ARMS RELIABILITY

The Reliability Leader's Guide to

Maintenance Strategy Optimization

Chapter 1

10 Common Routine Maintenance Issues (and Why They’re a Real Problem)

Regardless of industry or discipline, we can probably all agree that knowing the rhyme and reason behind your routine maintenance tasks - sometimes referred to as preventative, predictive, or even scheduled maintenance - is a good thing. Unfortunately, most companies don't have the robust (and justified) strategies they need.

Typical issues and the kinds of trouble they can create:

1. Lack of structure and schedule

In many cases, routine tasks are just entries on a to-do list of work that needs to be performed — with nothing within the work pack to drive compliance. In particular, a list of tasks beginning with “Check” which have no guidance of an acceptable limit can have limited value. The result can be a “tick and flick” style routine maintenance program that fails to identify impending failure warning conditions.

2. Similar Assets, Similar Duty, Different Strategies

Oftentimes, maintenance views each piece of equipment as a standalone object, with its own unique maintenance strategy. As a result, one organization could have dozens of maintenance strategies to manage, eating up time and resources. In extreme cases this can lead to similar assets having completely different recorded failure mechanisms and routine tasks, worded differently, grouped differently and structured differently within the CMMS.

3. Operational Focus

Operations might be reluctant to take equipment out of service for maintenance, so they delay or even cancel the appropriate scheduled maintenance. At times this decision is driven by the thought that the repair activity is the same in a planned or reactive manner. But experience tells us that without maintenance, the risk is even longer downtime and more expensive repairs when something fails.

4. Reactive Routines

Sometimes, when an organization has been burned in the past by a preventable failure, they overcompensate by performing maintenance tasks more often than necessary. The problem is, the team might be wasting time doing unnecessary work — worse still, it might even increase the likelihood of future problems simply because unnecessary intrusive maintenance can increase the risk of failure.

5. Over-reliance on past experience

There’s no substitute for direct experience and expertise. But when tasks and frequencies are solely based on opinions and “what we’ve always done” — rather than sound assumptions — maintenance teams can run into trouble through either over or under maintaining. Without documented assumptions, business decisions are based on little more than a hunch. “Doing what we’ve always done” might not be the right approach for the current equipment, with the current duty, in the current business environment (and it certainly makes future review difficult).

6. Failure to address infrequent but high consequence failures

Naturally, routine tasks account for the most common failure modes. They should however also address failures that happen less frequently, but may have a significant impact on the business. Developing a maintenance plan which addresses both types prevents unnecessary risk. For example, a bearing may be set up on a lubrication schedule, but if there's no plan to detect performance degradations due to a lubrication deficiency, misalignment, material defect, etc then undetected high consequence failures can occur.

7. Inadequate task instructions

Developing maintenance guidelines and best practices takes time and effort. Yet, all too often, the maintenance organization fails to capture all that hard-won knowledge by creating clear, detailed instructions. Instead, they fall back on the maintenance person's knowledge — only to lose it when a person leaves the team. Over time, incomplete instructions can lead to poorly executed, "bandaid-style" tasks that get worse as the months go by.

