

Prof. Ing. Dario Pozzetto

Department of Engineering and Architecture ó University of Trieste

Via Valerio, 10 ó34127 Trieste ó Tel: 040.558.3805 / 7982 Fax: 040.558.3812

E-mail: pozzetto@units.it

INDUSTRIAL PLANTS II

Chapter two ó part 7:

Maintenance of industrial plants

Maintenance General Definitions

DOUBLE DEGREE MASTER IN

óPRODUCTION ENGINEERING AND MANAGEMENTö

CAMPUS OF PORDENONE

UNIVERSITY OF TRIESTE

Actuarial Analysis: This is an analysis that provides statistical failure data that determines the age-reliability characteristics of an asset or piece of equipment.

Add-on Work: Additional work added to a maintenance schedule after the scheduled cut-off time.

Adjustments: Minor repairs requiring the use of hand tools, no parts and requires a small amount of time.

Age-Reliability Characteristics: Standard failure patterns.

Applications Parts List (APL): A list of all parts that are essential to perform specific maintenance tasks.

Applications Programming Interface (API): An interface that allows unrelated software programs to communicate with one another. **Apprentice:** A person who is learning a trade from a skilled employee.

Area Maintenance: The process for organizing Maintenance Operations in which the first-line Maintenance Leader is responsible for all maintenance tasks within a certain department, area or location within the facility or facility complex.

Assessment Reliability: An analysis comparing current best practices with actual performance to determine current processes effectiveness.

Asset: Is any physical item, piece of equipment, or property used in a facility's operations. Assets are anything of value owned by individuals or organizations.

Asset Care: Also known as maintenance process.

Asset Hierarchy: An organized index of all your maintenance equipment, machines, and individual components and how they work together. The organized structure helps maintenance teams understand the relationship among assets.

Asset Lifecycle: Is the various stages involved in the management of an asset. It starts with the planning stages when the need for an asset is identified and continues through its useful life and eventual replacement or disposal.

Asset Management: The process of maintaining and tracking a company's assets and effectively using those assets to gain value

Asset Management Standards (ISO 55000): This is the set of International Standards for Asset Management. ISO 55001 . defines the requirements for an integrated, effective management system for asset management. ISO 55002 -provides the guidance for the implementation of such a management system.

Asset Mapping: Get a comprehensive view and data associated with each asset on a floor plan, schematic, site map, or any other image.

Asset Performance Management (APM): Gives you the ability to capture and analyze historical and real-time operational and asset data to reduce costs, improve the reliability and availability of physical assets.

Asset Register: A detailed list compiled of all an organization's assets. It includes details on all assets such as location, condition, and owner. A CMMS asset register will include all physical items that require maintenance and servicing.

Asset Replacement Value: The value that is needed to replace the production capability of all combined assets in the facility.

Asset Reservation Requests: Gives users the ability to reserve assets or rooms for specific time frames.

Asset Tag: A unique number that identifies an asset or piece of equipment that you or your organization owns.

Asset Utilization: The amount of time that equipment is running.

Autonomous Maintenance: Maintenance processes performed by operators, not dedicated technicians or management.

Availability: The duration of actual operation time that a particular asset/equipment is being used for the intended task.

Available Hours: Refers to the total number of hours that an asset or piece of equipment is able to perform its specified functions.

Average Life: On average, how long an asset/equipment will last before it fails. Also known as Mean Time Between Failures.

Backlog: A buildup of work that needs to be completed.

Bathtub Curve: A bathtub curve is a visual representation of the failure rate of a product or group of products as they exceed their design lifetime.

Barcoding: An automatic data-capture technology that allows data to be collected rapidly and accurately from all aspects of a company's operations, including manufacturing, inspection, transportation, and inventory elements.

Benchmarking: A process of measuring the performance of a company's products, services, or processes against those of another business considered to be the best in the industry.

Bill of Materials (BOM): This is a detailed list of parts, items, assemblies, and other materials required to create a product, as well as instructions required for gathering and using the required materials.

Blanket Purchase Order: A purchase arrangement in which a buyer contracts with a supplier to take delivery of an agreed-upon quantity of goods at a specified price over a set period of time.

Breakdown: Equipment that fails to operate and is considered broken down and is unusable.

Breakdown Maintenance: Maintenance that is performed on equipment that has broken down and is no longer in operations.

Calibrate: Verification of the accuracy of the equipment and assure performance within tolerance.

Call-out: The client calls out the maintenance contractor or company during the normal non-working time to attend to a maintenance problem with a piece of equipment or another issue. Normally an emergency maintenance call.

Capital: Equipment with a useful life of longer than 1 year used in the productive operations of a company. Expensive assets that necessitate asset control and depreciation under tax guidelines, rather than being considered as an expense.

Change Out: Removal and replacement of a part with a new or refurbished one.

Chief Maintenance Officer (CMO): Is the technical leader of a maintenance operation within a corporation.

