

# Maintenance Regimes

A proactive, well-managed and audited maintenance regime is essential for an organisation to operate successfully and reduce the potential of unnecessary interruptions.

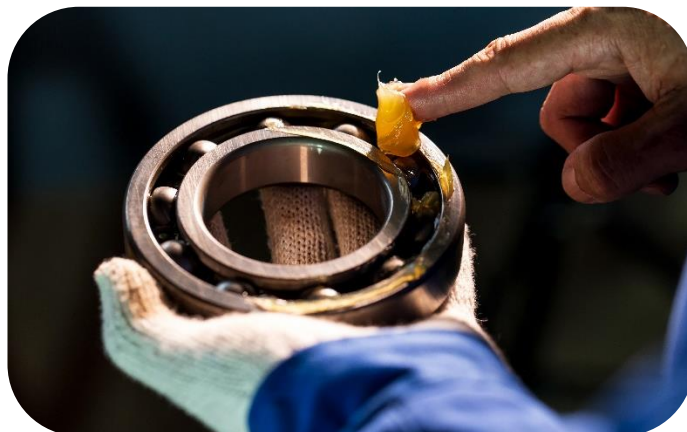
This Loss Prevention Standard provides guidance on establishing and managing maintenance programmes.

# Maintenance Regimes

## Introduction

Effective asset maintenance is essential for ensuring operational reliability, safety and long-term asset performance. Formalised maintenance not only helps prevent unexpected breakdowns and costly repairs but also supports compliance with regulatory requirements.

By proactively identifying wear, damage, or inefficiencies, organisations can potentially reduce downtime, extend equipment lifespan and help reduce the potential for related loss events and business interruption.



This document provides guidance on establishing and managing maintenance regimes.

**Note:** This document relates to general maintenance regimes and is focussed on property loss prevention and related risk management guidance. It is not intended to address liability exposures. The presumption is that all regulatory requirements, such as fire risk assessments and compliance with local building regulations, codes, or standards, have or will be met.

## Understanding the Risks

Regular inspection, testing, servicing and maintenance are necessary to ensure business assets operate efficiently and reliably. As a minimum, this should be as recommended by industry standards and by the manufacturer's or supplier's guidelines, however the integration of additional proactive maintenance programmes can help manage assets whilst reducing costs.

### Effective Maintenance

Formalised maintenance programmes could enhance the overall risk management proposition of any organisation. They can help reduce unnecessary damage, breakdowns, reactionary repairs, interruptions to activities, and associated delays in the delivery of products or services to customers, which help to maintain business reputation.

### Poor Maintenance

Poor maintenance can result in failures that may lead to:

- Damage to the asset and work in progress.
- Downtime for repairs.
- Shortfalls in production.
- Compromised servicing commitments.
- Expensive uninsured costs.
- Supply chain issues.
- Contractual disputes with customers.
- Possible prosecution and fines.
- An impact on the organisation's financial performance.

In addition, risk management programmes may be compromised if fire protection, detection and security systems are inadequately maintained, potentially leaving valuable assets without vital protection.

## **Maintenance Programmes**

The most appropriate maintenance methods should be implemented to help deliver optimum performance and reliability. This will help to reduce downtime, increase operational efficiency and reduce the risk of expensive, unnecessary, or unrequired maintenance.

The main maintenance programmes commonly used include but are not limited to:

### **Preventive Maintenance**

This is a programme of maintenance performed at regular formalised intervals through the asset's lifetime. Inspection, testing and maintenance regimes are scheduled based on the criticality of equipment and the risk of it failing. Preventive maintenance is designed to protect equipment, improve its reliability and reduce the potential for production downtime, and commonly used for routine greasing, lubrication, changing of filters and other components, checking fault conditions, etc.

Preventive maintenance is the minimum standard of maintenance expected, however condition-based monitoring is a more proactive method which can be used to enhance asset longevity and performance whilst reducing business costs.

### **Condition-Based Maintenance**

A maintenance strategy based on equipment performance monitoring. Through repeated or continuous analysis, it uses recognised detection measures on operating parameters that signal or identify when the equipment is deteriorating, and whether there is an increased risk of failure. Inspection techniques include vibration monitoring, oil analysis, thermal detection, thermography and equipment observation.

