

How to Optimize Reliability Through Better Planning and Scheduling

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Most organizations face a range of challenges, and they can come from all directions. Think of the impact on your operations of a good challenge, like an opportunity to increase your sales. You might have to increase production capacity quickly so you don't lose business opportunities, and now you may have to increase your workforce or bring new equipment on-line. If you're facing increased competition in your market, you have different decisions to make: Will you try to reduce your costs, or shorten your production lead time through greater efficiencies to remain competitive? Let's talk about human resources issues, like the trouble we all have hiring skilled employees and retaining key personnel. If your staff retention rate is poor, think of the training time and energy you have to spend, and the reduction in efficiency you experience while you try to get new staff up to speed. Finally, your organization has to understand and comply with all the rules and regulations touching on environmental impact, health and safety, and so on, Getting and keeping ISO, SOX, HACCP, and FDA approval will have a monetary impact on your business.

Maintenance guys can play a major role in a business, especially when you face challenges like these. In fact, you can probably help more than your COO thinks possible. Raise your hand if you wanted to be a superhero when you were a kid. Well, you can be one now, at least in the eyes of your COO and your stakeholders. And above all, if you are a Planner or a Scheduler, you can discover that you have super powers! And here you thought you were just Peter Parker or Clark Kent.

To unleash your super powers and be a superhero to your business, you have to align the maintenance department's work with your organization's objectives, so your maintenance team can deliver a super-hero positive impact on the business. Planners must identify strategies to overcome challenges and turn operational constraints into operational advantages. Your planning and scheduling needs to be agile so you can quickly respond to changing circumstances. For example if you are in full expansion and can afford a shut down, you have to deal with reduced production capacity. You as planner must focus on performance and efficiency to reduce production delays. You might have to out-source, spend more on overtime than you planned at the start of the year, and optimize maintenance interventions so they take place during shutdowns. You as planner can approve just-in-time parts purchasing, increase the inventory of essential

spare parts, and combine necessary maintenance on a machine during down time when you're replacing a worn-out part or the machine is off line for some other reason. These strategies impact the budget but will improve production KPIs, so you're helping the whole team reach your main business objectives.

Planners can work in opportunity mode and set KPIs related to production. Reliability and equipment efficiency must be part of your organization's objectives and indicators (MTTR, MTBF, OEE). Indicators must be defined around equipment performance and downtime reduction. With that in mind, the ideal strategy will prioritize work based on equipment criticality, while still setting indicators linked to schedule adherence or respecting preventive-maintenance plans.

If a business is trying to cut costs, your planning strategy will shift towards getting to your objectives at the lowest expense. You'll avoid purchasing parts in panic mode, optimize tool use, work with the team to reduce commuting time, and limit overtime and sub-contracting.

You as planner face a lot of challenges and must have tools that help you make the right decisions quickly and confidently. You need to be able to integrate financial indicators like maintenance cost per production hour, the number of pieces of equipment being maintained per maintenance employee, the amount of rework on service calls, and how well your organization maintains its and preventive maintenance plan. Having these indicators helps you demonstrate to stakeholders where the organization is doing well, and where it needs to do better.

Planners must be able to show how an equipment reliability plan will have an impact on maintenance costs. If we can identify the equipment that is essential, but is also a financial bottomless pit, we can then pinpoint recurring problems, implement a reliability analysis, and establish a game plan based on the best return on investment for the company.

Whatever the business challenges, KPIs must resonate with all stakeholders and everyone should understand them the same way. Maintenance and planning tasks should be in agreement with management goals, so KPIs truly and clearly support objectives.

Here's a story that illustrates my theory. An airline company has a major challenge: it has to reduce or even eliminate departure delays to keep a competitive edge over the competition. So, one day a plane has just landed and must take off an hour later. But following a routine inspection, the maintenance crew identifies a defective part, and there is no spare part in inventory. Forget about getting a new one from the vendor, because it will take four hours to get it, and the flight will be delayed. The planner knows that a similar plane

will land in 15 minutes, and that that plane doesn't have to go anywhere soon. So you move to the cannibalism strategy. You ask a technician to take the required part from the second plane and replace the defective one on the plane that needs to take off sooner. That way the first plane can take off without delays. This scenario will repeat over and over again until the vendor gets the new part to you. The impact on operational KPIs is 100% success. Since everybody agrees on the KPIs, cannibalism would be a winning strategy here, even though it generates a huge emergency for the maintenance crew. This would be a big problem if the department goal was to reduce the number of emergencies.