CMMS: See [Computerized Maintenance Management System](#).

CMMS Industry Applications: CMMS can be used throughout any industry and is perfect for organizations that need to perform regular maintenance of equipment and assets and track inventories. [Read Full Description](#)

Certified Maintenance & Reliability Professional Program (CMRP): Program designed for certifying the knowledge, skills, and abilities of maintenance, reliability, and physical asset management professionals.

Checklists: Is a form with a list of written tasks or procedures that a technician must follow to ensure that proper processes have been completed before a work order is closed out. [Read Full Description](#)

Component: A part or element of an asset, usually removable in one piece and interchangeable with other, standard components.

Compliance: To be in accordance with legislation, specification, and industry best practices.

Computerized Maintenance Management System (CMMS): Computerized Maintenance Management System (CMMS) is software that stores data about the maintenance performed on equipment, machinery, and other assets. CMMS assists with the effective and efficient management of maintenance activities through the application of computer technology. [Read Full Description](#)

Condition Based Maintenance (CBM): Uses sensor devices to collect real-time measurements (i.e. pressure, temperature, or vibration) on a piece of equipment and monitors the actual condition of an asset to help maintenance personnel perform maintenance at the exact moment it is needed.

Condition Monitoring: The process of monitoring a condition in machinery (vibration, temperature, etc.), in order to identify a significant change that is indicative of a developing fault.

Conditional Probability of Failure: The probability of failure that a specific item, such as a piece of equipment, system or material, will fail at a certain time interval.

Configuration: Specific parts or elements used to construct a machine.

Contingency: Alternative actions if the main action fails.

Contract Acceptance Sheet: A document that is completed by the appropriate Contract Supervisor and Contractor showing approval and acknowledgment that the work has been completed.

Corrective Maintenance: Any maintenance task which is required to correct a failure that has occurred or is in the process of occurring.

Craftsperson: A skilled maintenance worker who has typically been formally trained in a particular craft/skill. Also known as a tradesperson or technician.

Criticality: The priority rank of a failure mode based on an analysis that lets you understand the asset's potential risks that could impact your operation

Cycle-Count: An inventory process where counting and verification of stocked item quantities are continuously monitored and based on a predetermined schedule or frequency.

Dashboard: A real-time visual performance representation of a process. [Read Full Description](#)

Defect: A potential failure or other condition that will require maintenance attention at a future date, but is not currently preventing the equipment from functioning.

Deferred Maintenance: Postponement of maintenance repairs to infrastructure and assets that get delayed due to budget limitations and lack of funding.

Demand: Requests or orders for an item or service.

Design Failure Mode and Effect Analysis (DFMEA): A process used to recognize, evaluate potential systems and product design failures.

Deterioration Rate: The pace at which an asset degrades over time under normal operating conditions.

Disposal Task: The removal and discarding of items or parts.

Discard Task: This involves replacing a specific part or component of a piece of equipment at regular time intervals, regardless of its performance quality.

Document Management: Control lifecycle of documents and maintenance of regulatory compliance information.

Downtime: The amount of time that equipment is not operating or out of service, as a result of equipment failure.



Economic Life: The expected period of time that a business expects to be able to use an asset or piece of equipment before it is expected that it would be cheaper to replace the equipment rather than continuing to maintain it.

Economic Order Quantity (EOQ): Refers to the ideal order quantity a company should purchase in order to minimize its inventory costs.

Emergency Maintenance: This is a type of reactive maintenance to help prevent a threat to lives, property, profitability, viability, or to correct a failure that has a significant economic impact on an organization.

Engineering Work Order (EWO): An engineering work order enables you to initiate an engineering investigation, engineering design activity or engineering modifications to an item of equipment.

Enterprise Asset Management (EAM): Enterprise Asset Management (EAM) software is a type of maintenance software that collects and analyzes data for physical assets during all phases of the asset lifecycle, including the acquisition, maintenance, and disposal phase.

Environmental Consequences: A failure that can have a potential impact on the environment.

Equipment Configuration: This process sends information to a device that is used to adapt the equipment or software program to its environment.

Equipment Depreciation: A measurement of how much an asset or piece of equipment drops in value over a period of time.

Equipment/Facility Resources: Describes all of the equipment, facilities, and processes available for a company to perform efficiently.

Equipment Life: Equipment and machinery won't last forever, so it's important to have an understanding of the life cycle stages of a piece of equipment and where each asset resides within the cycle to avoid unplanned asset downtime.

Equipment Maintenance Strategies: The management and scheduling of routine maintenance tasks, designed to ensure that an asset or piece of equipment continues to perform its intended functions.

Estimated Plant Replacement Value (PRV): The approximate cost to replace the existing assets with new assets to achieve the same production capability.

Equipment Repair History: A detailed list of maintenance issues and costs for each asset or piece of equipment.

Equipment Use: This is a measurement of the use and performance of an asset or piece of equipment.

