

**MaintainX**

# Implementing Preventive Maintenance at Your Company

Reduce Failure and  
Save Money



# Implementing Preventive Maintenance

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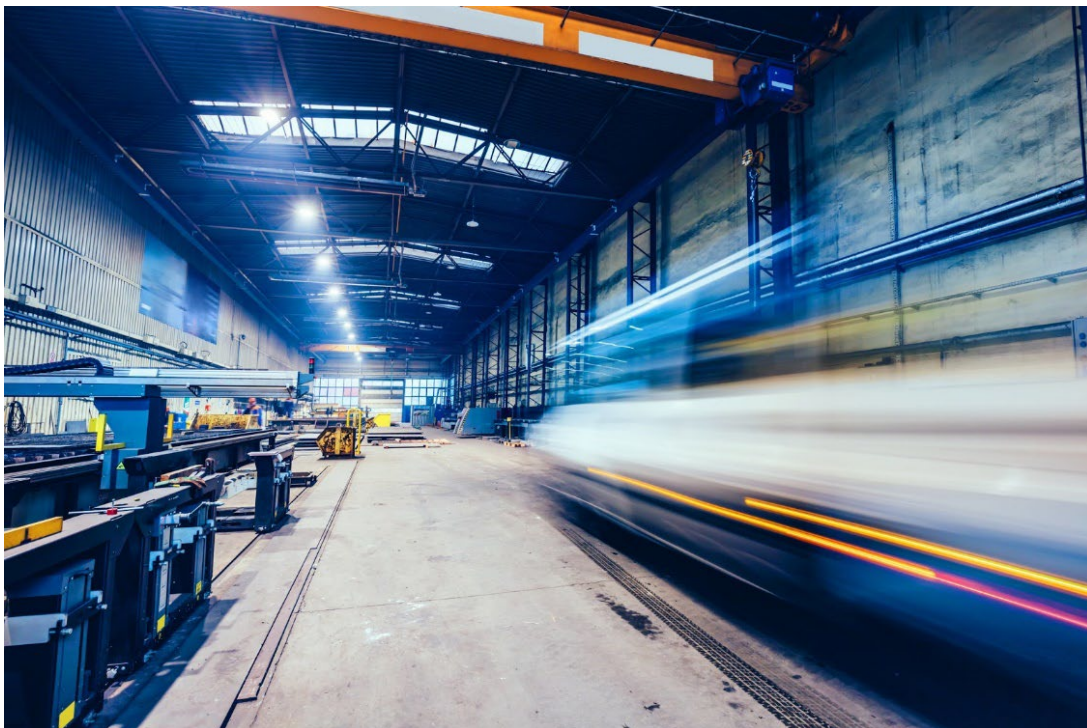
# 01

## Increasing Manufacturing Efficiency

There is a lot of discussion across industries and platforms about increasing production efficiency in manufacturing. It should come as no surprise that nowadays production efficiency involves the smart integration and automation of new technologies, machining centers (CNCs), and the Internet of Things (IoT). With the complexity of global production today, organizations are turning to new digital solutions to keep pace with today's swift-moving and changing environments to meet customers' demands.

Not surprisingly, the same 6-10 tips tend to circulate across all websites. While the concrete steps you take will be unique to your organization's challenges, resources, and production systems, the advice is mostly the same:

- Improve Business Processes and Workflows
- Implement Maintenance Strategies to Increase Production Efficiency
- Eliminate Wastefulness and Recycle
- Get Organized with Connected Worker Platforms
- Improve Employee Training Processes



Team collaboration tools like [Computerized Maintenance Management System \(CMMS\)](#) improve communication, streamline work order automation, and simplify asset management.

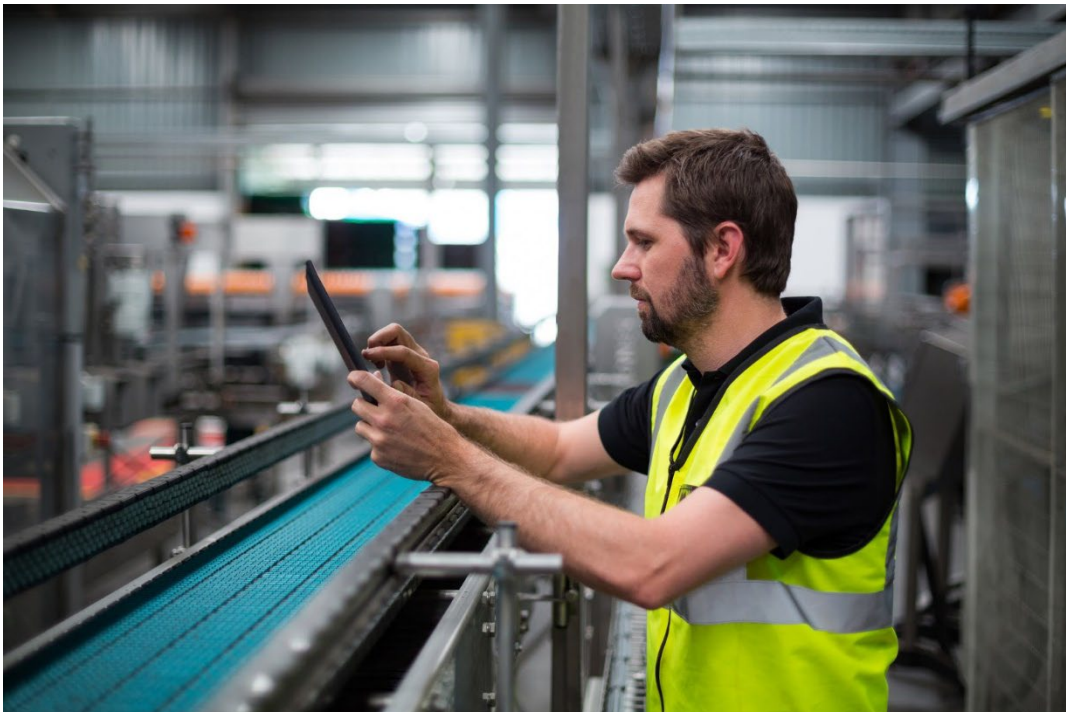
Most manufacturing leaders are familiar with CMMS that centralizes maintenance information, automates work order scheduling, and facilitates better Operations and Management (O&M) decision-making.

However, as with most technologies over the past two decades, much has changed in terms of CMMS functionality, versatility, and convenience.

Companies across industries are increasingly under pressure to get more done in less time. This push for greater productivity translates to increasing [uptime](#), decreasing downtime, and tightening plant maintenance operations.

Organizations periodically need to review current business processes to look for areas to improve, redefine, and reorganize. Whether your organization is drafting its first set of work instructions or re-evaluating long-standing procedures, always view them as a work-in-progress.

Companies that successfully measure, iterate, and improve these instructions as part of their internal culture tend to be the ones that last over time. This guide will discuss how integrating and automating critical aspects of production increases manufacturing efficiency across teams, facilities, and organizations.





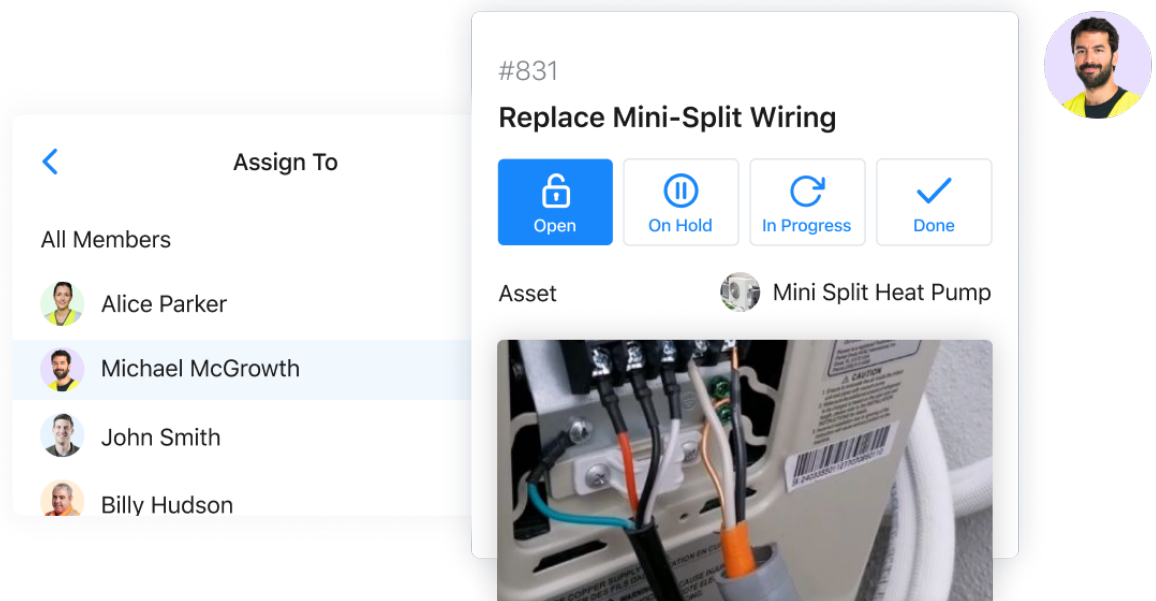
# Create, Integrate, and Automate Standard Operating Procedures

We recommend that organizations create standardized work Instructions to ensure that all processes are timely, consistent, and repeatable. Evidence suggests organizations need to automate their processes to stay competitive. [According to McKinsey](#), the number of businesses seeking to automate their processes increased from 57 percent in 2018 to 66 percent in 2020.

Standard operating procedures (SOPs) make it easy for employees to reference work instructions, policies, and checklists. Additionally, digitization allows managers to track SOP implementation, quality assurance, and maintenance efforts.

## 1. Use CMMS for SOP Automation

[Digital SOPs](#) make life easier for organizations of all types and sizes. They streamline manufacturing processes, reduce operational and total costs, and provide real-time updates on task completion. Using manufacturing Standard Operating Procedures, managers can standardize preventive maintenance processes and quality assurance plans across teams, facilities, and functions. From how a new piece of equipment runs to how a manager audits performance, an SOP will always make repeatable processes more efficient.



With digital SOP, management can quantify and organize every process that workers use. It is not only about the shop floor. Automate the SOP for how the front office receives production updates from the floor. Digitize the SOP to alert the warehouse maintenance team that products are ready to ship.

An SOP can even standardize how a team communicates. Streamlining internal communications creates production efficiencies across the company.

## **2. Automate Repetitive Tasks First**

Not sure where to begin? Start by documenting your organization's most repetitive tasks. Routine, manual tasks provide an easy opportunity for automation to free up time and resources. These tasks may include daily cleaning procedures, routine maintenance tasks, and worker opening/closing processes. In manufacturing environments, the term [downtime](#) refers to the amount of time production stalls because of non-functioning equipment. However, downtime can also represent any time wasted in an organization's production cycle. Use this methodology to identify opportunities to eliminate these eight types of waste with new processes:

### **DOWNTIME**

- Defects
- Overproduction
- Waiting
- Not utilizing talent
- Transportation
- Inventory excess
- Motion waste
- Excess processing

Lean Six Sigma is another holistic approach to industrial management focused on improving performance by eliminating "process waste." Common examples of operational and maintenance (O&M) waste include extra-processing, inventory mismanagement, transportation mismanagement, non-utilized talent, overproduction, and equipment downtime. Lean Six Sigma is a team-oriented approach that maximizes efficiency and improves business profitability.