Condition-based maintenance is usually performed when specific indicators have recognised a decrease in the condition or performance of the equipment being monitored. It can be the most appropriate method of maintenance for high risk, critical, high value or bespoke equipment, identifying issues before they develop into serious concerns, and can help avoid replacement of components parts, etc., until necessary, which helps to reduce cost for the organisation.

Further guidance can be found in [ISO 17359:2018 - Condition monitoring and diagnostics of machines — General guidelines](#), published by the International Standards Organisation.

### **Risk-Based Maintenance**

Maintenance completed by prioritising the assets that present a risk to the business should they break down or fail. By integrating analysis and maintenance planning based on the risk and consequences of failure, resources are focused on business-critical equipment, which should be monitored and maintained more frequently. This process reduces the risk of failure in key areas, ensures high levels of reliability, safety and efficiency, and helps lessen the overall risk to the organisation. Risk-Based maintenance can be used in conjunction with normal preventive and enhanced condition methods to further enhance the efficacy of maintenance arrangements.

### **Reliability-Centred Maintenance**

A maintenance programme that focuses on preserving system functionality by identifying and addressing the most critical failure modes. It then analyses equipment performance, failure consequences, and operational context to determine the most effective maintenance strategy, e.g., preventive, predictive, reactive or combinations thereof. By prioritising resources based on risk and impact, organisations can aim to improve safety, reduce downtime, optimise maintenance costs, and extend asset life.

### **Corrective/Reactive Maintenance**

A reactive maintenance programme, requiring the repair or replacement of equipment and components following a breakdown or failure. This type of maintenance presents an organisation with the risks of unplanned machinery and equipment downtime, and should be avoided for all equipment, but especially for any key systems or equipment that are considered critical.

## **Creating a Maintenance Programme**

### **Asset Register**

A comprehensive asset register and asset numbering scheme forms the foundation of the programme.

- New, temporary or replacement machinery and equipment will need to be entered onto the servicing and maintenance programme, with inspection checks prior to use.
- Essential spares must be re-assessed and updated on a continuous basis.
- Accurate formal drawings should be documented.

### **Risk Assessment**

Maintenance schedules and programmes need to be recorded and well-planned. They should be based on risk assessments that consider actual experience, industry standards and the recommendations of manufacturers and suppliers. A risk assessment should have three key focusses:

- The statutory, jurisdictional and regulatory requirements for that item or system.
- The safety requirements of an item/system, based on the Original Equipment Manufacturers (OEM) guidelines and in relation to its location and the hazards present.
- The resilience needed and the importance to the business activities, for example, in its inherent value, its lead time to replace, or in the financial and reputational impact to the business for the duration it is compromised, or should its failure lead to a more significant loss or environmental event.

The most appropriate maintenance programme methods can be implemented to align with the outcomes of the risk assessment.

Refer to the Aviva Loss Prevention Standards **Material Damage Risk Assessment** and **Business Impact Analysis** for further guidance.

### **Budget**

Maintenance budgets should be adequate and agreed/approved by senior management, with flexibility incorporated for unexpected events. Providing adequate maintenance budgets helps to preserve the long-term performance and value of important assets. Restricting or cutting maintenance budgets will invariably result in breakdowns, damage and business interruption losses and is not recommended.

## Responsibility

The success of any maintenance programme relies on the assignment of responsibilities to appropriate individuals or teams and the management of the individual or teams to provide oversight, approval and control. Tasks typically include:

- **Defining roles and responsibilities.** e.g., which parties are responsible for planning, performing the work, supervision, management, costs approval, documenting the work and any follow up actions.
  - ✓ A RACI matrix (Responsible, Accountable, Consulted, Informed) can help clarify arrangements. Further guidance can be found [here](#).
  - ✓ Ensure individuals are appropriately trained to complete the tasks and review competencies and re-training requirements regularly.
- **Management.** Assign a dedicated person or team to oversee the maintenance programme, ensuring tasks are scheduled, completed, and recorded.
  - ✓ This role should also handle compliance with regulations, management of contractors, issuing of permits to work, management reporting, etc.