Estimating Index: The percentage of Estimated Labor Hours required to complete a Work Order to the Actual Labor Hours required to complete the work order.

EWO: An Engineering Work Order (EWO) enables you to initiate an engineering investigation, engineering design activity or engineering modifications to an item of equipment.

Examination: This is a test that is performed to identify or diagnose equipment problems, or confirm that repairs have been effective.

Expediting: To accelerate a process.

Expensed Inventory: Parts written off as "cost of sales".

Expert System: A software-based system that uses databases of knowledge to offer advice or make decisions based on rules established within the software. Typically used for fault diagnosis.



Facilities: Buildings that are built, installed or established to serve a particular use.

Facility Condition Assessment: Physical audit of a facility, fixed equipment inside and outside of a facility with the final report giving an estimated life of the facility and the equipment.

Facility Management: Encompasses multiple disciplines to ensure functionality, comfort, safety and efficiency of business environments. [Read Full Details](#)

Facilities Maintenance Management System (FMMS): A set of processes required to ensure that the building systems perform as originally designed and constructed.

Fail-Safe: A design feature that when an asset or piece of equipment incurs a failure, nothing dangerous can happen.

Failure: Any event in which an asset or equipment cannot accomplish its intended purpose or task. It may also mean that the asset or equipment stopped functioning, is not performing or meeting target expectations.

Failure Analysis: This is the process of collecting and analyzing data to determine the cause of a failure, with the objective of determining corrective actions.

Failure Cause: Are defects in design, process, quality, or part application, which are the underlying cause of a failure or which initiate a process that leads to failure.

Failure Code: Identifies the causes of equipment failure that require corrective action. This code is entered against a Work Order in a CMMS, which lists the cause of failure as to why an asset failed during production.

Failure Consequences: The impact of a certain failure mode, primarily used in evaluating assets when using reliability centered maintenance (RCM). Some of the classifications can be Hidden, Safety, Environmental, Operational or Non-Operational.

Failure Effect: Documents the consequence of the events that occur after a failure has occurred as a result of a specific failure code.

Failure Finding Interval (FFI): The frequency with which a failure finding task is performed.

Failure Finding Task: A routine maintenance task, usually an inspection or testing task, designed to determine whether an asset or component has failed.

Failure Mode: A failure mode is a cause of a failure or one possible way a system can fail.

Failure Modes and Effects Analysis: A method for determining equipment functions, functional failures, assessing the causes of failures and their effects, and prioritizing preventive maintenance tasks. This information is often used as the basis for preventive maintenance planning.

Failure Pattern: This describes how a failure is produced from a fault, identifies the components which are involved in the failure, the specific errors which allowed the failure to occur, and the effect of the failure on the system.

Failure Rate: The anticipated number of times that an asset or piece of equipment fails in a specific period of time.

Fault Tree Analysis (FTA): A graphical tool to explore the causes of system-level failures.

Fifo/Lifo: FIFO (Last-In, First-Out) and LIFO (First-In, First-Out) are methods used in the cost of goods sold calculation. FIFO – assumes the oldest products in a company’s inventory have been sold first and goes by those production costs. LIFO – assumes that the most recent products in a company’s inventory have been sold first and uses those costs instead.

Fill Rate: The percentage of orders that are shipped in full and on time and were met through current available stock.

Fixed Asset: A fixed asset is a long-term tangible asset or piece of equipment that a business owns and uses in its operations to generate income.

Fleet Management: Management of commercial vehicles. [Read Full Description](#)

Floor Stock: The category of low-cost items that do not require inventory control.

Forward Scheduling: Businesses complete manufacturing their products as soon as possible before the due date.

Forward Workload: All backlog work, work that is due or predicted to become backlog work within a pre-specified future time frame.

Function: The expectation of what we want an asset or piece of equipment to do, and the level of performance that the users of the equipment expect.

Functional Failure: The inability of an asset to fulfill one or more intended function(s) to an acceptable standard of performance that is set by the user.

Functional Test: This is a type of software testing that validates the software system against the functional requirements/specifications.ca

Gantt Chart: A bar chart that provides a visual view of scheduled tasks showing the duration and sequencing of activities.

Go-line: Mobile equipment which is available, but not being utilized, is parked on the Go-line. Sometimes called Read-line.

Geographic Information System: Get a comprehensive view and data associated with each asset on a floor plan, schematic, site map or any other image. [Read Full Description](#)

H
[\(TOP\)](#)

Handhelds: A small mobile hand-held computing device, having a display screen with a touch input/keyboard.

Hazop: This is an analysis to help identify equipment modifications and the hazard work conditions to avoid any significant safety or environmental incident as a result of equipment failure.

Hidden Failure: A failure that has already occurred and is not evident to the operating technician. Because it is hidden, no one would be aware until another failure occurs.

Hold for Disposition Stock: Material that is defective and held at a stock location waiting for removal, repair or disposal.