### 3. Use Employee Input to Outline Processes

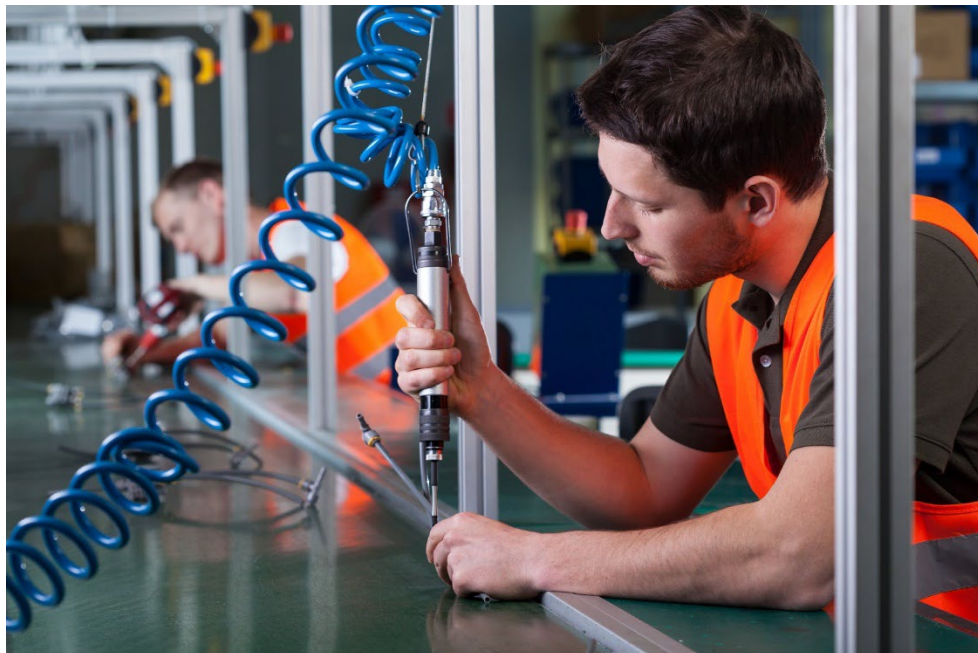
Upon closer look, you may notice that most broad employee assignments contain small steps within them. For this reason, the employees who regularly perform specific procedures should plan, develop, and write the first draft of the SOP. After all, they are the “subject-matter experts” (SMEs), most familiar with the procedures. The same employee who [writes the SOP](#) should then work through the written procedure to make any necessary changes. The writer may need to clarify the text and add graphics to increase clarity and ensure compliance.

Once the initial draft is complete, assign secondary employees and managers to review the SOP. Those familiar with the procedure may notice a missing or complicated step that can be broken into smaller ones. Once an SOP is in final draft form, organizational leaders can review for quality assurance and make final changes.

An SOP should not be complicated. The simpler it is, the more effective it will be. Write digital SOPs in simple, straightforward, and actionable language that everyone can understand.

When work instructions contain the optimal steps needed to perform a process, companies realize improvements in a variety of areas, including:

- Product consistency
- Product quality
- Operator safety
- Process throughput



# Benefits of Digital Standardized Work Instructions

Moving your company's processes and standardized work instructions to a digital platform can lead to various benefits: centralization, process control, and structured and linked workflows.

## Centralization

For a company to be competitive these days, work instructions need to be created and *maintained* with workflow management software. By doing so, you can centralize all instructions in one place, in one app, available virtually anywhere you bring your phone. Additionally, these can be iterated, improved, and put into action across your organization instantly – an undertaking that would have previously required months to prepare.

Centralization can and will save you and your workers time digging through hard drives, old files, and filing bins, which ultimately saves you money. Centralizing standardized work Instructions and procedures also ensures that your workers receive instructions.

Another benefit? Collaboration is much more straightforward.

## Process Control

How does your company ensure compliance with workflows and instructions? Without a standardized approach and constant supervision guaranteeing that technicians follow every step of a process correctly, compliance is challenging—if not impossible.

Welcome to [Industry 4.0](#). In this new wave of technology, you can upload Standardized Work Instructions and make them available on a digital platform to all your employees. You can create a series of checklists for procedures to enforce compliance by all your workers, leaving behind an **audit trail** of those employees who do not complete all the required tasks.



# 02

## Employing Maintenance Strategies to Increase Manufacturing Efficiency

A maintenance strategy is a systematic approach to maintain assets in prime working condition for efficient production. It involves equipment maintenance checks, data analysis—of KPIs, failure rates, performance, and costs—and the repair or replacement of faulty equipment. High-level maintenance programs typically mix several different maintenance strategies based on the needs of individual equipment.

However, managers often adapt industrial maintenance strategies for equipment to meet unique needs, goals, and budgetary constraints. The optimal balance between costs and performance is, therefore, different for each company. However, in many cases, shifting from reactive or corrective maintenance to preventive maintenance can improve the ratio between the two elements.

Effective maintenance strategies increase production efficiency by:

- Reducing downtime and guaranteeing high equipment availability
- Keeping maintenance and operational costs low and predictable
- Optimizing facility performance and production
- Maintaining a high level of safety
- Extending equipment life



Evaluate every aspect of your production line. Pay special attention to measuring throughput—the average number of units your company produces in a given period. This measurement will highlight any issues you have with specific machines.

Another essential metric to review is your capacity utilization. This measurement involves calculating the capacity of your total manufacturing output per factory at any given moment. Analyzing capacity utilization allows you to see which production lines are operating at their highest possible output.

Both metrics illustrate precisely how costly equipment downtime can be. For example, if the standard output rate is \$500,000 worth of widgets every hour, the difference between a maintenance mechanic taking 15 minutes to repair a broken conveyor belt versus 30 minutes is critical. The difference could cost your company \$125,000.

## **Maintenance Strategies**

### **Reduce Downtime and Bottlenecks**

During the past two decades, advanced technologies have allowed companies to manufacture products at a stunning rate. Consequently, maintenance teams need to plan equipment servicing to minimize costly equipment disruptions that halt production without warning. The more highly automated the facility, the more critical efficiently preventing, diagnosing, and solving complex asset breakdowns becomes using work order management tools.

Maintenance management is the prioritizing, strategizing, and delegating maintenance-related objectives to maintain company assets. It involves tracking, controlling, and maximizing equipment lifespans to increase organizational profitability, increase manufacturing efficiency, and reduce downtime.

Machine downtime is a common issue for production lines, manufacturing maintenance teams, and plant managers. There is no easy way to overcome this. However, downtime is variable, and reducing your [mean-time-to-repair \(MTTR\)](#) is a reasonable goal. Modern CMMS software systems provide preventative maintenance functions, optimal spare parts inventory levels, improved scheduling and planning, and measurable regulatory compliance.

Unplanned downtime negatively impacts organizations in many different ways, including unexpected repair costs (e.g., employee overtime, spare parts, and outsourced specialists), delayed shipments, customer dissatisfaction, and lost revenue.

However, to manage production efficiency, effective maintenance departments use automated software to organize both tactical and operational maintenance actions based on business priorities.

Organizational leaders must work together to identify the “critical asset targets” that *most* impact operational targets by conducting [criticality analysis](#) and automating strategic maintenance workflows.

## Benefits of Maintenance Management

### Decrease Downtime

Preventive maintenance ensures that your equipment continues to run smoothly without unexpected downtime or work stoppage—schedule preventive maintenance at regular intervals.

### Budget Accurately

Well-designed maintenance management systems will enable your organization to be more insightful about where your team’s resources are going than ever before. For example, in the manufacturing industry, say a floor supervisor believes a team is understaffed. He may be having a hard time justifying to management an increase in headcount or measuring asset life cycles. Fortunately, an effective maintenance management software can identify where the team spends most of its time. This data allows managers to re-prioritize their workflows or make a compelling case to bring on additional help to maintain or even increase productivity.



## Schedule Work

Many organizations oversee a complex array of machinery and systems that require a well-managed preventive maintenance routine to run efficiently. Many of these organizations depend on Excel spreadsheets or whiteboard schedules in the manager's office to know what maintenance employees should perform next.

## Manage Compliance

Computerized Maintenance Management Software allows you to pull up compliance information instantly from any connected device to produce any reports necessary to satisfy regulators.

Beyond sharing documents with regulators, maintenance management systems ensure that [compliance standards](#) are tracked and scheduled appropriately. During inspections, these digital audit trails validate that the appropriate personnel performed tasks efficiently and on time.

## Iterate and Optimize

Every organization is different, even across each site. There is no one-size-fits-all maintenance approach for every team. Therefore, managers need to monitor real-time production data for trends that can provide actionable insights towards improvement.

Your most expensive technicians may be spending far too much time performing routine tasks that fewer senior team members can accomplish, especially when a [total productive maintenance](#) program may lead to better production efficiency.

## Improve Safety

In an ideal world, you could sit your team through a safety video on their first day of work, and they would execute flawlessly going forward. We all know that is unrealistic. Beyond asset optimization and time management efficiencies, maintenance management software can provide timely reminders to follow safety guidelines when performing assigned tasks.

Not every assigned task is something your team members routinely perform. Having [safety instructions](#) available on their mobile devices at their fingertips can save lives and money.

# 03

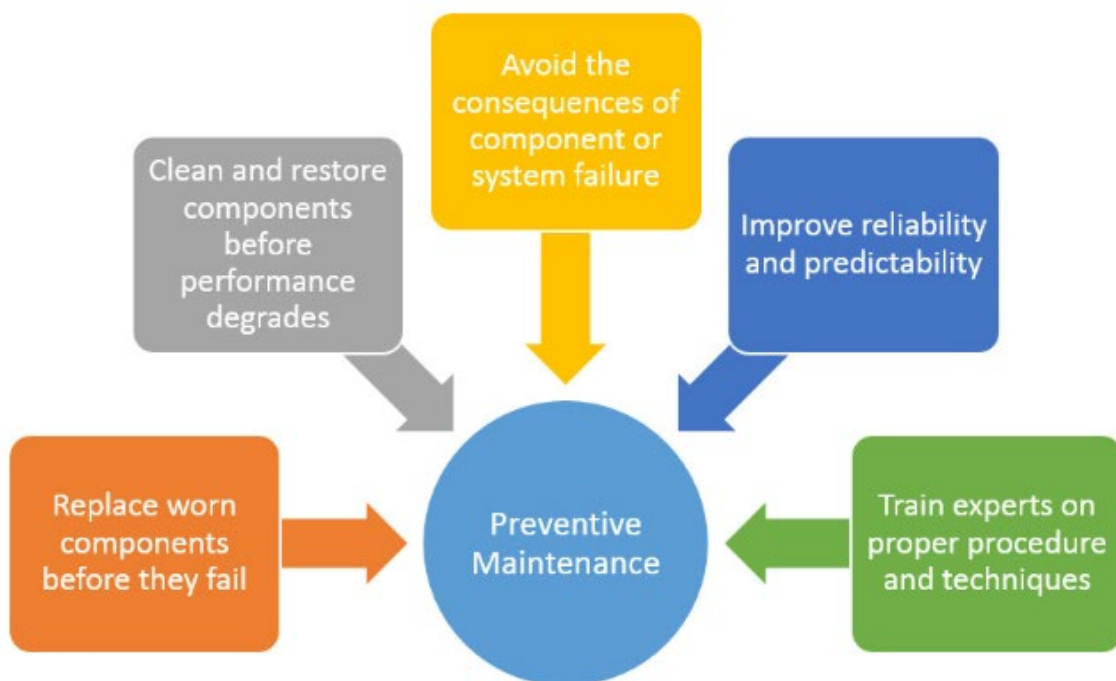
## Implementing Preventive Maintenance in Manufacturing

Studies suggest companies can save [an average of 12 to 18 percent](#) in costs by investing in preventive maintenance (PM). Facilities that are entirely reliant on reactive maintenance can save even more. In other words, every dollar spent on preventive maintenance will save nearly five dollars on expenses.