## Standard Operating Procedures.

Formalise the maintenance works in Standard Operating Procedures (SOP), this helps ensure work is conducted consistently regardless of the worker completing the task.

## Maintenance Management System

There should be a formal maintenance management system in place which is used to alert and record:

- The asset register.
- The required activity schedules/work orders.
- The type of inspection, service or maintenance that needs completing.
- The priority.
- A summary of the task involved.
- The required date of completion.
- The actual completion date.
- The name of the company and or engineer who completed the work.
- Description of the work undertaken.
- Any issues, faults, results, or feedback associated with the task.
- Follow up actions and designated person to complete.
- Any sudden failures and breakdowns.
- Spare parts inventory and tracker.
- Cost and budgeting tracker.
- Condition monitoring sensors, detectors, etc.

Ideally, this should be an automated rather than a paper-based system and should be able to provide appropriate management information to assess compliance, identifying any incomplete or missed activities.

To verify that the system is meeting its intended task, and the Key Performance Indicators (KPIs) are being achieved, it should undergo regular management audits and be supported by independent third-party auditing undertaken at regular intervals.

Maintenance records should be retained, so that key parameters can be compared with previous documents for trend analysis. This can help to identify and predict when a parameter is trending towards a failure condition, improving maintenance and asset replacement programmes.

## Sign-off

Robust follow-up and sign-off procedures should be implemented to ensure work tasks are completed to a satisfactory standard. The sign-off process should also be formalised within an SOP.

## Spares

A Spares Management Strategy, which helps ensure operational continuity, manage costs and minimise downtime, should be implemented to consider:

- **Criticality Assessment.** This helps identify critical assets and agree which spare parts are essential. Consider the financial impact to the business and cost of plant failures and replacement times. An ABC Analysis is a common method of assessing criticality by dividing items into three categories:
  - ✓ A items: High-value, low-quantity. These are the most important spares and require focussed control.
  - ✓ B items: Moderate value and quantity. These are less critical than A items, however, still hold significant importance.
  - ✓ C items: Low-value, high-quantity. These are the least important, often managed with simpler controls.

Further guidance on ABC Analysis can be found [here](#).

- **Inventory.** Consider a minimum and maximum stock level in accordance with the criticality assessment findings. Consider using historical data to forecast demand in line with production volumes.
- **Planned Changes.** Will new, upgraded or changed machinery or equipment impact spares usage?
- **Production Trends.** Could seasonal or other peak production periods impact spares usage? Are there sufficient spares for any critical equipment and would extra running hours mean additional spares should be procured?
- **Maintenance schedules.** Are spares available to meet planned maintenance activities including during planned and unplanned shutdown periods?
- **Availability.**
  - ✓ Do suppliers hold sufficient spares and what are the lead times for supply?
  - ✓ What would be the outcome of a supplier being temporarily unable to supply stock, e.g., in the event of a cyber incident, are sufficient stocks of all spares held to cover such a period?
  - ✓ Is there a sole reliance on any individual suppliers or are multiple suppliers available?
  - ✓ Are there any contractual issues which may prevent or delay procurement of spares from alternative suppliers?
  - ✓ Is a change management process required for any change in components to be agreed with the customer as part of the agreed service?
- **Storage arrangements.** Ensure storage methods are appropriate for the stock items, e.g., some spares can be vulnerable to water damage, or in some cases temperature fluctuations. Guidance may be sought from the OEM.
- **Procurement.** Do company procurement policies support the spares strategy.
- **Lifecycle Management.** Does any equipment have prescribed lifecycles? Will such equipment be replaced or overhauled. Do stocks of spare need to be procured should they become obsolete? Are they reviewed for redundancy upon change i.e. ensure you don't hold stock of what is no longer needed and costing the business.
- **Records.** Ensure part numbers, suppliers, service agreements, storage locations, etc., are appropriately catalogued.

- **Stock Checks.** Regular stock checks can help ensure actual spares align with documented records.
- **Review and Continuous Improvement.** Ensure the strategy is regularly reviewed to remain current and sufficient.

### **Contractors**

Inspection, testing, servicing and maintenance activities should only be completed by appropriately trained, qualified and (preferably) certified technicians, and all inspections and maintenance activities should be carried out in accordance with agreed and documented procedures drawn up to suit the age, environment and operating conditions of each specific item.

