

# Tool-Box Talk

## Maintenance Planning and Scheduling

### “Best Practices”

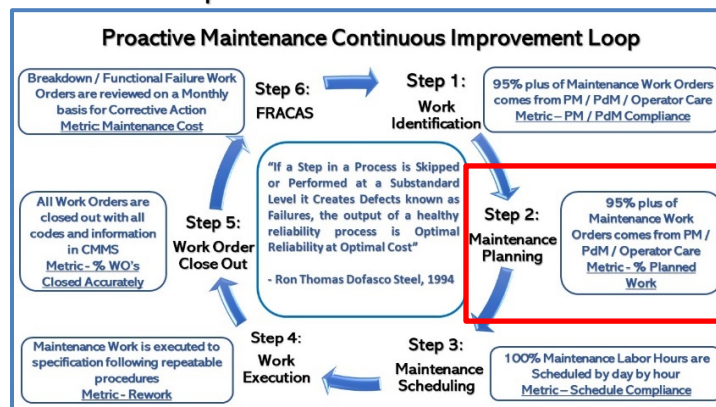
By Ricky Smith CMRP

Maintenance Planning and Scheduling is critical to success of any Maintenance Organization resulting in a significant increase in Wrenchtime (Hands on Tool Time). *Planning and Scheduling are two distinct functions which are dependent on each other.*

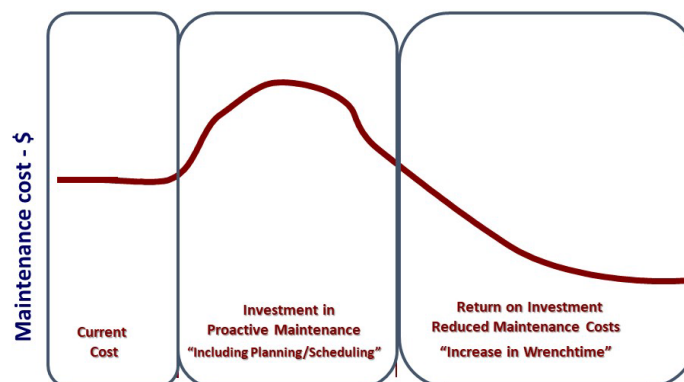
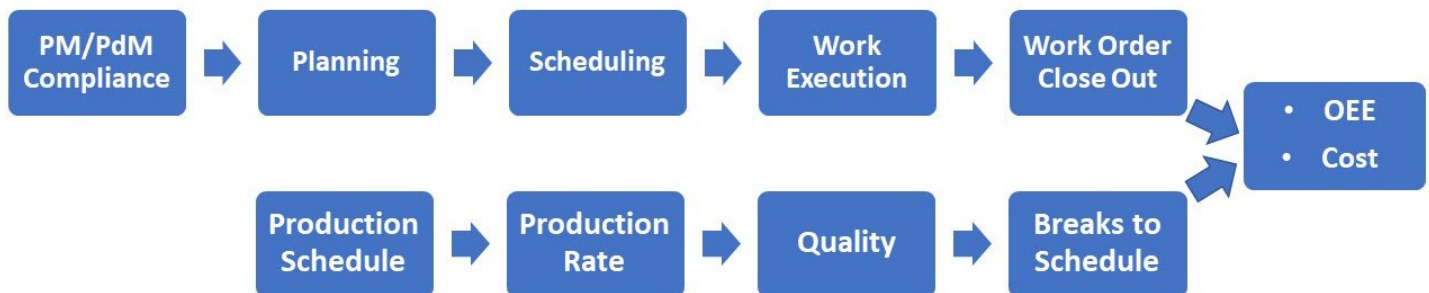
Wrench-time is a measure of maintenance personnel’s time accomplishing proactive work on time, on schedule, and on budget.

Wrench-time does not include time obtaining parts, tools or instructions, and work associated with those tasks, traveling to or from job sites, or time spent obtaining work assignments. It is about only focused on “hands on tool” time.