Yet, more than half of U.S. companies still exclusively practice reactive maintenance primarily because, as our research suggests, **leadership often assumes that:**

1. Reactive maintenance is more cost-effective than preventive maintenance and
2. They do not have time for it.

Both assumptions are incorrect. Here you will learn how preventive maintenance saves money, decreases downtime, and enhances safety for industries across the board. You will also learn how to create a preventive maintenance plan, determine which type of PM system is right for you, and evaluate CMMS.





# Preventive / Preventative Maintenance

Preventive Maintenance (PM) is [planned maintenance](#) that prolongs the lifespan of company assets, equipment, and infrastructure. Also known as preventative maintenance, PM includes [adjustments](#), cleaning, lubrication, repairs, and replacements.

*Preventive maintenance means fixing minor problems before they become big ones!* Organizations can obtain maximum asset value by slowing down excess depreciation, deterioration, and malfunction.

As the term suggests, [preventive maintenance \(PM\)](#) involves taking preventive actions to ensure pieces of equipment never come to an inconvenient and expensive halt. The heart of every PM program is a recurring schedule based on manufacturers' recommendations for upkeep, historical behavior of assets, and available resources.

The most widely recognized form of preventive maintenance involves automobiles. Cars come with service recommendations for specific mileage points. Those who diligently follow such recommendations add years to vehicle life spans.

For example, you change the oil *before* the engine catches fire. You replace the fan belt *before* it snaps. Ignoring such recommended PM tasks increases the chances of hazardous breakdowns that often cost more to fix than periodic oil changes, tune-ups, and parts replacement.

Preventive maintenance is ideal for the following types of assets:

- Assets with a critical operational function
- Assets with high financial value
- Assets with preventable failure modes
- Assets with an increased likelihood of failure with use
- Assets with statutory requirements

No matter the industry, preventive maintenance always has three components. It is:

1. Systematic
2. Performed routinely
3. Aimed at reducing or minimizing failures

Preventive maintenance aims to minimize failures by detecting and fixing them before they lead to costly downtime. Downtime is the amount of time a system, machine, or piece of equipment is inoperable. Think of it as proactive maintenance. If you do not do it routinely and on time, it will not be preventive—it will be reactive.

[Condition monitoring](#) is a critical component of any successful preventive maintenance program. This is what makes PM different from other types of maintenance. For example, bearings have a specific lifespan and need to be replaced after a specified number of hours. You should check bearings regularly to ensure they do not need replacement. This is preventive maintenance. If you want to improve asset reliability while keeping maintenance costs down, you need preventive maintenance.

[Preventive maintenance \(PM\)](#) is a proactive approach to maintenance that aims to keep an asset in good working order by fixing issues before failures occur. The practice reduces unplanned downtimes by scheduling maintenance at regular intervals.

When performed consistently, PM can help organizations minimize expenses associated with unplanned downtimes, reduce maintenance costs, and enhance reliability.

The [U.S. Department of Energy](#) estimates that **PM can save facilities up to 18 percent in maintenance costs than reactive maintenance alone.**

## Common Preventive Maintenance

Preventive maintenance minimizes equipment downtime, improves asset lifespans, and lowers maintenance costs. It is a simple, direct, and systematic way to improve asset reliability.

**The most common preventive maintenance tasks include:**

- Inspections
- Cleaning
- Lubrication
- Adjustments
- Repairs
- Parts replacement

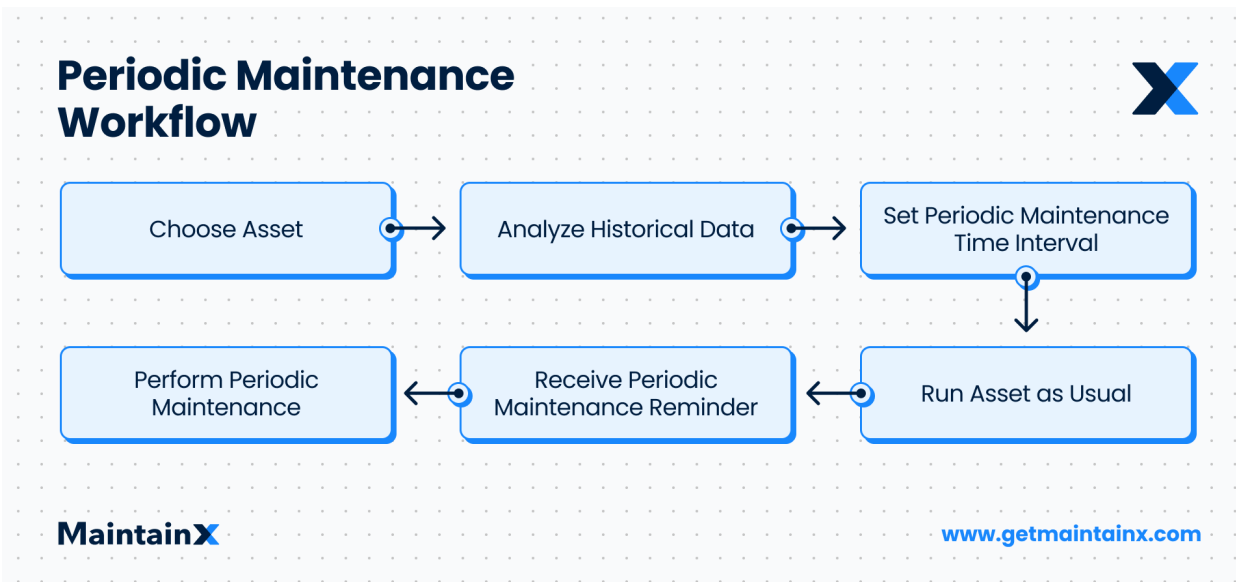
PM tasks are performed regularly to reduce the likelihood of failure throughout an asset's normal operating conditions. Operational and maintenance managers schedule PM tasks according to manufacturer recommendations, average asset life cycles, or historical behavior patterns.

# Types of Preventive Maintenance (PM)

Preventive maintenance tasks aim to reduce unplanned downtimes. Maintenance tasks generally fall into four broad categories.

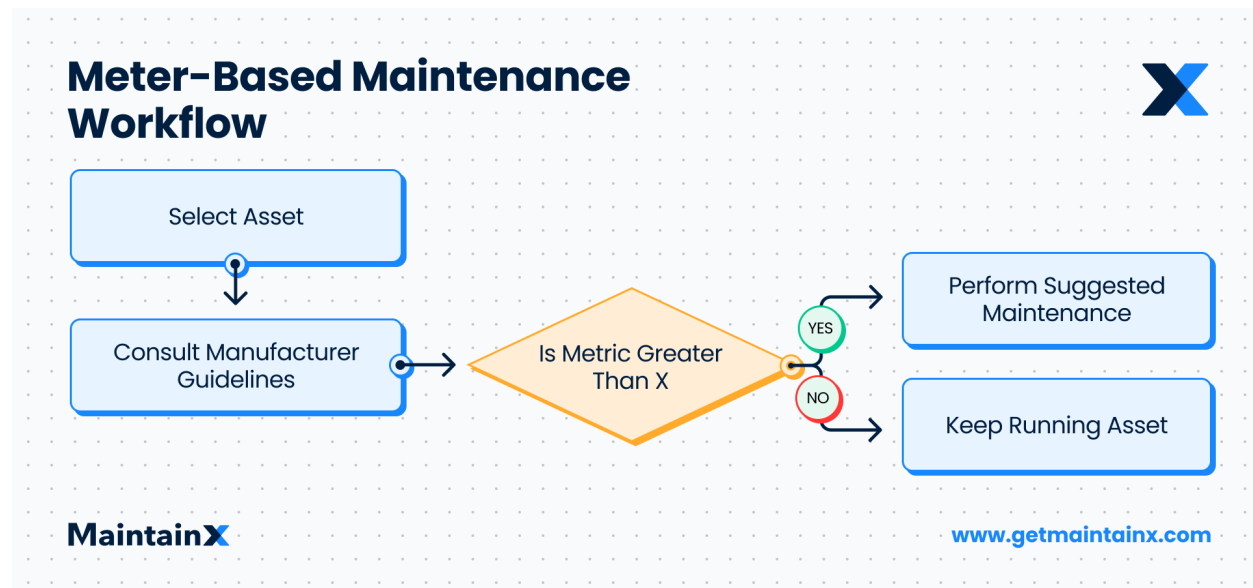
## Periodic Maintenance

**Periodic maintenance** includes preventive maintenance tasks performed at *scheduled* intervals. They can be performed weekly, monthly, quarterly, or annually. For example, you can change your engine oil every three months. Equipment manuals usually contain the recommended maintenance schedules for an asset. Periodic maintenance also is referred to as time-based maintenance.



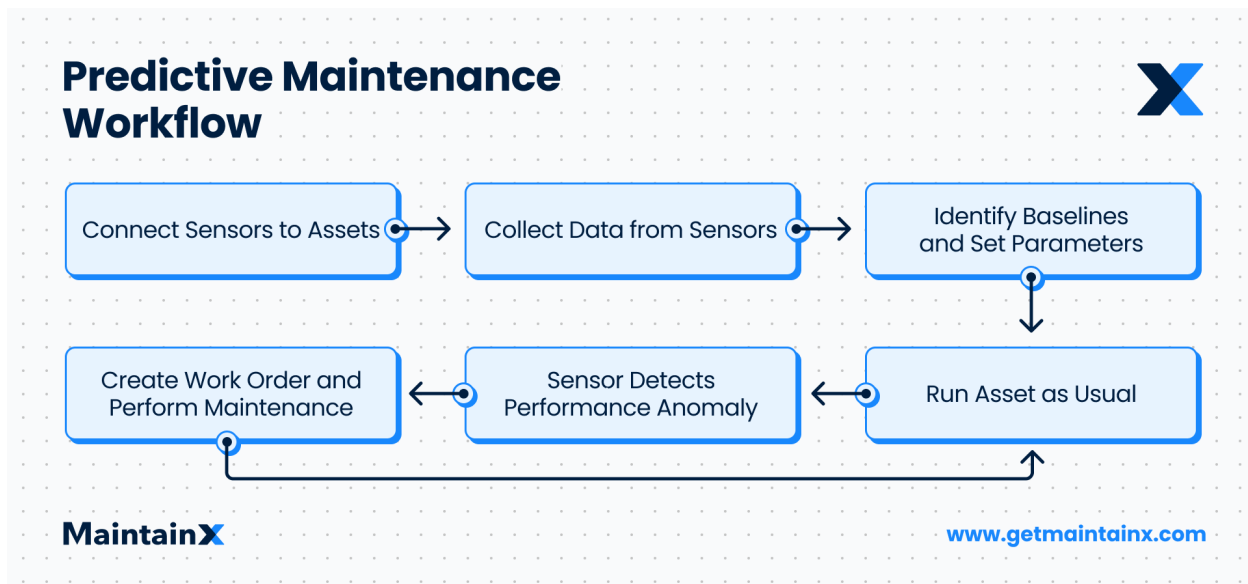
# Meter-Based Maintenance

**Meter-Based maintenance**, also known as performance-based maintenance, maintenance scheduling is based on equipment usage variables. Such assets usually have meters or counters to measure usage milestones. An example of meter-based maintenance is changing the engine oil every 3,000 miles.



# Predictive Maintenance (PdM)

**Predictive Maintenance (PdM)** is an advanced form of PM that uses sensor devices and data analysis tools to predict the optimal time when assets should receive maintenance to prevent failure. The goal of PdM is to perform maintenance just before failure occurs to eliminate the risk of under- or over-maintenance. An example of PdM is using vibrational analysis on high-rotating machinery to detect imbalance, misalignment, or bearing wear. A fluctuation in machine vibrations triggers maintenance.





## Prescriptive Maintenance

Prescriptive maintenance is similar to PdM as they both rely on data to make maintenance decisions. However, with prescriptive maintenance, machine-learning software gathers and analyzes equipment conditions to recommend specific maintenance actions. This helps to minimize operational risks. For example, sensors or other artificial intelligence (AI) software will recommend adjusting the barometric pressure in a processing tank in the event of a thunderstorm to avoid high pressure in the tank.

