

Hy-Lok
Always Connected

Key Benefits of Planned Shutdowns and How to Prepare for Them



The Importance of Annual Maintenance (or Scheduled Shutdowns)

Every MRO manager knows that getting the most out of annual maintenance activities and planned shut downs requires planning and a clear understanding of the tasks that need to be accomplished. Scheduling the work is only the first step; an experienced MRO will have the spare parts and equipment on hand to tackle anything unexpected. Anyone who's ever turned a wrench knows that there will always be surprises; however, a good plan and a little insight can at least minimize unexpected disruptions. Understanding your systems and equipment along with the ability to analyze historical data are all crucial to maximizing resources, as well as getting the operation back up and running on schedule.

Validation of maintenance activities is also an important component, as an annual maintenance report can be a qualifier for many aspects of an enterprise. For plant managers, it can be a signal of equipment efficiency and provide telltale signs of under- or over-utilization. As far as customers are concerned, however, an annual maintenance report can be an important sign of a company's commitment to quality.

The quality of a plant's product depends on the performance of each machine and system. Operational consistency is also essential to accurate operational planning and a key budgetary factor. This means that maintaining peak performance is crucial, and underscores the importance of effective maintenance activities.

Typical Scheduled Maintenance Activities Checklist

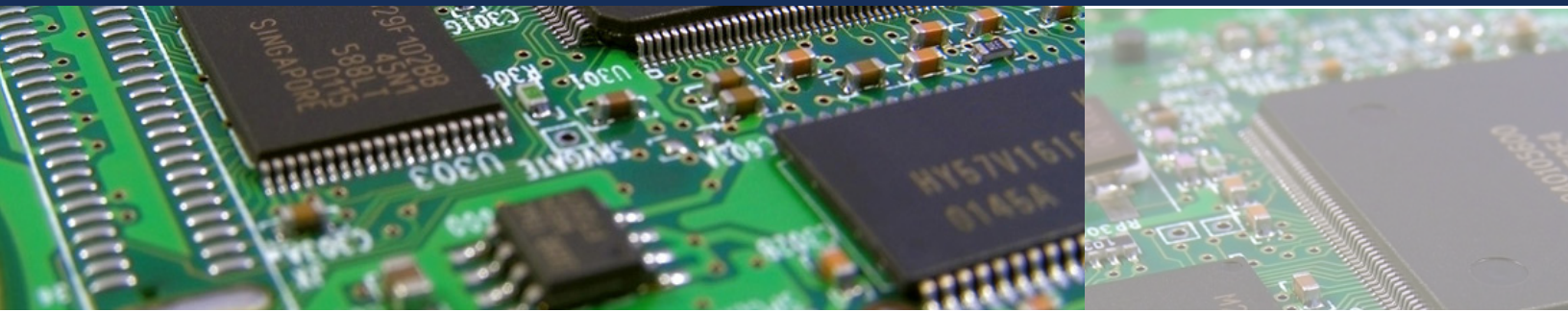
Annual maintenance should involve all key areas of your operation; if the entire plant cannot be shut down, or operations dictate a limited time frame, try a stepped approach. Define production areas that support one another; if you're running a lean operation with minimal inventory, upstream areas will have to build up an adequate inventory as to not disrupt production downstream.



Begin at the Beginning

Before you even schedule the date, do your homework:

- Compile historical data from each piece of equipment or system affected. If the data is missing, incomplete, or a mess, this is a good time to get it straightened out.
- Make a list of each piece of equipment to be maintained, with a sub-list of expected work to be done. If possible, check with OEM to verify recommended scheduled maintenance.
- Once you know what needs to be done, determine how long it will take. Always make sure to keep the maintenance staff in the loop; their knowledge will be invaluable during the planning phase.
- Do an inventory of your maintenance department. Are they equipped to handle the scheduled work? Will you need to bring in added personnel?
- Build a detailed timeline, check it and double check it, and build in realistic padding. It's always better to finish early and look like hero than to be delayed and hold up operations.
- Audit your maintenance department's safety readiness; verify that all required PPEs are available and that a robust Lock Out-Tag Out process is in place. If possible, get your EH&S department involved.



The Basics

Documentation

The best inspection in the world will do you no good if you can't prove it.

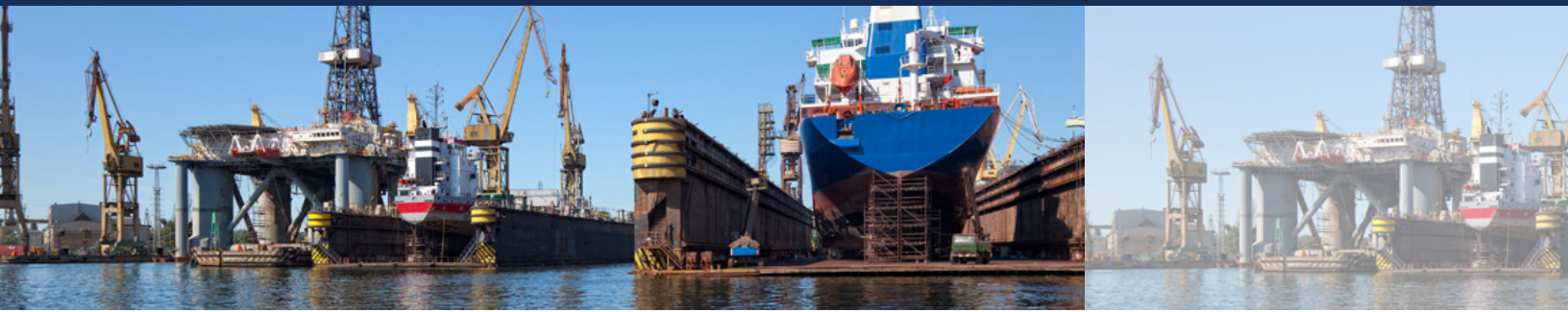
- Make sure your inspection plan is highly detailed.
- Leave areas for notes, additions, and recommendations for process improvements.
- Failure analysis must be included--document everything! This will not only help in the next shut down, but allow engineering to assess equipment capabilities and capacity.
- Allow for sign off on each step. Depending on your company's hierarchy, sign off should include the person performing the maintenance and the maintenance or MRO manager.

Data backup of the control for archive

- As a first step, verify that all control system data is backed up. Also verify that regular backups are occurring at scheduled intervals. Archiving data gives you a control to compare against, and achieve greater accuracy.

Electrical connections and voltage

- All electrical connections should be inspected and tightened. This means making sure they are secure and solid, with no corrosion present. Pay special attention to high vibration areas, as well as areas that experience temperature extremes.
- Voltage and current on motors should be measured.
- Control Panels and Electrical Boxes should be inspected for excessive dust or dirt. These conditions may be caused by bad door seals or open penetrations. Also inspect ventilation, and clean or replace filters if present.



The Basics

Lubrication

- If available, follow OEM recommendations for lubrication.
- Thoroughly inspect areas that require lubrication; indications of under lubrication can be indicative of damage that will require disassembly and repair.
- Check auto lube canisters if present.
- If grease fittings are used, verify that they are clean and operate correctly before adding grease. Do not over grease; understand how much is required before you pump.
- Look for areas with excessive dirt build up, as bad seals will expel lube which will attract dirt.

Condensation and water damage

- Excessive condensation in traps, pipes, and valves can cause premature failure and wear, and may be an indication of up-stream issues. A well-engineered system will be designed to compensate. Also be aware that if the system was upgraded since the last inspection, the modification may be the culprit.



The Basics

Inspection of hoses or pipes for leakage

- Check all pipe flanges for signs of leakage; look for residue around the gasket area and the bottom of the flange or lower bolt holes.
- Check all fittings and couplings. Use a mirror in tight spaces to see hidden areas.
- Check flexible hoses for cracks, cuts, or abrasion. Note excessive abrasion can be an indication that the hose may need additional protection, such as a jacket or sleeve.

Inspection of filters

- Verify that the correct filter is being used, either by OEM or engineering spec.
- If replacement interval is unknown, replace filter and begin tracking.
- Filters that can be cleaned need to be done so per OEM recommendations; also, know what the filter is clogged with. Simply blowing out a filter without understanding what's being removed can cause serious safety issues.

Inspection of belts and pulleys

- Check all belts for uneven wear. Uneven wear may indicate over-tightening, problems with pulleys, or that the wrong belt type is being used.
- Check belt tension.
- Remove belts and inspect pulleys; verify that they are tight with no play. Also inspect the shaft, making sure that the pulley is tightly secured.



The Basics

Functional testing

- After all inspections and repairs are made, be sure to perform a functional test of all components. Carry out every process and verify that the systems functions as designed.
- Verify that all control systems function properly; run the equipment through its paces, and make sure that it operates perfectly in every operational scenario.
- Inspect for noise and vibration during the functional test. Excessive noise or vibration above what is normally encountered must be diagnosed and rectified before bringing the system back into full operation.

Approval

- Before releasing the equipment or system back into service, do a walk down with the lead operator, the process engineer, and the MRO manager.

The Benefits of Preventive Maintenance

A robust preventive maintenance program that includes an annual inspection offers a number of advantages. Regular inspection means fewer repairs, and provides the opportunity to identify issues before they turn into downtime.

By understanding wear patterns, you'll be able to identify efficiencies in your processes, and have a better knowledge of actual consumables. This equates to better control of your annual budget and the reduction or elimination of the costs associated with unplanned maintenance.