8. Assuming new equipment will operate without failure for a period of time

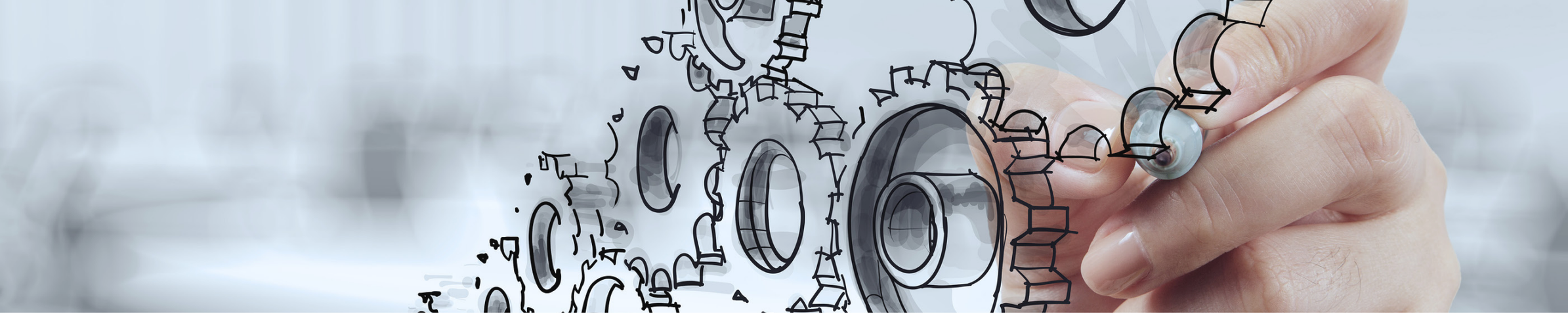
There's a unique situation that often occurs when new equipment is brought online. Maintenance teams assume they have to operate the new equipment first to see how it fails before they can identify and create the appropriate maintenance tasks. It's easy to overlook the fact that they likely have similar equipment with similar points of failure. Their data from related equipment provides a basic foundation for constructing effective routine maintenance.

9. Missing the opportunity to improve

If completed tasks aren't reviewed regularly to gather feedback on instructions, tools needed, spare parts needed, and frequency; the maintenance process never gets better. The quality or effectiveness of the task then degrade over time and, with it, so does the equipment.

10. Doing what we can, not what we should

Too often, maintenance teams decide which tasks to perform based on their present skill sets — rather than equipment requirements. Technical competency gaps can be addressed with a training plan and/or new hires, as necessary, but the tasks should be driven by what the equipment needs.



Without a robust routine maintenance plan, you're nearly always in reactive mode — conducting ad-hoc maintenance that takes more time, uses more resources, and could incur more downtime than simply taking care of things more proactively. What's worse, it's a vicious cycle. The more time maintenance personnel spend fighting fires, the more their morale, productivity, and budget erodes. The less effective routine work that is performed, the more equipment uptime and business profitability suffer.

Here's the good news: An optimized maintenance strategy, constructed with the right structure is simpler and easier to sustain. By fine-tuning your approach, you make sure your team is executing the right number and type of maintenance tasks, at the right intervals, in the right way, using an appropriate amount of resources and spare parts. And with a framework for continuous improvement, you can ultimately drive towards higher reliability, availability and more efficient use of your production equipment.

Chapter 2

Plans Can Always Be Improved: Top 5 Reasons to Optimize Your Maintenance Strategy

Maintenance optimization doesn't have to be time-consuming or difficult. Yet many organizations simply can't get their maintenance teams out of a reactive "firefighting mode" so they can focus on improving their overall maintenance strategy.

Other organizations never make a start because they lack the data and/or the framework to demonstrate the real, concrete business value that can be gained.

And even when organizations do start to work on optimization, sometimes their efforts stall when priorities shift, results are not immediate and the overall objectives fade from sight.

SMALL CHANGES CAN MAKE A **HUGE** DIFFERENCE

If any of these challenges sound familiar, there are some very convincing reasons to forge ahead with maintenance optimization:

1. You can make sure every maintenance task adds value to the business

Through the optimization process, you eliminate redundant and unnecessary maintenance activities, and make sure your team is focused on what's really important. You'll outline the proper maintenance tasks, schedules and personnel assignments; then incorporate everything into the overall equipment-utilization schedule and departmental plans to help drive compliance. Over time, an optimized maintenance strategy will save time and resources — including reducing the hidden costs of insufficient maintenance (production downtime, scrap product, risks to personnel or equipment and expediting and warehousing of spare parts, etc.).

2. You'll be able to plan better

Through the optimization process, you'll be allocating resources to various tasks and scheduling them throughout the year. This gives you the ability to forecast resource needs, by trade, along with spare parts and outside services. It also helps you create plans for training and personnel development based on concrete needs.

3. You'll have a solid framework for a realistic maintenance budget

The plans you establish through the optimization process give you a real-world outline of what's needed in your maintenance department, why it's needed, and how it will impact your organization. You can use this framework to establish a realistic budget with strong supporting rationales to help you get it approved. Any challenges to the budget can be assessed and a response prepared indicating the impact on performance that any changes might make.

4. You'll just keep improving

Optimization is a project that turns into an ongoing cycle of performing tasks, collecting feedback and data, reviewing performance, and tweaking maintenance strategies based on current performance and business drivers.

5. You'll help the whole business be more productive and profitable

Better maintenance strategies keep your production equipment aligned to performance requirements, with fewer interruptions. That means people can get more done, more of the time.

Chapter 3

How to optimize your maintenance strategy:

Optimizing your maintenance strategy doesn't have to be a huge undertaking. The key is to follow core steps and best practices using a structured approach. If you're struggling to improve your maintenance strategy — or just want to make sure you've checked all the boxes — here's a 1000-foot view of the process.

1 Sync Up

- Identify key stakeholders from maintenance, engineering, production and operations — plus the actual hands-on members of your optimization team.
- Get everybody on board with the process and trained in the steps you're planning to take. A mix of short awareness sessions and detailed education sessions to the right people are vital for success.
- Make sure you fully understand how your optimized maintenance strategies will be loaded and executed from your Computerized Maintenance Management System (CMMS)

2 Organize

- Review/revise the site's asset hierarchy for accuracy and completeness. Standardize the structure if possible.
- Gather all relevant information for each piece of equipment.
    - Empirical data sources: CMMS, FMEA (Failure Mode and Effects Analysis) studies, industry standards, OEM recommended maintenance
    - Qualitative data sources: Team knowledge and past records

Not sure you have enough detail? The truth is, you can still do a lot with limited or poor quality data, supported by additional sources of knowledge. Extract any and all information you have available, not just what is in the CMMS. Check out our blog, *"Making Maintenance Decisions Without Complete Failure Data"* to learn more.

3 Prioritize

- Assign a criticality level for each piece of equipment; align this to any existing risk management framework
- Consider performing a Pareto analysis to identify equipment causing the most production downtime, highest maintenance costs, etc.
- Determine the level of analysis to perform on each resulting criticality level

4 Strategize

- Using the information you've gathered, define the failure modes, or apply an existing library template — determine existing and potential modes — for each piece of equipment
- Assign tasks to mitigate the failure modes.
- Assign resources to each task (e.g, the time, number of mechanics, tools, spare parts needed, etc.)
- Compare various options to determine the most cost-effective strategy
    - NOTE: Reliability-centred maintenance (RCM) simulation software can be a great help in deciding between run-to-failure, time driven repair/replace and inspection tasks.
- Bundle selected activities to develop an ideal maintenance task schedule (considering shutdown opportunities).

5 Re-Sync

- Review the proposed maintenance strategy with the stakeholders you identified above, then get their buy-in and/or feedback (and adjust as needed)

6 Go!

- Implement the approved maintenance strategy by loading all of the associated tasks into your CMMS — ideally through direct integration from your RCM simulation software, manually, or via an Excel sheet loader.

7 Keep Getting Better

- Continue to collect information from work orders and other empirical and qualitative data sources.
- Periodically review maintenance tasks so you can make continual improvements.
- Monitor equipment maintenance activity for unanticipated defects, new equipment and changing plant conditions. Update your maintenance strategy accordingly.
- Build a library of maintenance strategies for your equipment.
- Take what you've learned and the strategies and best practices you've developed and share them across the entire organization, wherever they are relevant.

ARMS Reliability provides solutions to help companies achieve optimal asset performance.

This eBook has outlined at a high level why and how you should optimize your maintenance strategies. To ensure you are using the best approach to maintain your assets, ARMS Reliability can provide software, consulting, and training, either individually or in combination, to help you with:

- Criticality Ranking
- Maintenance Strategy Assessment
- Maintenance Master Data
- Maintenance Strategy Development
- Maintenance Strategy Optimization
- Reliability Centered Maintenance (RCM)
- Task Based Maintenance (TBM)
- Enterprise Data Migration
- Integration with your Computerized Maintenance Management System (CMMS)

Learn more about ARMS Reliability's approach to Maintenance Strategy Development and Optimization or contact us to discuss your current challenges.

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