## Choose Which Type of Maintenance to Perform

Companies do *not* need to perform preventive maintenance on every asset. **The costs of performing PM should always be less than the cost of failure.** For example, say the cost of downtime for a particular asset is \$500, and its PM cost is \$800. In this instance, PM would be a waste of time and money. The company could save \$300 by running to failure.

Conversely, the preventive maintenance of many assets *will* translate to financial savings. Take hotels, for example. Check under the mattress in your next hotel room, and you might discover some hidden PM instructions. Did you know hotel staff turn mattresses each week to extend their lifespans? Surprisingly, this minor preventive maintenance procedure results in millions of dollars in savings for hotels worldwide each year.

Organizations that adopt an overall preventive maintenance philosophy seem to save more money than those that do not. [As reported in the Wall Street Journal](#), the cost of unplanned downtime by industrial manufacturers may be more than \$50 billion per year, and [the number one cause of downtime is aging equipment](#). Operator error and lack of time were the other top reasons listed by maintenance personnel.

Predictive maintenance is capable of finding that sweet spot between traditional preventive maintenance and reactive maintenance. Companies wanting to invest more time in equipment data collection, analysis, and decision-making should pursue predictive maintenance. However, a combination of periodic and meter-based maintenance will get the job done just fine for most teams.

The primary differences between traditional PM programs and predictive PM programs:

- Predictive maintenance is more complex, as it involves using data from experts, equipment readers, past experiences, and IoT.
- Predictive maintenance has a higher setup cost and a higher variable cost, which will incur higher upfront expenses than others.
- Periodic maintenance involves little or no risk, while predictive maintenance involves a higher possibility of initial errors.
- Predictive maintenance reduces the probability of replacing a part prematurely as opposed to periodic maintenance.

In summary, preventive maintenance is the best way to move forward for companies wanting to increase equipment life without any risk and high fixed and variable cost.

## Which Maintenance Process Is Best?

The simple answer is that no one type of maintenance is the best. Service one asset more than is necessary, and you waste valuable time. Fail to service another asset enough, and you waste resources associated with the cost of downtime! The key to success is finding the right balance of preventive maintenance to planned unscheduled maintenance for *your* unique organization.

The most effective plan for your company comes from consistently monitoring downtime patterns, time spent on repairs, the cost of parts, and the cost of outsourced unplanned maintenance. Patterns reveal which strategy is most cost-effective for assets over time.

## Preventative Maintenance in Action

Unfortunately, putting preventive maintenance into action from scratch can be intimidating. Depending on the number of assets within an organization, and the number of workers available, regularly monitoring (and assigning) For example, a small property management team may have 200 assets requiring [routine maintenance](#), whereas a large manufacturing facility may have 20,000 assets.

However, employees may overlook guidelines for less routine maintenance without foolproof reminders and accountability systems in place. [The American National Standards Institute \(ANSI\)'s guidelines](#) provide a starting point for maintaining standard equipment. However, most organizations will not be successful without some form of [Computerized Maintenance Management Systems \(CMMS\)](#).

Reactive Maintenance



Preventive Maintenance

After equipment failure occurs.

Before equipment failure occurs.

Requires less planning and manpower.

Requires planning, often with a CMMS solution.

May be cost effective for minimal impact assets.

Prolongs asset lifespan.

Unplanned downtime causes decreased productivity, production, and profits.

Increases productivity, production, and profits.

Poses safety risks.

Reduces risk of injury.

Unlike preventive maintenance, **reactive maintenance** means waiting for minor problems to become major problems—before doing anything about them. Often called the “run to failure method,” this maintenance system lacks maintenance procedure reminders between equipment failures. A reactive maintenance worker may never inspect an asset until it breaks down or they happen to notice a particular part’s malfunction.

Many companies find themselves so overwhelmed with reactive maintenance that they cannot imagine finding the time to add preventive maintenance operations into their schedules. Reactive maintenance is not cost-effective because the inconsistent nature of asset downtime often results in unplanned expenses. Unfortunately, executives can overlook a common problem with “run to failure”: companies not only lose money on faulty equipment, but they also waste money on unanticipated expenses associated with lost productivity, overtime labor, and spare part/storage purchasing.

Data shows that the cost of dealing with unexpected equipment failures is often up to *six times* that of the cost of implementing PM systems.

# Examples of Preventive Maintenance

Almost every industry and organization run preventive maintenance programs. Real-life examples of preventive maintenance include:

## 1. Lubricating Moving Parts

Friction can cause a machine to break down and disrupt production. The heat generated from the friction can also result in a fire. Because machines are constantly running, there are high chances of friction. Regularly lubricating the moving parts of the machine can help to reduce friction and unplanned breakdowns.

## 2. Changing HVAC Filters

With time, HVAC filters back up and can result in the entire system breaking down. Repairing or replacing broken-down HVAC systems is more costly than simply replacing the filters every six months.

## 3. Refrigerator Maintenance

If you operate a restaurant, then a walk-in refrigerator is a critical asset to your business. You cannot afford to have it breaking down. Preventive maintenance activities on the refrigerator include checking the door seals for any leaks, defrosting built-up ice, draining the drip pan, and cleaning the condenser coils regularly.

# Automate Preventive Maintenance

Regardless of your organization's size, a preventive maintenance plan is key to achieving both short-term and long-term maintenance goals. You do not have to sacrifice features for simplicity—you can:

- Create reactive and preventive maintenance work orders.
- Assign recurring work orders to both teams and individuals.
- Monitor progress by maintenance category, priority level, downtime, etc.
- Analyze maintenance costs for greater efficiency and savings.
- Hold text conversations with team members in real-time.

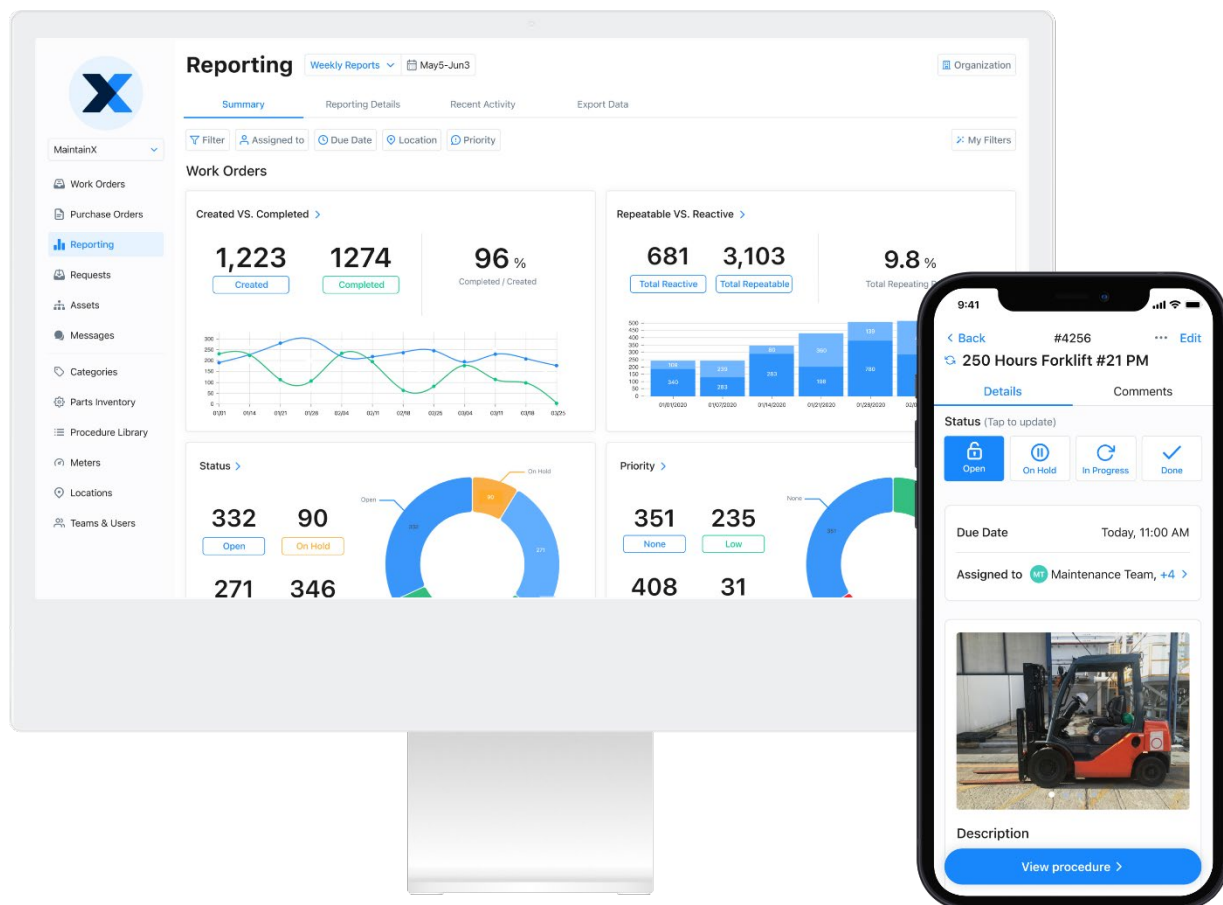
CMMS can help you get the best out of your facility's PM program.

# Preventive Maintenance and CMMS

[Computerized maintenance management systems \(CMMS\)](#) organize O&M tasks, including planning, scheduling, and tracking work orders. CMMS also can maintain asset historical records, manage inventory, and monitor spending trends.

Although [39 percent of facilities](#) still rely on paper records for maintenance management, there are many benefits to adopting and integrating CMMS. A cloud-based CMMS provides remote access, real-time maintenance data, automatic work order tracking, and built-in inventory tracking.

The software also improves communication between maintenance managers and technicians by enabling the sharing of real-time updates and maintenance reports. Managers wishing to maximize CMMS can a) adopt a mobile CMMS that workers can keep in their pockets and b) empower team members to become more autonomous in using the technology.





# 04

## Applying Manufacturing Maintenance Standards

Maintenance standards are recognized criteria for performing various maintenance tasks such as cleaning, repairs, parts replacement, lubrication, and maintenance data collection. Stakeholders in the maintenance industry establish standards for various reasons, including reduced safety risks, increased asset reliability, and enhanced efficiency.

### Overview

Companies of all sizes establish their own internal [standard operating procedures \(SOPs\)](#) to ensure smooth maintenance and operations. Additionally, industry institutions, such as the [International Organization for Standardization \(ISO\)](#), publish official maintenance standards as recommended best practices. Maintenance departments use these standards as guidelines when developing, implementing, and correcting maintenance team strategies.



### The implementation of maintenance standards takes into account:

- Organizational operating plans and budgets
- [Environmental laws](#), [OSHA mandates](#), and other regulatory requirements
- Terms and conditions of facility and asset insurance policies
- Terms and conditions of operations and maintenance agreements

While organizations have no obligation to implement SOPs, most high-volume companies consider them crucial to their long-term success. The more complex pieces of equipment a company utilizes, the easier it becomes to overlook the many small tasks involved in maintaining equipment reliability and cost-efficiency.

## Benefits of Maintenance Standards

Maintenance standards serve the following primary purposes:

**Clarify Contractual Obligations:** Ensure organizations and maintenance professionals understand responsibilities, liabilities, and essential details.

**Simplify Daily Operations:** Harmonize maintenance best practices among organizational key stakeholders to ensure everyone knows exactly what, when, and how to execute preventive and [corrective maintenance](#) tasks without question.

**Keep Everyone Safe:** Define criteria for reducing the risk of injury, minimizing environmental impact of processes, and upholding quality control.

