing off on work that has not been done, is commonplace at some plants. However, this is serious business – just ask someone in the airline industry.

Here's the deal: Falsifying records and making false statements is illegal.

And it's not just the person making the false entry who can be held liable – managers, supervisors, co-workers, and the company itself can be punished, too.

Make sure everyone clearly understands the legal requirements for completing maintenance records. Lay out a clear disciplinary policy for violators, and investigate any suspicious incidents.

13. Apply the 6:1 Rule

If your PM inspections are not generating much corrective work, that's a warning sign. You see, corrective work is your return on investment in preventive maintenance – that's where you get your money back.

So low corrective work means low return on investment.

Remember, the main goal of preventive maintenance is not to prevent equipment failures. It's to prevent the consequences of failures.

How? By detecting problems while they are still small and easy to fix. That allows you time to plan and schedule the repair work and avoid extended downtimes.

That's why a good metric to track is PM inspection time vs. correction time using the 6:1 rule. That means you should find something "wrong" one out of every six times you PM a machine.

For example, if four hours of preventive maintenance generates one hour of corrective work, that's OK. But if it takes seven or eight hours of PM to generate one hour of corrective work – that's not OK.

For instance, the maintenance manager at a pharmaceutical company in Puerto Rico recently discovered his ratio of inspection time to correction time was way above 6:1. So he decided to cut back on the frequencies of some of the PM inspections.

The result? \$221,000 saved in maintenance costs in the first few months ... with no change in equipment reliability.

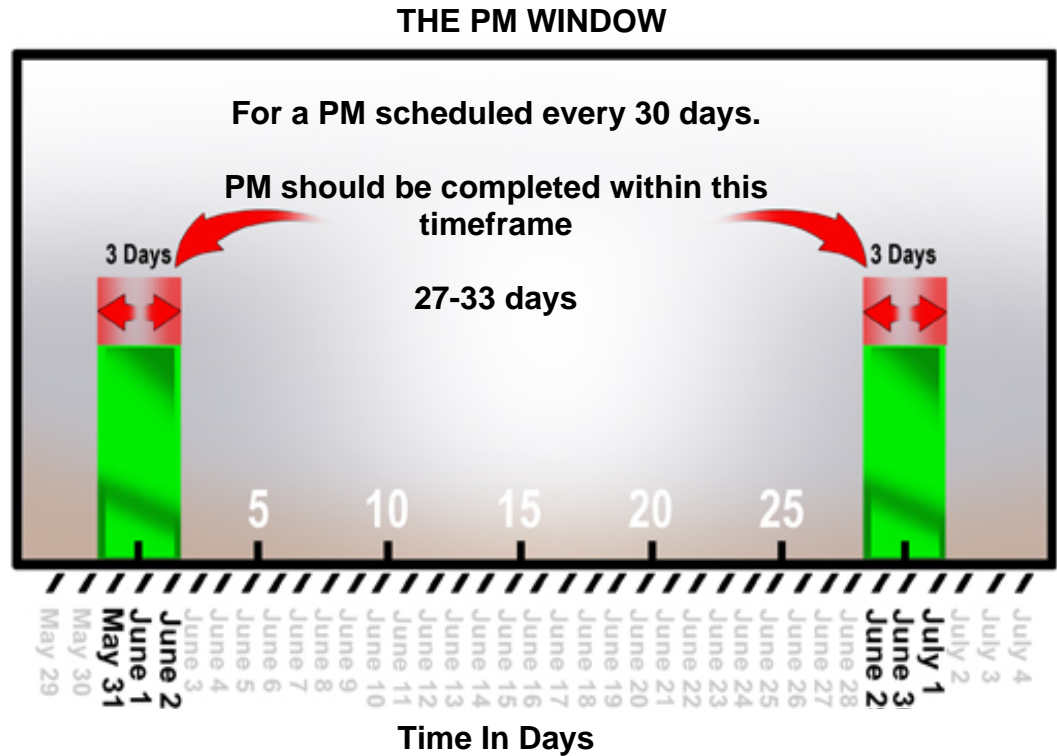
14. Consider the Time Factor

Do you struggle to find the time to perform PM's? Is there a significant number of PM's not being completed on time? Are PM's frequently deferred?

If so, that's another red flag.

Look, all PM's are time-based, so it's important to do them "on time." What that means is, a PM should be done within a timeframe of plus-or-minus 10% of its due date.

For example, if a PM is scheduled every thirty days, it should be completed within a three-day window of the due date. The following chart illustrates:



Frankly, one of the hidden problems of preventive maintenance is there's no immediate, observable consequence of not doing it.

For example, if you don't change the oil in your car at 3,000 miles, it's probably not going to break down the next day.

However, you can't defer preventive maintenance if you want to have an effective reliability program. PM may not be the most urgent or exciting work you do, but it's definitely among the most important.

15. Why Maintenance People Don't Like PM

What's the first thing your maintenance crews think when they hear the term "PM"?

Would you say, "Boring"?

Let's take a look at the three main types of maintenance work:

- "Routine" maintenance – including PM and PdM inspections, lubrication, etc.
- Backlog relief – dealing with investigations, repairs and restoration activities.

- Emergency response – immediate action to address breakdowns.

Here's a suggestion: Put your best troubleshooters and maintenance "heroes" in emergency response. Put the methodical, disciplined workers on preventive maintenance. Put new people on backlog.

That sends a clear message to your entire organization about the importance of preventive maintenance.

As the father of modern management, Peter Drucker, once said:

"The productivity of work is not the responsibility of the worker, but of the manager."

16. Get a Professional, Independent Evaluation of Your PM Program

A lot of companies know they need to downsize – or "right-size" – their PM programs. But the problem is, they don't have the time, tools or processes they need to do it.

That's why firms like Allied Reliability offer formal, in-depth PM evaluations. Here's how it works.

First off, your key PM data is loaded into custom software analysis tools. Then the PM's are sorted, reviewed and evaluated according to their content.

The results can be eye-popping. Here's proof: Take a look at the following results from a recent PM evaluation involving 20,000 PM's at a steel mill:

PM EVALUATION

PM Task Action Recommendation	# of PM's	% of PM Tasks	Man-Hours Represented	Cost at \$30 per hour
Non-Value Added or Reassign	5,876	29.4%	23,867	\$716,010
Replace with PdM	6,437	32.2%	28,222	\$846,660
Re-Engineer	5,200	26.0%	26,221	\$786,630
No Modifications Required	2,487	10.4%	8,987	\$269,610
Totals	20,000	100%	87,297	\$2,618,910

Now you can see the opportunities to save time and money – in real dollars:

- Save \$716,010 by eliminating the non-value added PM's or reassigning them to operations.
- Replace \$846,660 worth of PM's with more cost-effective PdM.
- Re-engineer \$786,630 worth of PM's so they truly add value.

In sum, over half of all the preventive maintenance work at this plant could be stopped – or replaced with PdM – without consequences.

And that's just the tip of the iceberg. That's why an independent evaluation of your PM program is the fastest, easiest, surest way to get your costs under control.

For more details about Allied's PM evaluations, call 918-382-9400.

Or send an email to info@alliedreliability.com.

Summary

It all comes down to this: Preventive maintenance is a business, so it should be run like a business.

Simply put, every PM work order is an authorization to spend money. That's why it's important to do the least amount of work, at the least cost, which will still meet your expectations for reliability.

So there you have it. Now you know **16 Ways to Save Time and Money on Preventive Maintenance.**

For more recommendations on products and services that will help you reach your goals in maintenance and reliability, contact:

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