ISO 41001:2018: Are standard guidelines for facility management published by the International Organization for Standardization.

Idle Time: The period of time that an asset/equipment/employee is available, but not doing anything productive.

Image Mapping: Enhanced Interactive Image Mapping to further enhance the accuracy in tracking and mapping of assets and work orders.

Industrial Internet of Things (IIoT): The interconnection of sensors, instruments, and other devices networked together with computers' industrial applications, including manufacturing and energy management.

Infant Mortality: The period of time when the failure rate is increasing after a few months of use.

Inherent Reliability: The level of reliability that is defined by the manufacturing design and process of your equipment.

Inspection: Tasks that check the condition of equipment and determine what tools, materials, and labor are required to repair them.

Interchangeable: Identical parts or components that have different configurations and numbers but can be substituted for another part. without modification.

Interval-Based: Time-based preventive maintenance performed on equipment at defined intervals.

Inventory Accounting: Refers to the part of *accounting* dealing with tracking, assessing, and accounting for changes in inventoried assets.

Inventory: A list of parts, tools, or materials, whether stocked or non-stocked, which can be replaced or installed when needed.

Inventory Control: The process of maintaining and managing a company's inventory levels.

Inventory Management: The process of tracking items from purchase through use. [Read Full Description](#)

Inventory Turnover: The financial ratio showing how many times a company has sold and replaced inventory during a given period of time.

Inventory Value: The value of stocked inventory.

Just-in-Time: An inventory management term that reduces waste and increases efficiency by receiving inventory only as it is needed for production, not ahead of time.

Key Performance Indicators (KPIs): Are a number of key measurements that enable performance against targets to be measured.

Kitting: Involves organizing and assembling parts used in manufacturing products into bundles to deliver to the point of use.

Knuckle Buster: An adjustable wrench made of poor quality.

Lead Time: How long it takes to complete a process from beginning to end.

Leak Detection & Repair (LDAR): A work process designed to identify leaking equipment so that emissions can be reduced through repairs.

Lean Maintenance: Helps to identify and eliminate waste-related issues and deliver real bottom-line improvements if implemented and managed in the right way.

Lean Manufacturing: Lean manufacturing strategies are to eliminate waste, optimize processes, cut costs, boost innovation, and reduce time to market.

Lean Six Sigma: A process improvement strategy designed to eliminate problems, remove waste and inefficiency, and improve working conditions to provide better customer satisfaction.

Level of Repair Analysis (LORA): The process to determine if and when it is cost-effective to replace, repair or discard an item.

Life Cycle: The process that manages the end-to-end stages of a company's assets or equipment throughout its period of ownership – from acquisition through the usage and finally removal.

Life Cycle Analysis (LCA): The methodology used to evaluate the environmental impact of a product through its life cycle including the extraction and processing of the raw materials, manufacturing, distribution, use, recycling, and final disposal.

Life Cycle Costing (LLC): The process of estimating how much money you will spend on an asset over the course of its useful life.

Lifecycle Management: The process of managing the end-to-end stages of a company's equipment, throughout its lifecycle or period of ownership — starting with its acquisition through to the usage and finally the disposal.

Lights Out Manufacturing: A manufacturing process where factories run a fully automated facility without any human intervention.

Lockout Tagout (LOTO): Are safety practices and procedures that safeguard workers from hazardous energy releases. Ensures that dangerous machines are properly shut off and are not able to unexpectedly release hazardous energy during maintenance activities.

Logistic Support Analysis (LSA): A methodology highlighting actions to define, analyze, and quantify logistics support requirements, and to influence design for supportability, throughout the system lifecycle. This is used to determine the cost-effectiveness of asset-based solutions.

Maintainability: The speed and ease with which any maintenance activity can be carried out to repair defects or determine the cause of a piece of equipment.

Maintenance: Any task carried out on an asset or piece of equipment to ensure that the asset continues to perform to its full capacity or to repair the equipment.

Maintenance Backlog: A maintenance metric, of required maintenance work that has not yet been completed.

Maintenance Dashboard: A real-time at-a-glance view of key performance indicators (KPs) that are important to a particular function or business objective.

Maintenance Engineering: The discipline and prime responsibility of the qualified person to ensure that maintenance processes are effective, equipment is maintained, technical issues are investigated, and departmental budgets are maintained to achieve better maintainability, reliability, and availability of equipment.

Maintenance Inspection: The process of evaluating the condition of an asset or piece of equipment.

Maintenance Log: A detailed document that records all maintenance tasks that have been performed on an asset or piece of equipment.

Maintenance Planning: A defined process used to develop an action plan that includes all maintenance, repair, and construction work.

Maintenance Policy: A document, developed by the organization's leadership team, articulating the target maintenance standard and formal commitment by the owners to that standard

Maintenance, Repair and Operations (MRO): Refers to a designation of all of the activities used to keep your facility (and equipment found inside it) in good operating condition.