Additionally, adhering to maintenance standards is crucial to passing audits, minimize unplanned downtimes, and reduce extraneous spending. Leading with agreed-upon protocols also can help build a positive work culture.

## Who Produces Maintenance Standards?

While some departments implement unique SOPs according to their unique needs, most departments follow global maintenance industry standards. The two dominant international regulatory organizations are the International Organization for Standardization (ISO) and the [International Electrotechnical Commission](#) (IEC).

## Maintenance standards developed by ISO include:

- Quality Management Standards
- Environmental Management Standards
- Health and Safety Standards
- Energy Management Standards
- Food Safety Standards
- IT Security Standards

ISO has technical committees that work on different aspects of maintenance. For instance, the [TC108](#) and [TC135](#) technical committees are responsible for developing condition monitoring, shocks, mechanical vibration, and non-destructive testing. Alternatively, the [ISO/TC 251](#) is responsible for asset management standards.

The IEC also includes [technical committees and subcommittees](#) that develop standards for the management, maintenance, and logistics support that applies to many equipment types. These standards include guidelines on rotating machinery, hydraulic and steam turbines, switching devices, and fiber optics besides electrical equipment.

In the United States, the [American National Standards Institute](#) (ANSI) develops standards and oversees conformity assessment activities. It is also a member of the two international standardization bodies mentioned above.

Lastly, private entities publish widely used maintenance standards. Though no one recognizes these documents as “official standards,” they provide reliable references for organizations in different industries. Examples of such entities include the [Society of Automotive Engineers](#) (SAE International), [American Society of Heating, Refrigerating and Air-Conditioning Engineers](#) (ASHRAE), [MIMOSA](#), and the [Society for Maintenance & Reliability Professionals](#) (SMRP).



# Classification of Maintenance Standards

ISO, IEC, and SAE International, among other institutions, develop standards that help organizations to improve their maintenance efforts. Some of the most common standards that maintenance personnel should be aware of include:

## 1. Asset Management Standards

Plant equipment and components fall under asset management. The goal of asset management standards is to coordinate and optimize an asset's entire lifecycle from acquisition to disposal. [ISO 55000](#) comprises three asset management standards:

- **ISO 55000:** It outlines the scope and merits of asset management. To be declared ISO 55000-compliant, organizations must have an asset management system that defines the policies, objectives, and processes to achieve organizational goals.
- **ISO 55001:** It elaborates the components of an asset management system, such as organizational context, planning, leadership, operation, performance evaluation, support, and improvement. The standard specifies the requirements organizations need to meet as an integrated and effective asset management system.
- **ISO 55002:** It provides guidelines for implementing asset management systems in line with the ISO 55000 family standards.

The ISO 55000 family also provides a practical framework for auditing and improving asset management systems.

## 2. Condition Monitoring and Machine Diagnostics

[ISO 13374](#) outlines the standards for condition monitoring and machine diagnostics. It aims to ensure organizations have efficient data sharing and distribution for proactive asset maintenance. This standard includes condition-based, preventive, and predictive maintenance.

Organizations should be able to exchange and integrate data across different systems easily.

The ISO 13374 family of standards provides ways to process, communicate, and present data in a unified and interoperable way across different systems without vendors' reliance. The components of ISO 13374 are widely used by organizations that conduct vibration analysis to determine asset health.

### 3. ANSI TAPPI TIP 0305-34:2008

The [ANSI TAPPI TIP 0305-34:2008](#) standard provides a practical approach for developing and maintaining valuable maintenance checklists. It outlines the guidelines for organizations and maintenance personnel to create daily, weekly, and monthly maintenance checklists. Maintenance engineers can customize the lists depending on organizational needs, types of assets, and physical configurations, among other characteristics.

### 4. MIMOSA Open Information Standards

[MIMOSA](#), a not-for-profit trade association, develops Operations and Maintenance (O&M) standards used in facility management, fleet management, and manufacturing. The standards cover different aspects of data exchange and O&M systems integration. Operational managers also use them for data sharing and interoperability across other maintenance datasets.

### 5. Industrial Internet Consortium Reference Architecture

The [Industrial Internet Consortium Reference Architecture](#) (IIRA) is at the forefront of digitizing the maintenance industry. It outlines the principles for structuring and integrating Industrial Internet applications in maintenance. Industrial internet systems are used in sectors such as manufacturing, transportation, healthcare, and energy. The IIRA standard outlines guidelines for developing flexible, interoperable maintenance applications. It defines the requirement for connectivity and data representation and distribution.

### 6. SAE JA1011 Standard

Initially, the [SAE JA1011](#) standard was developed to improve the reliability of assets and safety in the commercial aviation industry. It has been expanded and used in other sectors as well. Today, it is referred to as the Reliability-Centered Maintenance (RCM) process.

## Conclusion

The maintenance industry employs several standards to maintain safe, efficient, and reliable operations. The above list of standards is not exhaustive but does include the most commonly utilized standards right now. However, maintenance standards are constantly evolving. As organizational maintenance needs and data mediums change, teams must continually adapt their approaches. Such flexibility enables maintenance departments to determine which standards are most applicable to their unique needs.



# 05

## Creating Manufacturing Maintenance Standard Operating Procedures

As we have seen this year, operational managers have needed to reassess existing manufacturing and maintenance [standard operating procedures \(SOPs\)](#) and new efficiency and productivity measures. *What do we need to streamline? What are we doing now that may become a permanent part of our new reality? Which employees are qualified or trained to perform specific tasks?*

Manufacturing SOPs are crucial to onboarding and training new employees and those tasked with taking on new or different jobs. SOPs are step-by-step instructions that define how to perform repetitive business processes to achieve desired outcomes. They often accompany [preventive maintenance \(PM\)](#) work orders, inspection audits, and quality-control checklists. The best SOPs supplement procedural checklists with illustrations, photographs, flow charts, and linked resources to clarify work instructions even further.



In the manufacturing industry, SOPs are crucial to achieving production-line efficiency, uniform performance (of both machines and workers), regulatory compliance, and high-quality final products. Here are six of the leading benefits of implementing SOPs on-site.

## 1. Standardization

The very purpose of a standard operating procedure is to establish a standard and consistent way of completing a task. Assigning approved SOPs ensures workers always perform tasks in the same manner across manufacturing facilities and production lines.

Manufacturing SOPs streamline processes, improve consistency, and allow management to make informed business decisions based on how well a standard works.



## 2. Communication

Once standardized, managers can easily share data metrics with team members, thus improving communication from top to bottom. SOPs also reduce the risk of non-compliance, improve supply chain efficiencies, and streamline project management.

Manufacturing SOPs communicate across all facility and team levels. When digitized, a standardized manufacturing SOP provides crucial real-time information to workers and managers about work being performed, how it is being performed, and if something is getting in the way. SOPs can even standardize how a team communicates. Streamlining internal communications creates efficiencies across the company.

## 3. Efficiency

Managers are always looking to improve production efficiency with their teams. SOPs make workforces more efficient, predictable, and measurable. From how a new piece of equipment runs to how a manager audits performance, repeatable processes can always be made more efficient with procedure templates. Perhaps a few steps are redundant and do not present any additional value. Or, you may discover a frequent error or mistake that can be prevented by adding a step to account for the issues.

## 4. Regulatory Compliance and Quality Assurance

Going digital with Standard Operating Procedures streamlines and improves compliance.

Manufacturers deal with many areas of compliance, including product safety and environmental regulations. Quality assurance (QA) plans can help ensure that manufactured products meet quality standards.

With the emergence of global standards, government regulations have increased. For example, OSHA's [General Duty Clause](#) enforces worker health and safety. OSHA inspectors look for anything that can cause danger or bodily harm and impact an employee's life on or off the job.

Manufacturing facility and product inspectors frequently ask to review standard operating procedures when auditing operations. In the case of legal action, SOPs can serve as crucial defense documentation of procedures followed within industry guidelines. Step-by-step SOPs are crucial for reinforcing safety and compliance standards.

Online workflows improve a company's credibility and legal defenses. In fact, during auditing procedures, inspectors frequently rely on completed SOPs as checklists. Running quality systems is also an essential part of a manufacturing company. [The International Organization for Standardization \(ISO\)](#) developed **ISO 9000** to define a "quality management system." The ISO advises companies to:

- consistently provide products and services that meet customer and legal and regulatory requirements, and
- enhance customer satisfaction through the effective application of the system, including processes to improve the system.

Increasing laws and regulations call for increased regulatory compliance and quality management through effective standard operating procedures. [The American Society for Quality \(ASQ\)](#) defines quality as both a) the characteristics of a product or service that bear on its ability to satisfy stated or implied need and b) a product or service free of deficiencies.

As part of any quality assurance plan, SOPs implementation is critical. In fact, if and when lawyers get involved, having SOPs in place—and easily accessible through a digital platform with audit trails—makes a huge difference. Quality standard operating procedures show lawyers and the courts that a company adheres to standards and regulations.





## 5. Accountability and Tracking

SOPs should clearly define who is responsible for completing the work order, preventive maintenance check, or inspection. SOPs improve accountability across the manufacturing floor. If a task was not completed accurately, and the standard operating procedure was not followed, management can take appropriate action to prevent inaction or missteps from recurring.

Manufacturing compliance requires teams to troubleshoot problems, track decisions, and explain why changes were made. Tracking is easier when SOPs are digitized, especially when suppliers and new outsourcing are involved. Owners and manufacturing managers can also use completed digital standard operating procedures to gather data and carry out critical audits and inspections on the factory floor. Collecting and analyzing this data in real-time increases compliance in the manufacturing process.

## 6. DOWNTIME

[Writing standard operating procedures](#) to eliminate the eight primary types of waste—that form the word, DOWNTIME—maximizes efficiency:

- **Defects:** avoid manufacturing errors and poor-quality output.
- **Overproduction** – do not manufacture any more than the required amount.
- **Waiting** – prevent all unplanned manufacturing downtime or wait time.
- **Non-utilized talent** – reduce overstaffing or unused workforce.
- **Transportation** – cut unnecessary distance traveled from one location to another.
- **Inventory** – get rid of inefficient storage management.
- **Motion** – avoid excess movement by workers and manufacturing equipment that do not add value.
- **Excess manufacturing processes** – remove any processes that do not add value.

Once implemented, manufacturing standard operating procedures can help owners and production managers monitor the success and failures of a manufacturing line, a piece of essential equipment, or a work team.



## Digitize SOPs to Improve Manufacturing Efficiency

MaintainX allows manufacturing teams to create, fulfill, and monitor digitized SOP checklists from their smartphones in real-time. Our [Computerized Maintenance Management System \(CMMS\)](#) also allows managers to:

- Create, assign, and track recurring work orders with software automation.
- Create reusable SOP templates with hierarchical checklists.
- Organize assets, parts, and inventory data.
- Instant message team members.

With digital SOP, management can quantify and organize every process that workers use. It is not only about the shop floor. Automate the SOP for how the front office receives production updates from the floor. Digitize the SOP to alert the warehouse maintenance team that products are ready to ship.

To measure SOP efficiency, review, and evaluate the production line. First, measure throughput. This metric measures the average number of units produced in a given time period to highlight any issues with specific machines. If SOP and checklists are online, measuring throughput is simple.