- **Maintenance Planning** is a highly skilled function that requires a basic knowledge of the maintenance work processes, operations expectations, project management, computerized maintenance management system (CMMS) and related systems, as well as a practical understanding of the work to be performed.
- **Planning is the “what’s required” and “how to” part of any maintenance job.**
- **Planning typically includes the following:**
  - Parts/Materials
  - Specifications
  - Instructions (Repeatable)
  - Coordination requirements
  - Estimated time
  - Repeatable procedure
  - Safety/Environmental Requirements



- **Maintenance Scheduling** is the process by which all proactive maintenance activities are scheduled by day by hour in coordination with Production at least one week in advance.
- **Maintenance Scheduling requires the following:**
  - Maintenance Scheduling Meeting is managed by the Maintenance Planner/Scheduler
  - Production and Maintenance leadership agreement of schedule by day by hour one week prior to scheduled work execution
  - The Maintenance Schedule is agreed upon by all parties prior to scheduling meeting.
  - A Maintenance Scheduling Meeting, typically held every Thursday for 30 minutes, lead by Maintenance Planner/Scheduler to ensure nothing has changed for next week's schedule.
  - Personnel to attend Scheduling meeting:
    - Maintenance Planner/Scheduler
    - Maintenance Supervisor
    - Production Supervisor / Manager
    - Plant/Reliability Engineer (Optional – dependent on potential interference with next week's schedule due to contractor, project interference with schedule)
  - Measurements (prefer a dashboard posted in the plant)
    - # Breaks to the schedule by type of break, ie. Production could not release equipment on time, No parts, Maintenance Labor not available, etc.
    - Schedule Compliance
    - PM Compliance
    - OEE



# Planning and Scheduling Vision, Mission, and Guiding Principles

## Planning and Scheduling Vision Statement

To plan and schedule maintenance work in order to optimize asset and process reliability at optimal cost.

**“doing the right work at the right time”**



## Planning and Scheduling Mission Statement

Maintenance Planning and Scheduling is to enable proactive maintenance through increased **“wrench-time”** enabling optimal production process reliability at optimal cost.

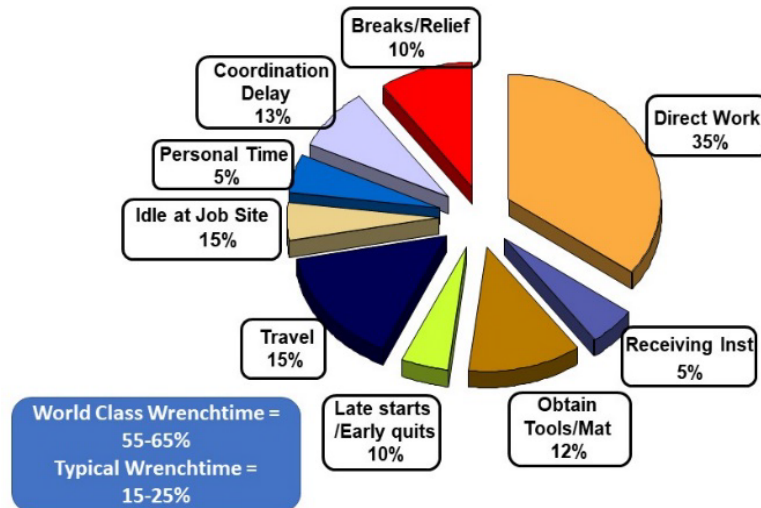


## Planning and Scheduling Guiding Principles

1. Scheduling uses a combination of Defect Severity and Asset Criticality to determine scheduling work orders.
2. Maintenance Planners focus on Future Work only, today's issues are handled by Maintenance Supervisor or Lead Person
3. Maintenance Planners plan and schedule **“MAINTENANCE WORK”**
4. All work **“Scheduled”** which require parts / material are kitted in a secure area
5. All Planned and Scheduled work is tracked through status codes, see **“Status Codes”** below:
  - > RTS – Ready to Schedule (parts kitted and staged/secure)
  - > AP – Awaiting Parts
  - > AWP – Awaiting Production
6. All Work Scheduled is scheduled by day and by hour
7. Scheduling meetings are held on Thursday for FINAL review of the following week's maintenance schedule with Production, Maintenance, and others as required (ie. Contractors, Safety)
8. Maintenance Planners facilitate the meeting and typically last 30 minutes
  - > Required attendees, Maintenance Planner, Maintenance Supervisor, Production Supervisor, Contractor (optional), Maintenance / Reliability Engineer
9. Leading and Lagging KPIs are used to manage the Planning, Scheduling, and Work Execution Process.



## Wrench-Time “Hands-On Tool Time”



1. Wrench time is a measure of crafts personnel at work, using tools, in front of jobs.
2. Wrench time does not include obtaining parts, tools or instructions, or the travel associated with those tasks.
3. It does not include traveling to or from jobs.
4. It does not include time spent obtaining work assignments.