This example demonstrates that we can't always apply best practice indicators in all contexts. This suggests that establishing maintenance and reliability objectives that support solving business challenges is crucial for your entire organization.

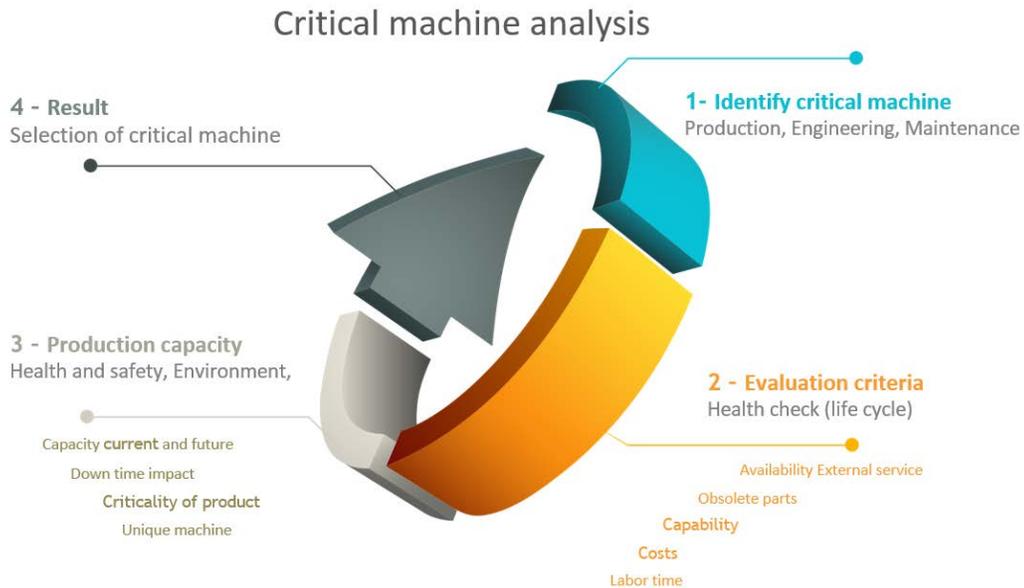
Preparation of work

Among best practices, preparation of work is probably the most important because it represents the foundation of successful planning and scheduling strategies. It lets you respond to and take better control of unexpected situations. Good preparation requires that you have the right information, and quick and easy access to the data you need.

You, the super-planner, need a strategy that lets you prioritize interventions, taking into account different criteria determined by stakeholders in production, engineering and maintenance. These criteria and your strategy must, once again, be in line with business challenges. Tools such as a prioritization matrix and identification of equipment criticality help planners rank interventions according to business priorities.

When we talk about prioritization, we are talking about developing a strategy of what work to do and when. You may use a score card matrix and list all critical equipment.

Figure #1: This graph represents Critical Machine Analysis



Your work as a planner will be more efficient when you have tools that give you quick access to all the information related to the equipment you have to keep running. When you have to prepare a service request for a piece of equipment, you can review its history to find failure trends or check for the last time a similar problem cropped up. Do your planners have access to the complete failure history, with data on causes and remedies for all cases? Having the full story will always improve the maintenance technician's efficiency. What are the preventive and monitoring frequencies associated with this equipment? Have we used subcontractors to maintain the equipment in the past? Are there warranties? When was the last PM? What could we have done in the last maintenance check to anticipate the failure and possibly prevent it? Do we have to change the frequency of maintenance, adjust the tasks, or improve the technicians' training? There are many questions that you can answer with a lot more confidence if you have the equipment's history to review.