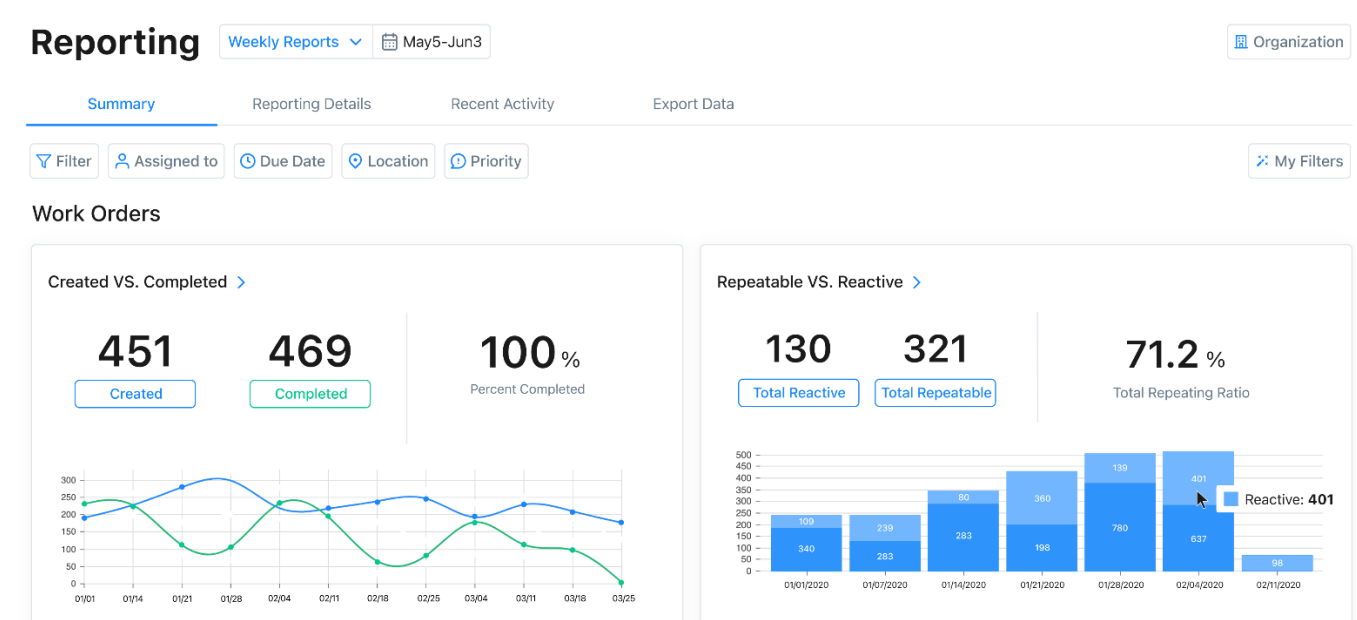
Then measure the capacity of the total manufacturing output (TMO) in a given time period. TMO identifies the production lines operating at their highest possible output. It also identifies those operating below expected output levels.

Using an online dashboard makes it easy to combine data on throughput and output to track production line efficiency.

## Standard Operating Procedures and CMMS Solutions

Computerized Maintenance Management Systems (CMMS) solutions make tracking compliance easy—from OSHA requirements to quality assurance and product standards to planned maintenance and manufacturing regulations. With digital audits and checklists, management can easily track a team's production processes and work orders.

Monitoring compliance is no longer a burden. Manufacturers can streamline and automate the process of collecting, reporting, and making critical data easily accessible to everyone.





Benefits of going online with manufacturing Standard Operating Procedures include:

- Being prepared for audits at any time
- Adhering to regulations and quality controls
- Sharing data and documentation on the spot
- Reviewing and editing Standard Operating Procedures in real-time

With the time saved by automating SOP comes more time for innovation.

Manufacturers can manage maintenance and demonstrate compliance regulations through manufacturing SOP that promote quality assurance and continuous improvement. Well-done SOPs will enhance your ability to produce and market products at an extraordinary rate, especially against competition across international markets. With CMMS, companies can stay on top of planned and preventive maintenance schedules SOP.

# 06

## Automating Effective Preventive Maintenance in Manufacturing

Effectively planned preventive maintenance (PM) programs deliver substantial savings. Studies show preventive maintenance can save facilities as much as [18 percent in maintenance costs](#). Why? Because scheduling routine maintenance based on usage or time triggers reduces the likelihood of unplanned equipment failures that translate to emergency maintenance expenses.

The expenses of workers' overtime, outsourced expertise, and expedited parts' shipments can add up quickly. However, the most significant financial loss for industrial businesses stems from missing production targets due to downtime.

Every effective PM program begins with a plan. In this article, we will discuss seven essential elements to include in your next preventive maintenance plan.



# 1. Asset Inventory

[Preventive maintenance](#) is an excellent strategy for keeping critical assets in good working condition. However, the real cost-savings in PM come from fine-tuning your organization's PM schedule over time.

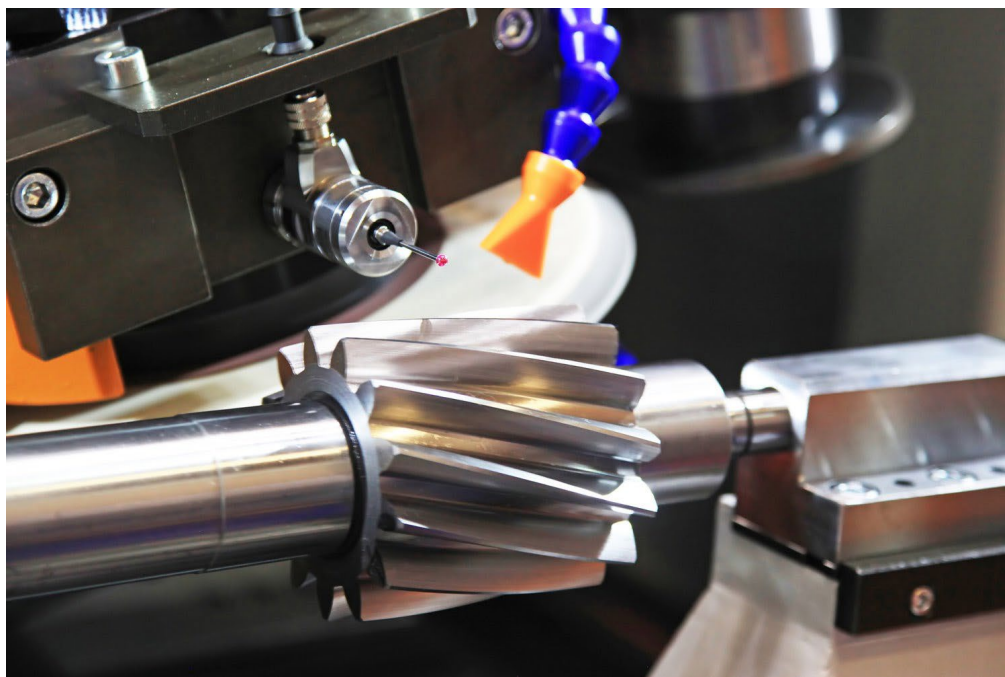
Manufacturer's recommendations do not always provide foolproof guidelines to obtain asset reliability. Workplace environments, machine usage patterns, and more can uniquely impact equipment behavior over time.

Beyond the importance of maintaining detailed asset inventories for accounting records, consistent record keeping can reveal opportunities to optimize spending patterns.

Each asset entry should include:

- Make, model, and serial number
- Specifications/capabilities
- Unit number
- Category
- Location
- QR/Barcode

As routine maintenance is performed, keep track of service dates, labor costs, parts used, and current conditions. Also, note the asset's criticality to production and safety.



## 2. Asset Prioritization

It is nearly impossible to place all essential assets on initial PM programs. Stay realistic by creating an asset hierarchy for your organization's most critical assets.

An asset hierarchy is a logical index of every machine and component that is critical and illustrates how the action of one machine can affect another. Maintenance teams can use the tool to track machines more easily, schedule PMs efficiently, and identify the root cause of failures quickly.

Prioritize assets that significantly impact production, have high maintenance costs, require regular maintenance, or pose safety hazards. As you begin to realize the return on investment (ROI) of your assets, gradually add more assets to the PM program.

During the preventive maintenance planning stage, some organizations choose to perform a criticality analysis. This exercise helps determine precisely how specific asset failures impact company goals. Managers can then prioritize the maintenance tasks that are most detrimental to production and safety when creating PM schedules.

## 3. PM Schedule

A PM schedule lays out when maintenance activities are performed on a given piece of equipment. When developing your PM schedule, select a day and time for maintenance that does not disrupt production. Base PM schedules on one of two metrics:

- **Time:** You can base your PM schedule on time and perform maintenance after a set period of time. For example, your fleet of vehicles can undergo maintenance every three months.
- **Usage:** For usage-based PM schedules, track usage metrics such as operating hours and production cycles. Maintenance activities are then performed when certain milestones are met. For example, schedule your fleet of vehicles for maintenance every 1,000 miles instead of every three months.

PM schedules usually depend on a work order system. A work order is a document that provides details about a maintenance task and outlines the process to complete the task.

It details the scope of the work, what is expected, the projected timeline for completing the job, who authorized the work orders, and an assigned maintenance technician. Work orders help you organize, assign, prioritize, track, and complete maintenance tasks besides capturing asset maintenance history.

## 4. CMMS Software

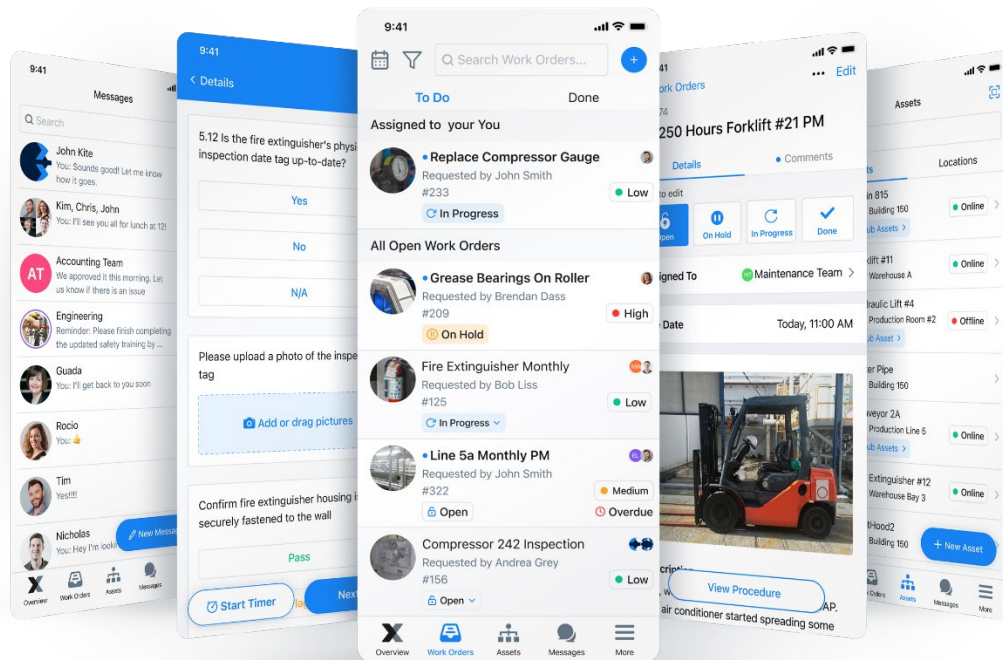
Most effective PM programs have one thing in common: a Computerized Maintenance Management System (CMMS) the entire team feels comfortable using. Maintenance planners can create, implement, and track recurring work orders via user-friendly dashboards.

Additionally, CMMS simplify, automate, organize, and optimize O&M. A whopping 58 percent of facilities rely on CMMS to manage their maintenance operations.

However, up to 80 percent of CMMS implementations fail. Reasons for CMMS failure include:

- Exclusion of users from the selection process
- Complex CMMS software
- Resistance to technology adoption
- Poor implementation of CMMS

Using modern, cloud-based CMMS can help overcome these implementation challenges. Unlike traditional on-premise systems, cloud CMMS is available over the Internet and, therefore, easier to set up, access from anywhere, and manage the database. Modern CMMS like MaintainX also provide regular updates and better database security.