When considering contractors or subcontractors for any maintenance works, ensure evidence of their competency, training and qualifications is obtained and documented. Ensure such evidence relates to the individuals performing the tasks rather than blanket the company wherever possible.

All contractors' and subcontractors' quotations for specific works must be to an agreed specification and standard that meet the business requirements. Once accepted and inducted on any site, they must be adequately supervised. Their works should be inspected and recorded in your maintenance management system, which must formally identify any third parties. It is essential that any third parties follow all site rules and procedures.

Refer to Aviva Loss Prevention Standard **Managing Contractors - Property** for further guidance.

**Important:** Prior to accepting any quotation, ensure that their insurance cover is adequate for the task. Depending on the values exposed and nature of the proposed works, this should be discussed and agreed with your insurer and broker.

### **Items for Consideration**

Examples of items to consider within maintenance programmes include, but are not limited to:

#### **Property and Premises**

- Access roads, service yards, car park surfaces, fences, gates, external lighting systems.
- Trees, landscaping and vegetation.
- Weighbridges.
- External storage areas and bunkers.
- Building structures, including walls, composite panels, doors, windows, glazing, roofs, chimneys, drainage systems, roof access and safety systems, transmission aerials and masts, stairs, hoists or lifts.
- Electric vehicle charging equipment and locations.
- Battery Energy Storage Systems.
- Solar Photovoltaic Systems.
- Other Renewable energy systems, e.g., wind turbines, etc.
- Lightning protection systems.
- Perimeter security, e.g., fences, gates, locking devices and locks, security lighting, Video Surveillance Systems (VSS) cameras and systems.

- Electronic security, e.g., Intruder and Holdup Alarm systems, monitoring equipment, access control systems, and remote signalling systems.
- Doors and shutters, door locking and latching systems, including safety interlocked systems.
- Moisture detection systems.

### **Plant and Equipment**

- Cranes and lifting equipment.
- Hot work, welding, cutting equipment and fume extraction systems.
- Forklift trucks, mechanical handling equipment and battery charging.
- Bailing machines and shredding machines.
- Ovens, conveyors, mixing and weighing machines, extract ducting systems.
- Tools, batteries, machinery and plant, including bearings.
- Earth bonding and other static risk controls including clothing.
- Production and manufacturing equipment.
- Air compressors, pressure vessels, receivers, associated pipework, dryers, drain and pressure relief valves.
- Vehicles and mobile plant.
- Storage racking and shelving.
- Lighting systems.
- IT equipment including cleaning.

### **Fire and Explosion Safety**

- Fire compartment walls, fire doors, fire dampers and fire shutters.
- Fire stopping and fire resistive coatings.
- Fire escape stairs.
- Fire escape signage and emergency lighting.
- Fire protection systems, including automatic sprinklers, water spray deluge, valves, water monitors, tanks and fire pump sets, watermist systems, fire water systems, hydrants, dry and wet chemical systems, gaseous fire protection systems, portable and fixed extinguisher appliances, and fire blankets.
- Fire and security safety interlocks and signalling systems.
- Blast walls, explosion relief, and spark detection and suppression systems
- Automatic fire alarms and detection systems, including fire safety interlocked systems and remote signalling systems.
- Gas and vapour detection systems.
- Smoke extraction/venting systems.

### **Tanks and Fuel**

- Silos, tanks and tank farms, tank supports and pipe brackets, valves, pipework, spillage containment systems, tanker loading and offloading areas.
- Fuel dispensing pumps, storage tanks, earth bonding connections, drainage systems including surface water holding ponds, penstock valves and interceptor pits.
- Spillage containment systems.
- Pipework and service gantries.

### **Electrical Equipment**

- Electrical systems, including transformers, power and lighting, substations, switchgear and controls, circuit breakers, emergency lighting systems, portable appliances, UPS and other back up battery power systems.
- Standby generators, including associated switchgear, control panels and fuel storage tanks.