A planner wants to check if the PM schedule is being followed or if there are delays or frequent cancellations of PM. This is crucial information when you are negotiating with the production team for equipment

availability for the next preventive maintenance tasks. A good planner must be able to demonstrate that doing preventive maintenance pays off. You can do so by showing a correlation between cancellation of preventive maintenance tasks and an increase in the number of emergency situations. What is the consumption of parts? Are the replacement parts already in the catalog to prepare the bill of material? Are the parts in stock, or should we create a purchase order? Does your CMMS integrate kitting so you can prepare in advance the shopping cart for the technician? This strategy is very pro-active and has direct impact on the technician's wrench time. Missing parts and round trips to the store must be avoided, or the maintenance staff loses valuable time. Does your purchasing system notify you when a purchase order is created, when a vendor indicates a shipping date, when your team has received all the parts, and when he everything required is in the work order cart? This is all essential information that makes possible effective planning and improves intervention coordination.

Can the planner access the security procedures, the lock-out, tag out, and enclosed areas easily and quickly? Do the files contain drawings, photos, videos, a trouble shooting guide, and a knowledge base to allow technicians to access information and make quick and informed decisions about what they have to do? Does the planner know how to review tool availability and arrange external rentals when needed? Can the planner manage tools reservation and follow-up in the calendar? Not having an essential tool available is another factor that will affect the technician's performance and burn valuable time.

The planner is often the equipment data watchdog. As you know, all work orders go through the planner. He knows well which equipment has potential problems. He can work with the maintenance and engineering departments to highlight equipment with recurring problems and lead the way to a reliability and continuous improvement program. Having KPIs for your equipment lets you quickly verify the evolution of MTTR, MTBF, maintenance costs (parts, resources, services) and other business strategy-related indicators.

To complete his preparation, the planner needs to have work order libraries, templates to increase efficiency in the team's response to the most frequent and the most complex calls. Having good template libraries leads to time saving and process standardization, while requiring less expertise on the part of the planner. You choose the most suitable template from the library and quickly have the new work order under way, even one with multiple phases and many tasks, with greater confidence that you have not left out a key step or essential requirement. Each work order template provides starting places for estimates, parts lists, tools, and procedures. Ideally, such libraries provide a simple and intuitive management system so you can quickly edit, update and modify templates, and log and review the history of their use. Work libraries must be dynamic so they can evolve with the business.

The performance of the planning team depends on the quality of the tools available. The tools need to help you eliminate repetitive tasks and provide a logical user interface so you can spend time manipulating data, not reading the user manual. The more your tools are simple and quick to use, the more planners and maintenance technicians will use them to get and give the right information at the right time. The quality, accuracy and integrity of the information enable business practices that support a productive reliability culture in your organization.

When you apply best practices, supported by efficient and usable planning tools, you can coordinate teams better and generate better estimates. You can deal with more work orders with the same team size. Many studies show that one hour of planning can save three to five hours of maintenance (or wrench) time.

One of the benefits of good planning and scheduling is that your planner and supervisor can spend more time on the floor instead of staring at a computer screen. When you are on the floor, you can identify and direct more preventive maintenance, execute reliability analysis, improve project transparency, and control the overtime sub-contractors are running up.

Good planning and scheduling also have a major positive impact on maintenance employees. Because you are well organized, maintenance technicians work with more confidence, get more done, and are more appreciated by their production colleagues.

Planning and Scheduling

To succeed, the planner needs a good visual overview of the elements of each work order. The overview must be available in real time, and must be reliable, accurate, and easy to read. Each work order must be easy to update, and to drag-and-drop into its place in the schedule. You must be able to adapt your information, and your overview, to the developing realities your teams face, so you have the best information clearly available to the people who need to act on it.