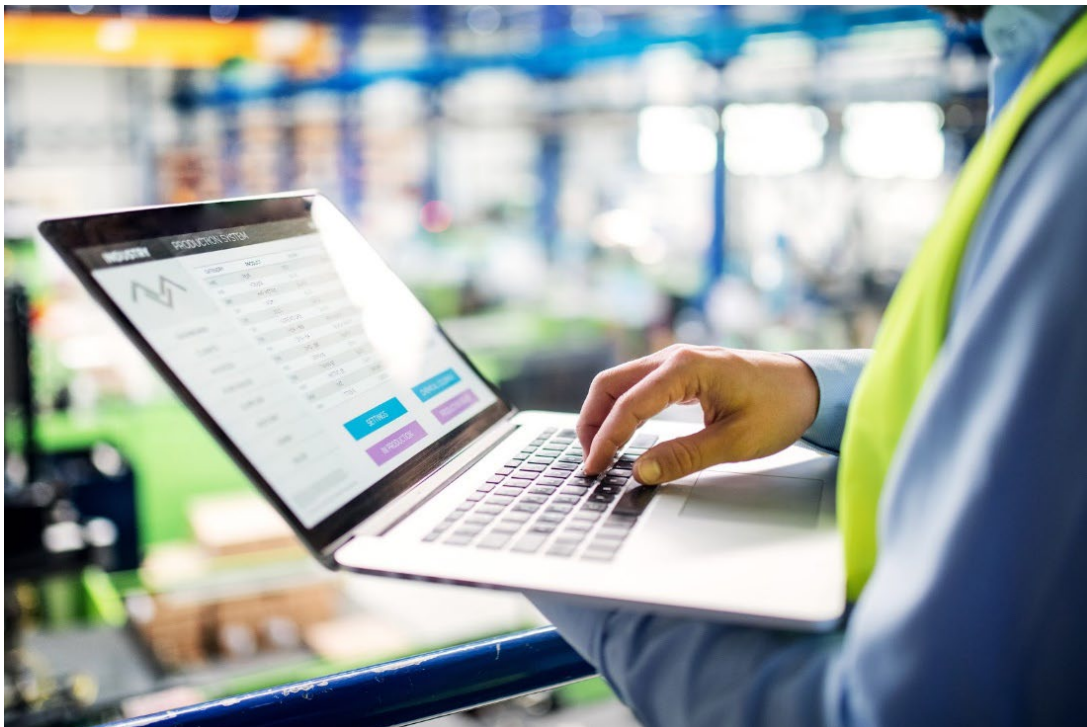
## 5. Team Communication

Clear and fast communication is essential for an effective PM program. Your team should always be able to communicate with each other efficiently and effectively. Poor communication can lead to:

- Delayed maintenance timelines
- Overlapping work orders and activities
- Inappropriate prioritization of maintenance tasks
- Under- or over-maintenance
- Poor maintenance inventory management
- Prolonged downtimes

Approximately [96 percent of office executives](#) claim poor communication is to blame for workplace failures. Maintenance departments are no exception to everyday communication woes.

[According to McKinsey Global Institute](#), a connected workforce is more likely to post better performance. Using a [mobile CMMS with team chat](#) will virtually eliminate important project details falling through the cracks. MaintainX reduces time spent clarifying details, improves access to maintenance records, and speeds up troubleshooting between technicians and managers.



## 6. Preventive Maintenance Plan Goals and KPIs

Next, set *SMART goals* and key performance indicators (KPIs) to measure progress. SMART is an acronym for Specific, Measurable, Achievable, Relevant, and Time-Bound.

Your maintenance goals should clearly outline what you are looking to accomplish, when you are looking to achieve them, and the metrics you will use to measure success. Your goals should be relevant to your company's broader business goals.

Common KPIs for measuring preventive maintenance plan effectiveness include:

- **Planned Maintenance Percentage (PMP):** How much time you spent on planned maintenance compared to unplanned maintenance within a given period.
- **Preventive Maintenance Compliance (PMC):** How many scheduled PM tasks you completed within a specific timeframe.
- **Scheduled Maintenance Critical Percentage (SMCP):** The impact of delayed planned maintenance activities.
- **Mean Time To Repair (MTTR):** The average time it takes to repair and restore an asset to full functionality.

## 7. Upper-Management Support

Finally, you will need the support of your company's upper management to implement a PM plan successfully. Convincing leadership to get on board, and increase O&M budgets, can be a daunting task. Here are some tips to help you to make a case for implementing a PM plan:

- **Estimate Return on Investment (ROI):** You need to convince the management of how the PM program will improve its bottom line. Select a few critical assets and demonstrate how shifting from corrective to preventive maintenance will reduce maintenance costs and improve profits. For example, if you experience three unplanned downtimes a year and the cost of restoring full functionality each time is \$500, a PM program could reduce the downtimes from three to one and save \$1000 in maintenance costs.
- **Lay out Maintenance Goals:** You can also make a presentation on your long-term maintenance goals and how they align with the overall organizational goals. Remember to cover the challenges faced with the current (reactive) system and how a PM program would overcome them.



## Why Preventive Maintenance Plans Sometimes Fail

Lastly, take action to mitigate the following common reasons why PM plans sometimes stall out:

- Failing to provide proper training for maintenance technicians
- Mismanaging PM oversight, accountability, and transparency
- Overlooking root causes of equipment breakdowns

For an effective PM program, you first need to understand your facility's maintenance goals and develop maintenance checklists that align with the goals.

## Simplify PM Planning with MaintainX

Preventive maintenance helps organizations reduce unplanned downtimes, increase asset reliability, minimize maintenance costs, and improve operations. While initially launching a preventive maintenance program may seem complicated, it is simple if you effectively plan for it.

Focus on scheduling PM for your most critical assets to keep your new maintenance program affordable, manageable, and effective. The easiest way to get organized is with the support of a [user-friendly CMMS like MaintainX](#).

# 07

## Increasing On-Time-Delivery via Preventive Maintenance

Deadlines are essential in every industry.

Journalists publish newsworthy articles, construction workers complete project milestones, and educators develop lesson plans—all according to daily timelines.

Missed deadlines cause chain reactions that affect others. Nowhere is that impact felt more strongly than in manufacturing facilities. As recently demonstrated, [everyone depends on manufacturers](#) to sustain global supply chains with food products, vital equipment, and other important items.

However, both personal and corporate expectations of manufacturers have recently increased due to speedy delivery services like *Amazon Prime*. According to the [2020 MHI Annual Industry Report](#), four of the six most commonly cited manufacturing challenges relate to delivery requirements.

Nearly half of the 1,000 manufacturing and supply chain professionals surveyed listed “customer demands on response times” and “rising customer service expectations” as significant concerns for the year ahead.

Poor [On-Time Delivery \(OTD\)](#) performance can happen for various reasons, including material shortages, poor material handling procedures, and inefficient production methods. Some of those factors are within your control, while others are not. Here, we will focus on what you *can do* to increase OTD: organizing [an effective manufacturing preventive maintenance \(PM\) program](#).

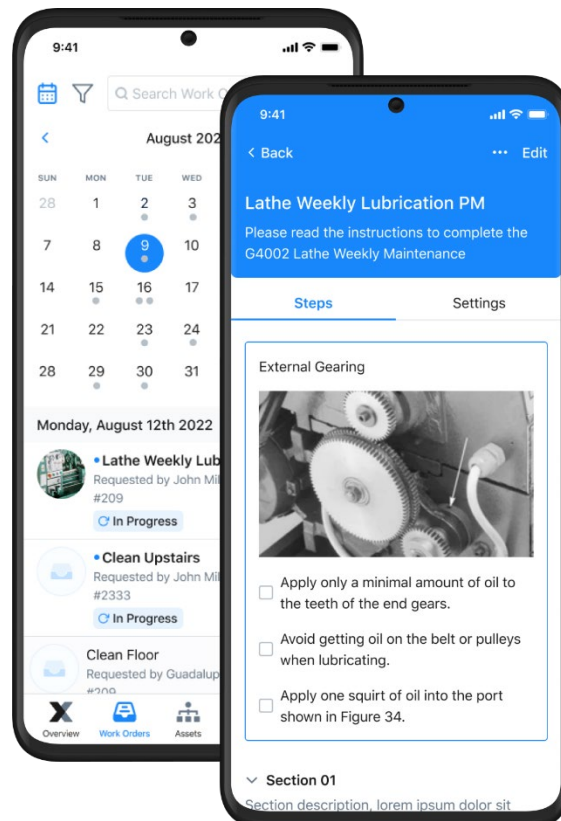
## 7 Manufacturing Preventive Maintenance Tips

Performing routine maintenance on manufacturing equipment may sound like a lofty goal amid competing priorities. However, [studies show](#) that effective preventive maintenance programs can save companies money by reducing downtime. Predictive maintenance systems (that track machine historical data) can save even more.

Considering that only 10 percent of industrial equipment ever completely wears out, and downtime costs some facilities as much as [\\$22K a minute](#), practicing strategic preventive maintenance is wise. Increase your overall equipment effectiveness with planned maintenance.

Most facility and maintenance directors already understand the value of preventive maintenance. Many of them even invest in Computerized Maintenance Management Systems (CMMS) to digitize, assign, and organize work orders. The larger the manufacturing facility, the more difficult using paper clipboards becomes. Unfortunately, choosing the right [CMMS platform](#) can be tricky. According to Reliable Plant, a whopping [80 percent](#) of managers fail to use purchased CMMS solutions.

*We believe this happens for a simple reason: The software is too complicated.*



## 1. Choose a user-friendly CMMS

Manufacturing preventive maintenance programs depend on the consistent use of CMMS platforms. Fortunately, new SaaS providers have entered the CMMS market, making the software more user-friendly than ever before. MaintainX offers a freemium maintenance management app that is comprehensive, elegant, and robust.

Maintenance workers can learn how to access work order assignments, upload equipment photographs, chat with managers, and complete work orders in just a few minutes—all from their mobile devices.

## 2. Track costs for savings opportunities

The best CMMS solutions cross-reference work order components by the assigned technician, asset type, priority status, time to complete, and several other categories. This information is combined to create powerful reports that illustrate previously unseen savings opportunities. A user-friendly CMMS will make data collection a breeze so that maintenance does not feel burdened with cumbersome data entry steps. The more equipment data you have, the less likely your facility will experience downtime, and the faster it will meet customer deadlines.

[MaintainX Reporting 2.0](#) includes the ability to track downtime, Mean-Time-to-Repair, inspection failures, and other valuable metrics to inform operational decision making.

## 3. Enhance team communication

While nothing beats face-to-face conversations, the enormous size of many manufacturing facilities means that it is not always convenient. Conversations are often limited to walkie-talkies, email, and text messages—if they happen at all. However, these methods are not helpful when trying to organize complex instructions regarding separate projects.

Software companies provide smartphone apps that allow companies to organize communication threads by department, project, and tasks. The MaintainX platform goes a step further. Our CMMS allows manufacturing team members to upload PDFs, take equipment photos, and chat directly within the comments section of digital work orders.

When you receive some last-minute instructions to order a part, simply update the information within the work order and ping the assigned technician with a comment. Keeping important discussions within their work order categories helps manufacturing teams decrease the likelihood of equipment setbacks, downtime, and shipment delays.

*Note: Our reporting feature is only available on the MaintainX Desktop and Web applications.*

## 4. Negotiate preventive maintenance arrangements with equipment providers

Many machinery manufacturers offer [preventive maintenance service visits](#) for flat annual rates or discounted labor costs. If an equipment provider does not offer such agreements, make sure you receive recommended PM instructions for your team to work with.

Not only do service contracts ensure necessary PM is performed, but they also help managers improve their cases for annual budgets. While you should strive to complete most maintenance in-house, partnering with an experienced equipment service provider on essential assets can be beneficial.