### **Heating and Cooling Systems**

- Boilers, including flame failure devices, drop valves, cabling, fusible links, pressure relief valves, solenoid valves, shell and tube welds, expansion tanks and safety interlock systems.
- Heating systems, both for building and process use.
- Stratification fans.
- Refrigeration systems and plant.
- Cooling towers and fan coil units.
- Air conditioning systems.
- Cold and freezer stores.

### **Water Systems**

- Potable water supply systems, sluice gates, valves, filters, fittings, strainers, pipework and pumps.
- Water tanks and connections.
- Water Closets and showers.
- Escape of water and leak detection systems.
- Effluent water treatment and plant.
- Leak detection and flow monitoring systems.

### **Key Actions**

- Undertake a risk assessment to determine the maintenance strategy from a regulatory, safety and business objectives perspective.
- Review this risk assessment at least annually, and during any significant change to operations or assets to ensure it remains accurate and sufficient.
- Compile an asset register.
- Agree roles and responsibilities.
- Determine the most appropriate maintenance methods, or combination of methods.
- Ensure maintenance budgets are adequate and do not reduce maintenance provisions to meet unrealistic budgetary targets. This is likely to result in losses and business interruption.
- Utilise a good quality maintenance management system.
- Implement a robust sign-off and audit programme to ensure works are completed satisfactorily.
- Ensure spares are adequately managed via a Spares Management Strategy.
- Manage contractors closely and ensure competency levels are appropriate for the works being undertaken.

## Checklist

A generic **Maintenance Regimes Checklist** is presented in Appendix 1 which can be tailored to your own organisation.

## Specialist Partner Solutions

Aviva Risk Management Solutions can offer access to a wide range of risk management products and services at preferential rates via our network of Specialist Partners.

Specialist inspections - [Bureau Veritas](#)

For more information please visit: [Aviva Risk Management Solutions - Specialist Partners](#)

## Sources and Useful Links

- [HSE Guidance - Maintenance of Work Equipment](#)

**Note:** Whilst UK standards and legislation are referenced in this document, other international standards and legislation should be referenced where applicable.

## Additional Information

Relevant Aviva Loss Prevention Standards include:

- **Electrical Installations - Inspection and Testing**
- **Electrical Installations - Partial Discharge, Testing and Monitoring**
- **Stop Audits - Property**
- **Material Damage Risk Assessments**
- **Business Impact Analysis**
- **Fire Doors, Fire Shutters and Fire Dampers**
- **Thermographic Surveys**
- **Fire Compartmentation**
- **Roof Mounted Photovoltaic Solar Panel Systems - Installed and Ongoing Care.**

To find out more, please visit [Aviva Risk Management Solutions](#) or speak to one of our advisors.

Email us at [riskadvice@aviva.com](mailto:riskadvice@aviva.com) or call 0345 366 6666.\*

\*The cost of calls to 03 prefixed numbers are charged at national call rates (charges may vary dependent on your network provider) and are usually included in inclusive minute plans from landlines and mobiles. For our joint protection telephone calls may be recorded and/or monitored.

# Appendix 1 – Maintenance Regimes Checklist

Location	
Date	
Completed by (name and signature)	

	Maintenance Programme	Y/N	Comments
1.	Is there a manager responsible for the site's overall maintenance strategy?		
2.	Is there a formal asset register, and does it include: <ul style="list-style-type: none"> <li>• Buildings?</li> <li>• Services and utilities?</li> <li>• Plant and fire protection or detection systems?</li> <li>• Processing or manufacturing equipment?</li> <li>• Spares?</li> </ul>		
3.	Are there formal up-to-date drawings for the: <ul style="list-style-type: none"> <li>• Buildings?</li> <li>• Services and utilities?</li> <li>• Plant and fire protection or detection systems?</li> <li>• Processing or manufacturing equipment?</li> </ul>		
4.	<ul style="list-style-type: none"> <li>• Have the buildings, objects, equipment, processes, utilities, and activities on site been risk assessed to understand what is considered important to the site?</li> <li>• Has the anticipated downtime, outage and recovery of these been assessed, and is it considered acceptable to the organisation's risk appetite?</li> <li>• Have these been specifically identified?</li> </ul>		
5.	Have all statutory or regulatory required objects and systems been identified, such as pressure systems, lifting equipment, DSEAR, etc.?		
6.	Have any bottleneck, bespoke or long lead-time objects or equipment been identified and their exposure quantified?		