Maintenance Schedule: Represents the routine maintenance and/or inspections that are to be performed during a given time frame to repair and upkeep assets and equipment.

Maintenance Shut-Down: A temporary closure of a building or department to perform maintenance.

Maintenance Strategy: A long-term plan covering all aspects of asset and equipment maintenance management to maximize equipment uptime and facility performance while balancing the associated resources and costs.

Maintenance Remove and Replace: The removal and disposal of an existing item or component and to provide and install a new item or component in its' place.

Maintenance Repair and Overhaul (MRO): Includes all the tasks and materials required to keep a company focused on its core mission, which includes tests and repairs as well as the supplies and equipment required to keep all the individual tasks, machines, and equipment operating.

Maintenance Troubleshooting: The process of identifying problems when the issue is not immediately obvious.

Materials Management: A method for planning, organizing, and controlling the activities that are related to the flow of materials in a company.

Mean Time Between Failures (MTBF): A KPI that measures equipment reliability and the amount of time that elapses between one failure and the next.

Mean Time Between Repairs (MTBR): A KPI that defines the average time that equipment is operating between breakdowns or stoppages.

Mean Time to Repair (MTR or MTTR): Key Performance Indicator (KPI) that represents the average time required to troubleshoot and repair failed equipment and return it to normal operating conditions. MTTR gives organizations a more accurate analysis of how well their teams are responding to repairs and equipment problems.

Meter Readings: CMMS software lets you track all your meter readings without a person ever having to look at a dial.

MIL: United States Military Handbook

MIL-STD: United States Military Standard

Mobile Maintenance Management: Mobile maintenance gives your maintenance team the ability to utilize mobile devices to access and manage applications from anywhere.

Modification: For maintenance, this means all measures designed to improve product quality or speed.

No Scheduled Maintenance: In this process, Corrective Maintenance is the only maintenance performed after the equipment has failed.

Non-Destructive Testing (NDT): Refers to testing and inspection methods of equipment that allow inspectors to evaluate and collect data about a material, system, or component without permanently altering it.

Non-Operational Consequences: Are caused by failure that might not directly affect the facility's production, but still impacts the organization's expenses.

Non-Repairable: Parts or components that are disposed of upon failure for technical or expense reasons.

Non-Stock Item: Parts or items that are not tracked or inventoried. This is also known as "Spot Buys".

Non-routine Maintenance: Maintenance tasks that are not performed on a regular or pre-determined schedule.

Obsolescence: Decrease in value or use of an item that has been replaced by a higher-quality item.

Obsolete: Designation of an item for which there is no replacement.

Oil Analysis: Oil analysis, or oil analysis [Tribology](#), is the process of determining whether the oil system is clean and dry, if the oil is fit for use, and if wear is occurring inside the machine.

On-Condition Maintenance: An inspection/functional check that determines an item's performance and may result in the disposal of an item before it fails in service.

On-Condition Task: An inspection process that is designed to detect potential failures.

On-Demand Facilities Management: The delivery of facilities management support and services in temporary and unusual circumstances.

On-Premise CMMS: These systems require that the software be installed and configured on a company network and can only be accessed within the facility.

Operating Context: The external operational environment that influences asset operations.

Operating Hours: The period of time that a piece of equipment is actually operating.

Operational Consequences: Failure effects with operational consequences directly impact the production of the plant. These failures have a direct adverse impact on operational capability (lost production, increased production costs, poor product quality, or unsatisfactory customer service).

Operational Efficiency: A key metric that calculates the Overall Equipment Effectiveness.

Operation and Maintenance Manual: This in-depth document provides all the details necessary about a physical plant as well as individual pieces of equipment to help the maintenance staff keep everything running efficiently.

Operator: Is a skilled technician who uses a variety of tools to perform and assist in the maintenance activities of a business establishment.

Outage: A period when a power supply or other service is not available or when equipment is shut down.

Operator-Based Maintenance (OBM): This is a maintenance strategy where employees that are operating equipment are properly trained and properly informed of what they need to do to be able to keep the machinery in optimum reliable condition.

Order Point: This represents the minimum stock level you would like to maintain for the item.

Order Quantity: Refers to the ideal order quantity a company should purchase in order to minimize its inventory costs.

Overall Equipment Effectiveness (OEE): The standard for measuring manufacturing productivity. It identifies the percentage of manufacturing time that is truly productive.

Overhaul: An in-depth examination and restoration of an asset to an acceptable condition.

P-F Interval: The time between the initial potential failure condition and the time of the actual asset or component has failed.

Part Numbers: Unique identifying numbers and letters that are assigned to each specific part configuration; also called stock numbers or item numbers.

Percent Planned Work: This KPI measures the total work (labor hours) worked in a specific time period that has been planned in advance.

Periodic Maintenance: Maintenance activities performed on equipment based on set time intervals, repair history data, use or elapsed time.