## 5. Shadow equipment providers

Anytime an outside technician visits, consider assigning an in-house technician to shadow his work. Maintenance team members can observe complex maintenance tasks up-close, ask questions, and take notes. The shadowing worker should also request a copy of the inspection report so that parts are checked and the date of service is recorded in your CMMS calendar and on your Asset history.

The next time that specific machine is due for preventive maintenance, your in-house technician might feel confident enough to accomplish the task. Taking advantage of every training opportunity is key to establishing an effective manufacturing preventive maintenance program.

## **6. Stock frequently replaced parts**

Next, consider asking outsourced providers for spare parts lists. You can often purchase your equipment's most frequently needed parts at lower prices. While you should not feel obligated to buy every part, stocking the most commonly replaced parts can reduce potential downtime and save money in the end.

## **7. Plan PM around seasonal variables**

Finally, schedule preventive maintenance tasks that require downtime during slower seasons. Comprehensive PM for larger assets requires an average of four to eight hours to complete. Get ready for a marathon maintenance session! However, these preventive measures can help your team avoid days' worth of reactive maintenance when an essential machine breaks and causes costly downtime.

# **Simplify Maintenance with CMMS**

Manufacturing facilities are the heart of our global supply chain. Maintenance teams that choose user-friendly CMMS solutions to support preventive maintenance programs can reduce downtime, increase OTD, and increase corporate profits. In-house technicians that take the time to shadow outsourced equipment service providers also contribute to facility efficiency.

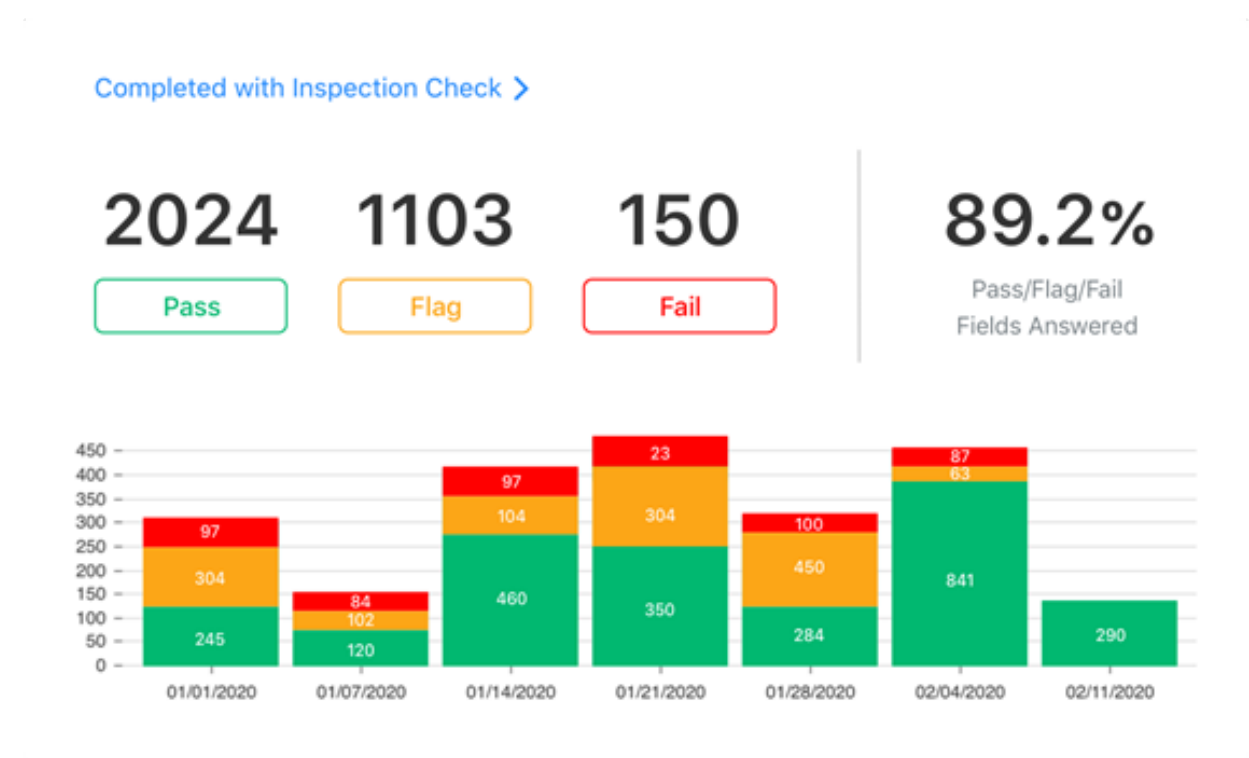
# 08

## Getting Manufacturing Maintenance Done with MaintainX

Maintenance management and operations software, like MaintainX, provides in-depth analytics and reporting capabilities. Customizable dashboards, audit trails, and reports allow management to view completed preventive maintenance plans and regulatory SOP in real-time.

Eliminate onboarding and training hurdles by automating SOP to reinforce processes, compliance, and quality. By using a modern CMMS solution, processes can be at your team's fingertips wherever they are, whenever they need them.

[MaintainX](#) can help build an accessible knowledge base for your employees to reference on the go and keep everyone on the same page.





# 1. Mobile Usability

You might be thinking: *Does usability qualify as a feature?* The answer is a hard “yes.” Too many operational managers abandon maintenance management software because of confusing user experiences. Measure ease of use and usability by evaluating:

- **Design:** Is the architecture simple to navigate?
- **Learning:** Can new users quickly fulfill assigned maintenance tasks?
- **Efficiency:** Can maintenance managers easily navigate inventory management?
- **Memorability:** Do field technicians remember how to accomplish routine tasks after interacting with the program?
- **Error Frequency/Severity:** How often do users make errors while using the system? How serious are those errors?
- **Satisfaction:** Do users enjoy using the platform?

Unfortunately, the subjective nature of usability allows software providers to sometimes overlook significant design flaws. So, start with the basics: you should be able to easily assign work orders, manage work orders, and track work order requests from your mobile app without significant training. Look for proof of usability in customer satisfaction reviews like this:

## 2. Real-Time Chat

Nothing beats face-to-face conversations. However, the large square footage of some facilities requires facility managers to stay in touch via walkie-talkies, text messages, or email. Unfortunately, these communication methods are ineffective when navigating complex instructions within separate work orders.

The easiest way to communicate regarding PMs and service requests is via [business messaging platforms](#). In recent years, software companies have released smartphone apps that allow organizations to group communication threads by department, topic, and task.

The communication solution is perfect for busy maintenance teams accustomed to troubleshooting unexpected asset questions. MaintainX is the only maintenance work order software platform in the marketplace that includes integrated chat within its CMMS. Maintenance team members can chat with an individual, group, and work-related channels. As reported in *MaintainX's 2019 Year-In-Review survey*, “work order commenting” was voted the most popular feature by software customers.

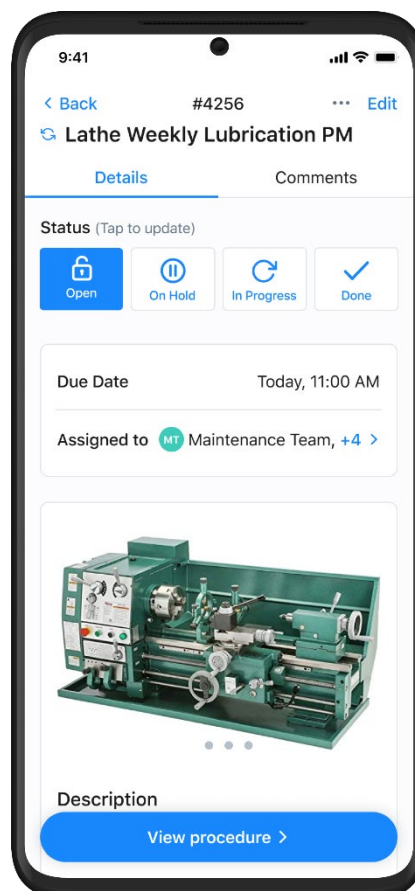
### 3. Ability to Upload Photos

Has one of your team members ever come across an equipment issue that was difficult to explain? They say a picture is worth a thousand words, and this is especially true for time-strapped technicians.

The best maintenance work order software programs allow users to upload photographs of assets, parts, and failures from their smartphones. The photos can then be marked up with circles, arrows, and text to detail problem spots. Finally, the photos should instantly appear within digital work orders without extraneous file attachments.

### 4. Recurring Work Orders

Organizations can obtain maximum asset value by slowing down equipment depreciation with preventive maintenance (PM). Of course, PM programs depend on maintaining organized maintenance schedules and dependable recurring work order processes! Consult equipment manuals to determine how often significant assets should be adjusted, lubricated, cleaned, and updated with new parts.



Of course, the easiest way to ensure upcoming tasks are permanently assigned is via software with work order tracking capabilities. A solid work order management system allows management to automate the scheduling of daily, weekly, monthly, and yearly PM notifications. Managers can also select custom dates with minimal effort.

## 5. E-signature Sign-Offs

Modern maintenance work order software programs should display work completion time stamps. For example, say Carl marks his digital work order as “Completed” at 12:15 pm. His manager will see a real-time display indicating that he completed the PM. This validation of work order status completion meets most organizational needs.

However, some organizational leaders may prefer the increased accountability of a traditional signature from a manager. Modern CMMS solutions have solved this problem by integrating e-signature capabilities. Managers can use the e-signature option when creating work order templates, and technicians can have managers sign-off using their fingers and mobile device screens to approve a job well done. In seconds—a foolproof digital audit trail!

The screenshot displays the MaintainX software interface. On the left is a sidebar with navigation icons and a search bar. The main area shows a work order titled "Change the battery monthly" with a due date of 03/22/2021. Below the title are buttons for "PASS", "FLAG", and "FAIL". A section titled "OVERALL COMMENTS AND INSPECTOR'S SIGNATURE" contains a text box for "Overall Comments" and a signature area. The signature area shows a handwritten signature and the text "Signed by Ashley Gwilliam on 02/22/2021, 4:22 PM". Below this is a "Comments" section with a text box. On the right, there is a list of assets with details like "3 Ford F150 - Plate# 435RH1" and "TI02 Condenser #24512".

## 6. Asset Management Accessibility

Does your organization maintain an extensive database of asset information?

Maintenance departments that have been practicing preventative maintenance for a while have detailed spreadsheets chock-full of equipment serial numbers, service dates, and locations.

You should not have to re-enter dozens of rows and columns worth of data into your new work order database by hand. Choose a CMMS provider that will either transfer your asset history into the new system at no cost or provide a convenient import feature to streamline data integration.

Furthermore, this information is often most valuable to the folks using the tools day in and day out. Asset history should be easily accessible from the mobile platform to reduce rework and waste.

## 7. Detailed Reporting

Finally, choose maintenance work order software that includes advanced metric reporting capabilities that answer questions like:

- How much time did Carl spend on safety audits last month?
- Should we continue maintaining our HVAC or purchase a new one?
- Are we understaffed or overstaffed (and inefficient)?

CMMS software should cross-reference work order data by the assigned technician, asset type, priority status, time to complete, and several other categories. These pieces of information are then combined to create insightful reports that illustrate maintenance cost-savings opportunities. However, data collection is only useful when applied to meaningful business decisions. Choose a platform that automatically calculates and makes sense of important KPIs like MTBF, MTTR, and MTTF for maintenance management.

# MaintainX: Work Order Management Software

User-friendly automation is the future of the digital era, and intuitive mobile work order apps are most definitely the future of Computerized Maintenance Management System (CMMS) software.

Work order software selection is a matter of personal preference, but some products are better than others. We encourage you to prioritize overall usability, real-time chat, photo uploading, e-signature capability, asset imports, workflow, and user-friendly reporting. MaintainX is the best digital maintenance SaaS on the market, [natively designed for mobile](#), tablet, and desktop interfaces. We are the only CMMS platform that handles maintenance, operations, safety, and training.