The visual overview can be a graphic depiction of the evolution of each team's backlog and workload. You need more than just a statement of the number of work orders pending: you need to know, among other things, how many person-hours each work order requires, and which tools it needs. The planner needs to be able to filter and analyze that information by different parameters. For instance, you might want to view the work orders by factors like priority, type of maintenance, skilled trades required, department, or critical equipment. You may want to review trend lines of workload over the past months or years to see if you can spot issues and develop strategies to address them before they become crises. The rates for various

parameters should ring an alarm bell if any show an upward trend. The planner should then determine a strategy to fix the issues and return the rate to normal. It's necessary to verify overtime, sub-contracting work and claims, shut downs, old work order clean-ups, priority revisions, and similar significant indicators. The ideal tool lets the planner group tasks and sub-tasks through a user-friendly interface, and then assign the groups by team, skilled trade, task, work awaiting equipment or parts availability, or by any other criteria. The tool should let the planner select fields to sort or filter work orders on and quickly see for each work order the estimated time, the number of employees and steps required, parts and tools availability, and any other relevant information.

The biggest challenge for planners is to manage resources with simplicity and speed, keeping up with changes in availability and work schedules. What is the impact of fly-in / fly-out; 5-2 and 4-3-4; 8-hour and 12-hour schedules; and weekends and breaks? How do we deal with skilled trade requirements, sub-contractors, and shut-downs? Planners and schedulers need to be able to respond to visual cues in the software with simple drag-and-drop functionality to get each work order into its proper place in the schedule, right down to the specific week or day. A good planning tool lets the planner and scheduler manage the evolution of each work order at any level of granularity.

Best practices of planning and scheduling sometimes require you to split a work order into many steps. Each step gets its own estimate, number of employees, and place in the schedule. The planner needs a visual depiction of the parts available, the tools that are booked, the health and safety procedures enabled, and whether the work order or the current step has a prerequisite that must be completed before the current step starts. Planners often display the results of their work in a Gantt Chart for the current day or week, showing the work to be done, the dependencies, and the implications of delays on project success.

The smart planner schedules daily activities with some flexibility built in, instead of trying to plan every hour. This is to avoid idle time for employees when they finish a job ahead of the estimate. It gives each employee some control over the process and some flexibility to react to changing circumstances. Because the employee can see clearly what has to be done during the day, and the implications on the whole team if there is a delay, the employee can be both more focused and more agile in getting to completion, while taking into account the production schedule.

Your planning tool must allow your team to quickly visualize progress on work orders and steps which were not completed by the last work shift, so they can understand how that affects the schedule for the next shift. Good practices help planners create and manage a work order that may be open for many days, but ideally has many small steps per shift and per day in order to minimize the impact of delays. A huge work order running many days is like an elephant: you can eat it, but it will take many small bites.

There are many ways to plan workload. What percentage of time should we set aside to manage emergencies or take advantage of opportunities? How do we define the percentage of a work order to schedule as prevention, un-planned work, in-project work, and so on? The answer will depend on the strategies you put together to reach your business objectives. Actions must be measurable, and you have to be ready to adapt according to business challenges. You need to understand the level of urgency of the current work, and what the target is for getting it done. The most important thing is to define a strategy aligned with the goals of the organization, and then to make sure you have the tools to support that strategy.

Good planning and scheduling are fundamental to increasing employee efficiency (wrench time) and equipment availability (uptime). The faster you can do repairs, the faster the equipment is back at work, so more work can be done and you are more likely to hit or even beat your estimate.

A good planning tool makes it easy to create a good plan, and a good plan impacts maintenance team production:

- Short term: take control of the work, increase wrench time, decrease MTTR, and increase production team confidence in the maintenance department.
- Medium term: decrease down time, control maintenance costs, integrate more projects, and increase stakeholder and executive confidence.
- Long term: dramatically enhance your operation's reliability and efficiency.

By using good planning and scheduling tools you can be more productive and increase the reliability of your equipment. More than that: your job can contribute to operations and finance more significantly than you may be able to imagine.

Figure #3 represents how the right planning and scheduling tool can offer a quick return on investment



Keywords : Asset Management, Asset Reliability, Best Practices, CMMS, Maintenance Management, Maintenance Process, Planning and Scheduling, Preventive Maintenance, Reliability, Schedule, Scheduling, Work Order, Wrench Time.