## Steps to Success in Maintenance Planning and Scheduling

### Step 1: Identify External Distracters

- Poor spare parts and inventory controls
- Conflicting ideas of what planning *is*
- *No planner*
- Planners taken off job, put on tools, or involved in daily activities (parts chaser, facilitating daily work)
- Maintenance and Production not acting as a team
- No planning process, unclear expectations, unclear roles and responsibilities
- Maintenance leadership not following the plan
- Emergency / Urgent Work too High
- Lack of Discipline
- The CULTURE

## Step 2: Education of the Team - “Coaching is not just for Planners Anymore”

- Plant / Operations Leadership
- Frontline Production Leadership
- Maintenance and Reliability Leadership (all levels)
- Planners
- Maintenance Personnel
- Operators

“If you send a Maintenance Planner to Training be sure you send you best technician or maintenance supervisor as well, change is never easy”

### Tool Box Talk – Wrench Time Study “Utilization Survey”

*“Work Sampling: Why Is It Needed?”*

**What Is Wrench Time?**  
Wrench Time is defined as the actual amount of time a crafts person spends doing value added work. A Wrench Time Study, or Work Sampling Study, is aimed at identifying and then eliminating or mitigating the time spent on non-value added tasks.  
World Class Wrench Time is 55-65%; most companies' Wrench Time is between 15-30%.  
“Your system is perfectly designed to deliver precisely the results you're getting.”  
— W. Edwards Deming, PhD

**Guiding Principles of Wrench Time Studies**  
Identify the percent of time maintenance personnel are delayed due to one of these specific reasons:

- Traveling to and from the workplace: items not in the plan
- Breakdown Planning: (emergency/critical or urgent work) waiting for parts, people, etc.
- Training: technical, safety, etc.
- Meetings: training, safety, etc.
- Work Execution: waiting on parts, waiting on someone, etc.
- Breaks: lunch, heat breaks, etc.
- Waiting: waiting on supervisor, another maintenance person, production, etc.
- Administrative: Union issues; personnel issues; discussion with supervisor about vacation, work orders, etc.

**WARNING:**  
“Drive out fear, so that everyone may work effectively for the company.”  
— W. Edwards Deming, PhD  
We never want our employees to fear any actions we take as managers. If a wrench time study is to be conducted, it is necessary to discuss the reasons for the study and its value.  
Do not follow the “just do it” approach. You want your maintenance personnel to buy in to the process.  
“The only reason for conducting a Wrench Time Study is to identify the delays causing maintenance to be less efficient!”  
**Pay Attention to This Message:**  
A Wrench Time Study is not about finding personnel who are inefficient, making mistakes, or performing poorly. It is about the quality of the planning process and how the organization uses the planning process.

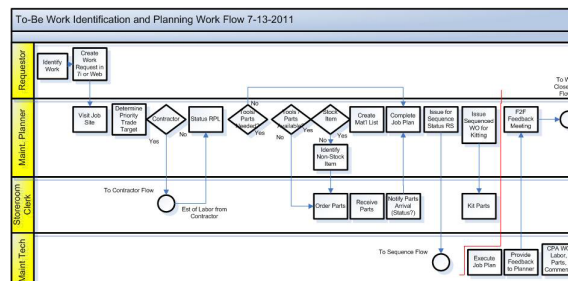
**Planning / Scheduling Impact on MTBF**

**How is a Work Sampling Study Conducted?**  
Over the years, Work Sampling Studies have taken many forms. The most infamous is the Industrial Engineer following someone around all day with a clipboard and stop watch. This technique rarely achieves accurate results.  
I prefer a different method. Personnel conduct the study on themselves by means of carrying around a Palm D

## Step 3: Create Guiding Principles for Planning and Scheduling

- The planners focus on future work and maintain at least two weeks of work backlog that is planned, approved, and ready to schedule / execute.
- Planners Do Not Chase Parts for Jobs in Progress
- Supervisors and Crew Leads Handle the Current Day’s Work and Problems – Coordination
- Scheduling Does Not Occur Until Parts are Kitted
- We will maintain a stable / nonfluid Criticality Index