	Maintenance Programme Contd.	Y/N	Comments
7.	Is there an appropriate system in place for managing all inspections, testing, servicing and maintenance activities?		
8.	<p>Is there an appropriate mechanism in place for ensuring the frequencies for inspection, testing, servicing and maintenance activities are appropriate, based on:</p> <ul style="list-style-type: none"> <li>• Regulatory requirements?</li> <li>• Manufacturer or OEM guidelines?</li> <li>• Industry standards?</li> <li>• Site experience and learning?</li> <li>• Risk to the business?</li> <li>• Your insurer?</li> <li>• Best practice?</li> </ul>		
9.	<ul style="list-style-type: none"> <li>• Does the management system enable you to prioritise tasks?</li> <li>• How are priorities established?</li> </ul>		
10.	<p>Does the management system enable you to identify task completion rates and measure this against the number of tasks due, based on the:</p> <ul style="list-style-type: none"> <li>• Priority of the tasks?</li> <li>• Total number of tasks?</li> <li>• Length of time outstanding?</li> </ul>		
11.	Does the management system enable feedback and recommendations resulting from a completed task?		
12.	<ul style="list-style-type: none"> <li>• Does the management system track any feedback and recommendations through to completion with periodic reminders?</li> <li>• How are ownerships assigned?</li> </ul>		
13.	<p>Does the management system enable the completion rate of the task feedback/recommendations to be tracked?</p> <ul style="list-style-type: none"> <li>• Versus the total number of items raised in the system?</li> <li>• Versus the length of time since it was raised?</li> </ul>		
14.	Does the management system enable trending of any parameters tested for specific tasks, such as temperature, pressure, or moisture content?		
15.	<ul style="list-style-type: none"> <li>• Is the management system auditable?</li> <li>• Are changes made to the system recorded in the system?</li> <li>• If so, when and by whom?</li> </ul>		

	Maintenance Programme Contd.	Y/N	Comments
16.	Are the task frequencies periodically audited to verify their applicability?		
17.	Is there a Spares Management Strategy to identify and manage spares?		
18.	Have the types of spares needed and the minimum levels of these spares been identified?		
19.	Have critical, important or difficult-to-replace spares been identified?		
20.	Are spares stored in line with the manufacturers' recommendations?		
21.	Are spares stored in a separate fire area or building to the primary equipment they belong to?		
22.	Are spares for consumables stored in a separate fire area to equipment or production-related spares?		
23.	Is there a robust system to replace spares as soon as they are used?		
24.	<ul style="list-style-type: none"> <li>• Is there a separate capital expenditure budget set aside for maintenance activities and spares?</li> <li>• How are replacement spares funded?</li> <li>• Has an acceptable time been established for replacement of spares</li> <li>• once used?</li> </ul>		
25.	Are spares inventories audited?		
26.	<ul style="list-style-type: none"> <li>• Are any OEMs, service providers, or spares providers no longer trading?</li> <li>• If so, what are the contingency plans?</li> </ul>		
27.	<ul style="list-style-type: none"> <li>• Does the learning from any near-misses, accidents, failures and incidents feed into the inspection, testing, servicing and maintenance management system?</li> <li>• How is this formally and consistently completed?</li> <li>• How is this shared among any other departments or locations within the group or company?</li> </ul>		
28.	Additional Comments:		

## **Please Note**

This document contains general information and guidance only and may be superseded and/or subject to amendment without further notice. Aviva has no liability to any third parties arising out of ARMS' communications whatsoever (including Loss Prevention Standards), and nor shall any third party rely on them. Other than liability which cannot be excluded by law, Aviva shall not be liable to any person for any indirect, special, consequential or other losses or damages of whatsoever kind arising out of access to, or use of, or reliance on anything contained in ARMS' communications. The document may not cover every risk, exposure or hazard that may arise, and Aviva recommend that you obtain specific advice relevant to the circumstances.

21<sup>st</sup> October 2025

Version 1.5

ARMSGI982021

Aviva Insurance Limited, Registered in Scotland Number SC002116. Registered Office: Pitheavlis, Perth PH2 0NH.  
Authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority.