



# How Planning and Scheduling Improve Maintenance Effectiveness

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Ricky Smith, CMRP, CMRT

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The goal of this article is to present a concise description of the planning and scheduling process and to become familiar with the process and know how to interact with it to leverage their reliability improvement efforts.

## Why Maintenance Planning and Scheduling Matter

Maintenance Planning is the process by which all work is planned and is ready to be scheduled.

The purpose of any Maintenance Planning should be to eliminate delays in the maintenance process and coordinate the schedules of the maintenance resources and the production schedule.

All jobs are not good candidates for planning. Very simple jobs normally would not go through the planning process, as little value is added. Additionally, jobs that have low predictability are not good candidates, since a planner would be unable to accurately predict

the job's resource and part needs.

## Maintenance Planning and Scheduling Cycle



Every organization involved in planning and scheduling efforts should identify the jobs that should be planned and scheduled.

Planning and Scheduling is not part of urgent or emergency work which is fraught with delays, misdirection, and confusion; but by its very nature, we cannot take the time to investigate the needs of the job, estimate the resources, develop a plan, and obtain the necessary parts. Instead, we run headlong into the fray and figure out what we need as we go. Sometimes, we must back up and try a different route.

This approach adds an unnecessary cost to the job, but when production has been put on hold, you must demonstrate a bias for action. Putting an end to work such as this is a goal that is common to both reliability and planning and scheduling, and the two should be linked together.

## Key Roles in a Planning and Scheduling System

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The primary people in a planning and scheduling system are the planner, the scheduler, and the maintenance coordinator. In general, the planner identifies everything that will be needed to execute the job, the scheduler arranges and communicates all timing aspects of the job, and the maintenance coordinator enables maintenance to attend to the most important work at the optimum time relative to production scheduling.

Usually, both the Planner/Scheduler report through the maintenance department, whereas the maintenance coordinator should report through the operating department.

Clear role boundaries aren't bureaucracy – they're the backbone of maintenance precision.

Some organizations have one or more people assigned to each of these roles; at the other end of the spectrum, some may have individuals responsible for more than one of these roles. Either situation can work effectively as long as the roles are looked at as distinct and ample time is allotted to fulfill each one.

As maintenance work requests are made from the cooperating department, it should be a continual process for them to be “funneled” through the maintenance coordinator. As mentioned, one of the maintenance coordinator's primary tasks is to enable maintenance to work on the most important work.

When all work for a given maintenance organization goes through a single operating department person (the maintenance coordinator), priorities can be leveled and unnecessary or duplicate work eliminated. The benefit this provides to the maintenance organization cannot be overstated.

Rather than having everyone in the production department who initiates maintenance requests set a priority based on personal current needs and a limited perspective, a maintenance coordinator, who has a larger perspective by virtue of seeing all maintenance requests and knowing the overall production scheduling needs and constraints, can provide a much clearer focus for response by the maintenance organization.

“The maintenance coordinator deletes unnecessary or duplicate requests and adjusts the priorities of the remaining work requests to reflect the needs of the production department, while recognizing the limited capacity of the maintenance organization. Then, the requests are sent to the planner”.

## **Wrench Time: The Metric That Exposes Maintenance Waste**

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The planner's most important role is to identify and quantify the resources required to execute a given job. When a job can be prepared for and executed without delay, maintenance effectiveness can be multiplied. It is not uncommon for the effectiveness of planned and scheduled jobs to be 25% or more than the same job without Planning and Scheduling.

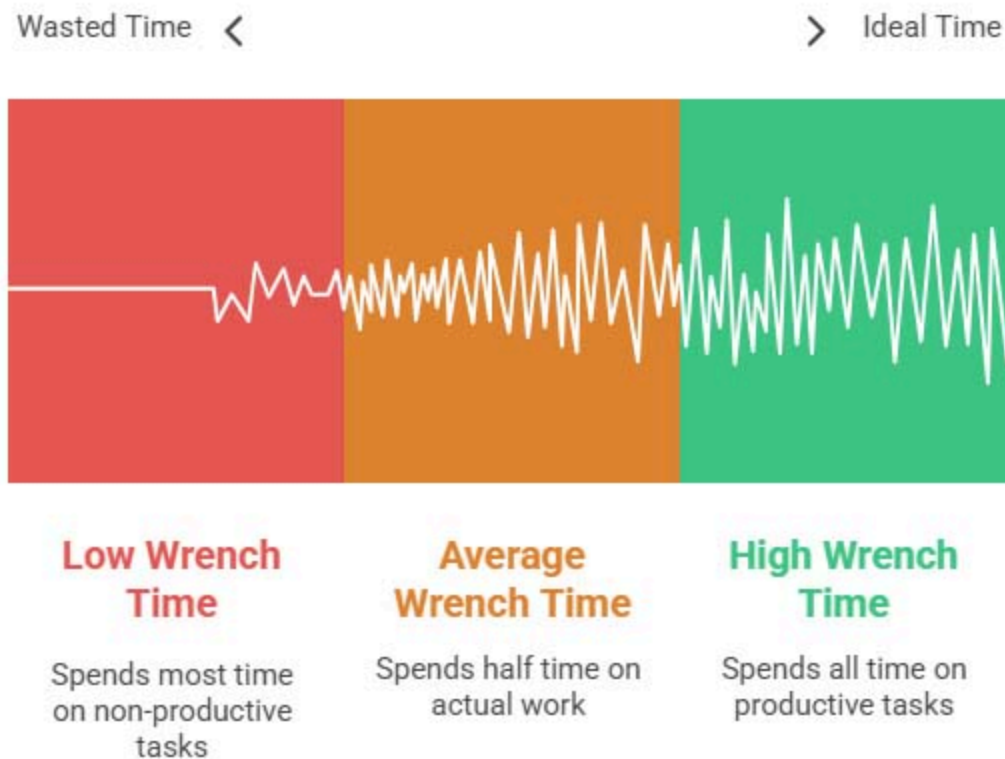
To see just how critical maintenance is, consider the following. The term wrench time refers to a unit of measure for the amount of time maintenance personnel spend doing the actual work for which they are responsible.

Wrench time is usually expressed as a percent, and national studies typically put this number between 25 and 50% for North American industries. As an example, the time a maintenance mechanic takes to replace a mechanical seal and do a laser alignment on a pump would count as wrench time.

However, the time spent leaving the job to get the seal from the storeroom and the time spent away from the job site obtaining additional shims for aligning the pump would not count as wrench time.

## Wrench time measures maintenance effectiveness, from wasted to ideal.

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Wrench time is a measurement of effective time and excludes wasted or unnecessary time. The goal is to eliminate all delays and nonproductive work, so that maintenance personnel can work effectively nonstop, never leaving the job once it has started until it has been completed, except for breaks, lunch, or the end of the day.

In that ideal situation, the only time that would not be counted as wrench time would be things like safety and other meetings, break and lunch times, and travel time to and from the job. While this measure is somewhat idealistic, it does provide a clear way to assess overall effectiveness. Planning and scheduling is the most effective way to improve an organization's wrench time.

The power in improving wrench time is considerable. For example, if you have a crew of 10 people that has a wrench time of 30% and it is improved to 40%, one effective mechanic will have been added, and this mechanic has a wrench time of 100%.

## **Linking Reliability, Planning, and Scheduling for Lasting Impact**

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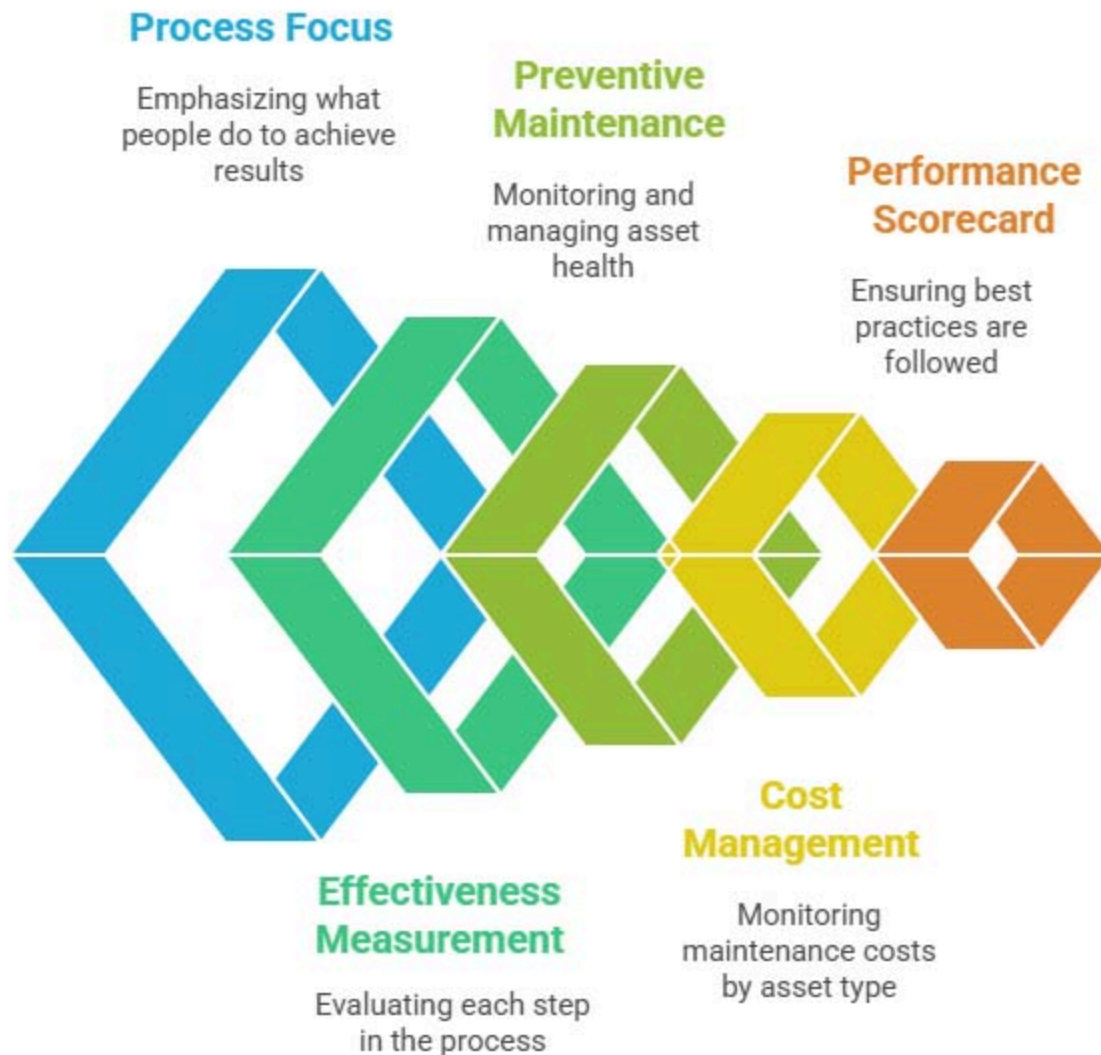
When planning and scheduling are implemented together with reliability, a synergistic relationship develops. A properly designed and operated planning and scheduling system increases a maintenance organization's effectiveness, enabling it to complete a given amount of work in less time.

This shifts the balance of the work system, creating a void to fill in the remaining time. If well-thought-out reliability initiatives are used to fill that void, reactive work is reduced, which in turn enables more planned and scheduled work to be completed, a virtuous cycle that continues to improve until a new balance point is achieved.

Planning enables scheduling, and scheduling enables effectiveness. Effectiveness enables reliability, and reliability enables planning. Without planning, scheduling loses its ability to maximize the use of time.

Without scheduling, planning lacks a means to orchestrate the activities required by the job. Without planning and scheduling, reliability-related work is neglected for the sake of urgent work.

# Achieving Optimal Asset Health



Without reliability-related work, the decreased flexibility in scheduling the job makes planning and scheduling lose their ability to maximize the use of time. Without scheduling, planning lacks a means to orchestrate the activities required by the job.

- Without planning and scheduling, reliability-related work is neglected for the sake of urgent work.
- Without reliability-related work, the decreased flexibility in scheduling the job makes it more difficult to schedule 100% of the available personnel resources.

Companies that “Get It” imagine a corporation fighting an uphill battle to survive despite foreign competition, an aging workforce, and many other issues. The chief executive officer (CEO) decides to focus on reliability because maintenance is the largest controllable cost in an organization, and, without sound asset reliability, losses multiply in many areas.

Over a two-year period, a dedicated team of over 50 key employees researched the world's best maintenance organizations, assimilating the "best practices" they found and implementing them in a disciplined, structured environment. Focusing on reliability, it was found to offer the biggest return with the longest-lasting results.

Corporations that truly understand reliability typically have the best-performing plants. Some common characteristics of a "reliability-focused" organization are that its goal is optimal asset health at an optimal cost.

1. They focus on processes—what people are doing to achieve results.
2. They measure the effectiveness of each step in the process, in addition to the results.
3. Their preventive maintenance programs focus mainly on monitoring and managing asset health.
4. Their preventive maintenance programs are technically sound, with each task linked to a specific failure mode.
5. Formal practices and tools are used to identify the work required to ensure reliability.
6. Roles and Responsibilities are well defined for Maintenance Planning and Scheduling.
7. Maintenance Cost by asset type is monitored and can have a large impact on production costs.
8. Maintenance and Reliability Manages "Maintenance Cost as % of Replacement of Asset Value"
9. Maintenance and Reliability must be measured based on accurate Work Order Close Out
10. A Maintenance Scorecard should be applied to ensure everyone sees what best practice is and whether your organization is moving forward or not.
11. Maintenance Planning and Scheduling Guiding Principles are critical to follow to ensure Planning and Scheduling is followed in a repeatable manner.

## **Planning and Scheduling Guiding Principles**

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- Maintenance Planners focus on Future Work only, today's issues are handled by Maintenance Supervisor or Lead Person
- All work "Scheduled" which require parts/ material are kitted in a secure area
- All Planned and Scheduled work is tracked through status codes, see "Status Codes" below:
  - RTS – Ready to Schedule (parts kitted and secure)
  - AP – Awaiting Parts
  - AWP – Awaiting Production
  - All Work Scheduled one week in advance, typically scheduling meetings are held on Thursday for the following week with Production, Maintenance, and others as required (ie, Contractors, Safety)



- Leading and Lagging KPIs are used to manage the Planning, Scheduling, and Work Execution Process.

## The Benefits of Maintenance Planning and Scheduling are:

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- Lower Total Cost
- Production meets its goals consistently
- Increase in Maintenance Wrench-Time by performing Proactive work and not Reactive work.
- Lower turnover of Maintenance Technicians and Production Operators
- Less stress for everyone
- Reactive work is rare
- Maintenance Rework is low

Remember this quote:

Maintenance Planning and Scheduling can make the most impact on Production and total Cost by following Best Practices.

## Author

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Ricky Smith, CMRP, CMRT

Ricky Smith, CMRP, CMRT is the Vice President of World Class Maintenance and a leading Maintenance Reliability Consultant with over 35 years of experience. He holds certifications such as Certified Maintenance and Reliability Professional (CMRP) and Certified Maintenance and Reliability Technician (CMRT). Ricky has worked with global companies like Coca-Cola, Honda, and Georgia Pacific, delivering expert maintenance solutions across 30 countries. His career began in the U.S. Army, advancing to leadership roles, including a position at the Pentagon as Facility Investigator for the Secretary of Defense. Ricky is also the co-author of *Rules of Thumb for Maintenance and Reliability Engineers* and *Lean Maintenance: Reduce Costs, Improve Quality, and Increase Market Share*.

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