## Step 4: Define the Planning and Scheduling Processes





## Step 5: Define Roles and Responsibilities

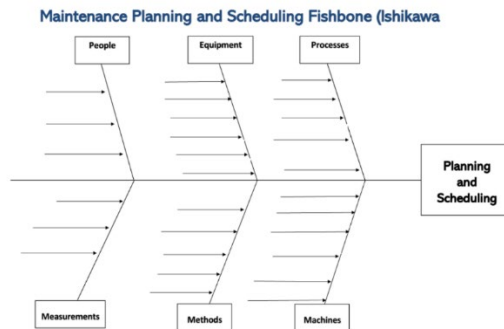
**MAINTENANCE PLANNING AND SCHEDULING**

Tasks <small>Decisions/Functions</small>	Maintenance Supervisor	Maintenance Planner/Scheduler	Maintenance Manager	Production Supervisor	Tradesman	Storeroom	Operator
Work Order PMP/OpCare	R	I	A	A	R		R
Planning	C	R	A		C	C	
Scheduling	C	R	A	C		C	
Scheduling Meeting	I	R	A	C	I	I	
Work Execution	A		I		R		R
Work Order Close Out	A	R	I		R		R
FRACAS	A	R	R	R	R	R	R

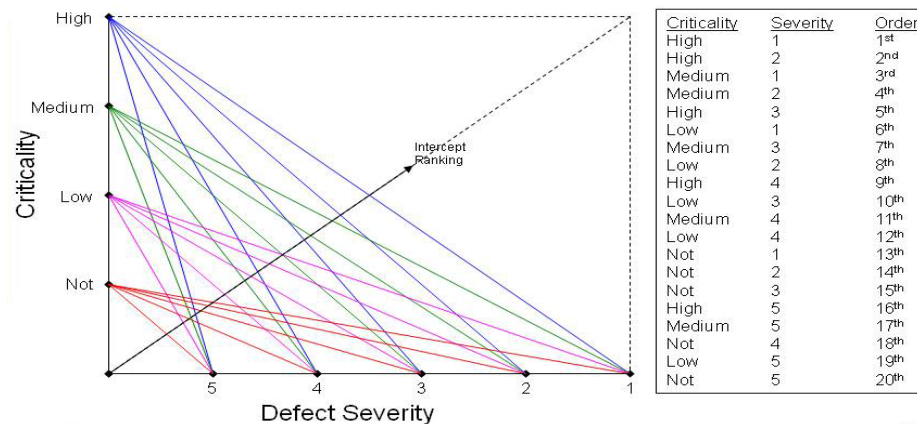
R Responsibility "the Doer"  
A Accountable "the Buck stops here"  
C Consulted "in the Loop"  
I Informed "kept in the picture"

### Steps to Success

1. Assemble a team of people involved in Planning and Scheduling (ex: planner, supervisor, technician, storeroom attendant, production supervisor)
2. Define the process tasks required for success of Planning and Scheduling
3. Educate the team in what an effective Planning and Scheduling looks like
4. Facilitate the team through the RACI Process
5. Post the RACI Chart along Planning and Scheduling KPIs Dashboard for all to see
6. Perform RCA when Planning and Scheduling is not meeting expectations



## Step 6: Prioritize Work to be Planned



## Step 7: Develop Repeatable Procedures for all Maintenance Work in order to:

- Ensure repeatability and reduce variation in execution
- Capture Knowledge based on past issue/failures
- Train New Employees with Repeatable Procedures
- To Reduce Human Error

***Human error refers to something having been done that was "not intended by the actor; not desired by a set of rules or an external observer; or that led the task or system outside its acceptable limits".***

**Human Induced Failures are equipment failures caused by the actions of people.**

### 80% of Equipment Failures are Human Induced

**Here are a few examples you may relate with:**

- Repairs are made with a repeatable procedure so everyone does it a little or a lot differently creating uncontrolled deviation to the reliability of the equipment.
  - Mechanic #1: Follows a repeatable procedure and does the job the "right way" (Mean Time Between the Next Failure is large)



- Mechanic #2: Lubricates the same equipment without a procedure, does it like he/she always has not knowing proper contamination control method. (Mean Time Between Failure is out of control but no one knows it because it is not measured)

**Have you seen any of the following indicators which point to a serious problem with Human Induced Failures?**

- Lubricating Electric Motors without removing the relief plug
- Welding on equipment without grounding close to the welded area (ground should be 6" from welded area)
- Equipment failure occurring all the time without a known root cause
- Operators not operating the equipment to specifications (people allowed to do their own thing costing the company millions)
- Zinc anodes not replaced on water cooled heat exchangers causing tube damage and water intrusion into oil.
- Maintenance personnel making quick repairs without making a permanent repairs
- No time standard on the work order

**Repeatable procedures reduce human induced failures because everyone performs the work the same way every time unless new information presents itself.**

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