Physical Asset Management: Physical assets are anything from your company's production equipment, product stock, property, office furniture, and even liquid funds. Gaining maximum productivity and effectiveness from physical systems and equipment.

Pick List: A pick list is a document sent to your warehouse pickers to fulfill a customer order.

Planned Maintenance (PM): Scheduled maintenance activities carried out according to a documented plan of tasks, skills, and resources.

Planned Maintenance Optimization: A process for improving maintenance strategies based on existing preventive maintenance (PM) routines and available failure history.

Planned Maintenance Percentage (PMP): This is a percentage that documents the amount of maintenance time used towards planned maintenance tasks, which is measured against the total amount of maintenance hours in a given time period (weeks, months, years).

Plant Maintenance: A set of activities that are necessary to keep machinery, parts & types of equipment in good operating conditions to avoid production stoppage and loss.

Potential Failure: The point in the deterioration process which detects whether a failure is occurring, or is about to occur.

Precision Maintenance: Performing maintenance tasks so they are always done with consistency, accuracy, and in line with industry best practices.

Predictive Maintenance (PdM): A type of condition-based maintenance where assets/equipment are monitored with sensor devices that provide data (: Vibration Analysis, Sonic Testing, Dye Testing, Infrared Testing, Thermal Testing, Coolant Analysis, Teratechnology) about the asset's condition which is used to predict when the asset will require maintenance.

Prescriptive Maintenance: This is an asset maintenance strategy that uses machine technology to adjust operating conditions for desired outcomes, and schedule and plan asset maintenance.

Pressure Sensor: An instrument consisting of a pressure-sensitive element that senses and measures the actual pressure.

Preventive Maintenance (PM): Proactive maintenance that is regularly performed on a piece of equipment to lessen the likelihood of it failing. It is performed while the equipment is still in operations so that it does not break down unexpectedly.

Primary Function: The major functionality required of an asset, building or facility.

Priority: The relative importance of a job in relation to other jobs, operational needs, etc, and the time that the job must be completed.

Proactive Maintenance: A maintenance strategy that includes planning corrective tasks that can prevent equipment failures. The same things as preventive maintenance.

Probabilistic Risk Assessment (PRA): PRA is used to estimate the risk by computing real numbers to determine what can go wrong, how likely is it, and what are its consequences. PRA provides insights into the strengths and weaknesses of the design and operation of a nuclear power plant.

Probabilistic Safety Assessment (PSA): Similar to Probabilistic Risk Assessment, except focused solely on safety-related risks.

Process Failure Modes and Effects Analysis (PFMEA): This is an analytical tool used by businesses to locate and identify possible process failures.

Procurement: The process of acquiring people, services, supplies, facilities, materials, or equipment.

Production Efficiency: Refers to a level of production at which additional quantities cannot be produced without sacrificing the production of another product.

Project Evaluation & Review Technique (PERT) Chart: A graphical representation that breaks down the individual tasks of a project for analysis.

Protective Device: Devices and Assets used to protect equipment, machinery, components to reduce the consequences of equipment failure.

Provisioning: Process of determining the variations and quantities of repair parts, spares, special tools, etc. that are needed to be put in stock to maintain equipment for specified periods of time.

Purchase Requisition: An authorized document used to purchase specific materials, parts, supplies, equipment, etc.

Purchase Order: A document that is provided by a buyer to a seller that providing the details on products or services to the seller will provide the buyer.

Quality Assurance (QA): The maintenance of a desired level of quality in a service or product, with concentration on every stage of the process of delivery or production.

Quality Audit: The process for gathering objective evidence to determine whether audit criteria is being met.

Quality Rate: Used in the calculation of Overall Equipment Effectiveness and is the ratio between the yield produced and the total production quantity.

Quality Control (QC): The process of maintaining standards in manufactured products by testing a sample of the output against the specification.

Ranking Index for Maintenance Expenditures (RIME): A maintenance priority method includes a ranking of equipment/asset criticality combined with the repair work classification ranking to produce a priority index value.

Reaction Time-Response Time: Refers to the amount of time that takes place between the receipts of an order to when it is responded to.

Reactive Maintenance (Breakdown Maintenance): Refers to the repairing of assets when equipment has already broken down, in order to restore the equipment to its normal operating condition.

Ready Line: Used in relation to mobile equipment. Equipment that is available, but not being used is considered parked on the ready line.

Rebuild: Restoring an item to an acceptable condition in accordance with the original design

Rebuild-Recondition: Complete dismantle and reconstruction of a product.

Redesign: A Reliability Centered Maintenance term that means any one-off intervention to enhance the capability of an asset/equipment, job procedure, a management system or resource skills.

Redundancy: Duplicate parts that are joined functionality so that if one fails the duplicate part will continue to function if a failure of the first part occurs.

Refurbish: Clean, refine, reconditioned, renovated parts to make the parts usable.

Regulatory Compliance Audit: A comprehensive review of an organization's adherence to regulatory guidelines.

Reliability: The probability of an asset on continuing to function as intended for a specific time period under specified conditions without failure.

Reliability Analysis: The process of identifying maintenance of significant assets and classifying them with a malfunction on safety issues.

Reliability Centered Maintenance (RCM): A process for determining the maintenance level that is needed for a company to operate effectively in terms of overall cost, production availability, spare parts, and other factors.

Reliability Engineering: A staff function whose prime responsibility is to ensure that maintenance processes are effective, that equipment is designed and modified to improve maintainability, that ongoing maintenance technical issues are investigated, and the appropriate corrective actions and improvements are taken.

Reliability Performance Indicators (RPI): Key Performance Indicator metric that relates to the measurement of asset reliability. Examples:

Maximum Corrective Time (MCT) and Maximum Preventive Time (MPT): The maximum time expected for maintenance.

Mean Active Maintenance Time (MAMT): Meantime needed to perform preventive and corrective maintenance tasks.

Mean Downtime (MDT): Average time a system is non-operational.

Mean Time Between Failure (MTBF): Average time between system breakdowns.

Mean Time Between Maintenance (MTBM): Average time between corrective and preventive actions.

Mean Time To Repair (MTTR): Average time it takes to fix a failed item.

Renewable Energy: Energy that comes from a naturally renewable source.

Reorder Point (ROP): the minimum unit *quantity* a specific product reaches to trigger inventory replenishment

Repair: Any task that restores an asset to an acceptable condition by the renewal, replacement, or mending of worn or damaged parts.

Repairable Spare: Parts or items that are technically and economically repairable.

Repair Parts: Individual parts that are required for the maintenance or repair of equipment, systems, or spares.

Repairable: Parts that are technically and economically repairable.

Replaceable Item: Equipment or an asset that is functionally interchangeable, but is physically different than the original part and requires an additional modification to make it work.

Reporting: CMMS provides reporting tools that give you the ability to assemble your collected data and transform it into reports that are meaningful to you and others in your organization. [Read Full Description](#)

Restoration: Any activity that returns the pre-damaged asset that has not failed to a level of performance equal to, or greater than, that specified by its functions, but not greater than its original maximum capability.

Return on Assets: An indicator of how profitable a company is relative to its total assets. ROA gives a manager, investor, or analyst an idea as to how efficient a company's management is at using its assets to generate earnings.

Run-to-Failure: Assets are deliberately allowed to operate until they break down, at which point reactive maintenance is performed.

Risk: The potential probability or threat of damage, injury, loss, or any other negative occurrence that may be avoided through preemptive action.

Rotable: A term used in the maintenance of heavy mobile equipment. A rotatable component that has failed can be repeatedly restored to a working and serviceable condition.

Root Cause Analysis: The process of discovering the *root causes* of problems in order to identify appropriate solutions.

Routine Maintenance Tasks: Tasks that are performed on a regular basis.

Running Maintenance: Maintenance that can be done while equipment is still operating.

Run-to-Failure (RTF): No scheduled maintenance plan beyond replacement when it fails.



SaaS: A way of delivering applications over the Internet as a service. Instead of installing and maintaining software, you simply access it via the Internet, freeing yourself from complex software and hardware management.

Safety Consequences: A Failure has safety consequences if it causes a loss of Function or other damage that could hurt or kill someone.

Safety Stock: The level of additional stock that is maintained to mitigate the risk of stockouts (shortfall in raw material or packaging) caused by uncertainties in supply and demand.

Salvage: The saving of reuse of condemned, discarded, or abandoned materials and irreparable materials for reuse or scrapping.

Schedule Compliance: A KPI that is used to monitor and control maintenance. This maintenance metric that measures the percentage of time that scheduled work orders are completed over a period of time

Scheduled Discard Task: The replacement of specific parts or component of a piece of equipment at regular time intervals, regardless of the condition of the component at the time of its replacement

Scheduled Maintenance: Pre-planned tasks performed on a maintenance schedule to keep assets in good operating condition.

Scheduled Operating Time: The percentage of time when an asset is scheduled to be in operation and is available to operate.

Scheduled Restoration Task: A maintenance task to completely overhaul a piece of machinery or equipment that is performed on a predetermined schedule regardless of the condition of the equipment.

Scheduled Work Order: A work order that has been planned and included on a maintenance schedule.

Scoping: A planning process that outlines the scope and details the work and resources needed to get the job done.

Secondary Damage: Any additional damage to equipment, above and beyond the initial failure mode.

Secondary Function: A term used in Reliability Centered Maintenance. The secondary functionality required of an asset . usually not associated with the reason for acquiring the asset, but now that the asset has been acquired, the asset is now required to provide this functionality.

Security Audit: An audit of how the confidentiality, availability and integrity of an organizations information is assured.

Serial Number: Number or letters that uniquely identify an item.

Service Contract: Contract calling directly for a contractor's time and effort rather than for a specific end product.

Service Level Agreement (SLA): Specifies the level of service you expect from a vendor, providing the metrics by which service is measured, as well as remedies or penalties should agreed-on service levels not be achieved. It is a critical component of any technology vendor contract.

Service Request: Also known as a work request, provides communications and management of services needed. [Read Full Details](#)

Servicing: The replenishment of parts or consumables needed to keep an item in operating condition.

Shelf Life: The period of time during which an item can remain nonfunctioning in proper storage without significant deterioration.

Shop Stock: Things that are stored and accessible directly in the shop work area.

Shutdown: The period of time that equipment is out of service.

Shutdown Maintenance: Maintenance that can only be done while equipment is shutdown.

Signature Capture: This allows you to set up different types of electronic sign-offs. [Read Full Description](#)

Single-Minute Exchange of Dies (SMED): Is a strategic process that allows teams to reduce the amount of time required to complete equipment changeovers.

Single Sign-On: This is an authentication that allows users to log into a computer with a single ID and password and have access to information for a specific timeframe without re-entering authentication factors. [Read Full Description](#)

SKU: Stock Keeping Unit, warehouse inventory management term used to identify individual stocked items that are carried in inventory.

Spare Parts Inventory: The strategic planning of having the right stock of critical parts available while keeping the cost of inventory parts and supplies at a minimum. [Read Full Description](#)

Spot Buys: Unplanned purchases made up of small orders, and are often paid for immediately.

Standard Job: A Work Order stored in the CMMS which contains all the necessary information required to perform maintenance tasks

Standby: Assets installed or available but not being used.

Standing Work Order: A work order that is left open with no end date, for the purpose of collecting labor hours, costs and/or history for tasks for which it has been decided that individual work orders should not be closed.

Statistical Analysis: Is Statistics and the process of statistical analysis is a mathematical science pertaining to the collection, analysis, interpretation or explanation, and presentation of data.

Standard Operating Procedures (SOP): A document that lays out the steps to do something in a clear and concise way. They are used in all sorts of fields and in almost every business function that requires a specific process or way to do things.

Stock Keeping Unit (SKU): This is a warehouse Inventory management term for individual stock items carried in Inventory.

Stock Items: This is the same as SKU. Items that are carried in inventory.

Stock Number: This number is assigned by the stocking organization to each group of materials, which are then treated as if identical within the using supply system; also called the part number, item number or part identifier.

Stock Out: This indicates that all quantities of a part normally on hand are not presently available.

Stores Requisition: The authorized document provided by user departments approving the issuing of specific materials, parts, supplies or equipment from the store or warehouse.

Supervisory control and data acquisition (SCADA): A system that is used to monitor and control field devices at your remote sites.

Supply: The process of procurement, storage, and distribution of materials.

Supply Chain Management: Is the centralized *management* of the flow of goods and services and includes all processes that transform raw materials into the final product.

Support Equipment: Items that are necessary to maintain assets/systems operating under different environments. Some of this equipment includes special vehicles, power units, test equipment, tools, etc.

Terotechnology: The process that leverages management, engineering, and financial expertise to optimize installation, operations, and upkeep of assets and equipment.

Theory of Constraints: A process improvement methodology that highlights the importance of identifying what is holding back an objective in manufacturing from achievement and engaging a team to make necessary changes to regenerate the progress.

Thermography: The process of monitoring the condition of equipment through the measurement and analysis of heat patterns.

Throwaway Maintenance: Maintenance that is performed by discarding used parts rather than attempting to make repairs

Total Asset Management: An integrated approach that incorporates elements (Reliability Centered Maintenance, Total Productive Maintenance, Design for Maintainability, Design for Reliability, Value Engineering, Life Cycle Costing, Probabilistic Risk Assessment, and others), with the final result being the optimum Cost-Benefit-Risk asset solution to meet production requirements.

Tradesperson: A skilled maintenance worker who specializes in a particular occupation that requires work experience, on-the-job training or been is formally trained through an apprenticeship program.

Tribology: The process of monitoring the condition (wear, friction, and lubrication) and interacting surfaces in relative motion.

Third-Party: Is used for an enterprise or company that gets its products manufactured by other manufacturing companies under its own brand name.

Throughput: A measurement of how much product a machine, line, unit, or plant produces within a given amount of time.

Tool Tracking: A process that allows operators to locate tools and hours a specific tool is available.

Total Cost of Ownership: The purchase price of an asset plus the costs of operation.

Total Productive Maintenance (TPM): Is a system of engaging employees at all levels of an organization to improve the efficiency and safety of production equipment.

Total Quality Management (TQM): A company-wide approach revolving around the principle that quality needs to be maintained in every aspect of a company's operations.

Traceability: Is the ability to track every part and product throughout the manufacturing process, from when raw materials enter the factory to the minute the product is shipped.

Tradesperson: A skilled maintenance worker who has typically been formally trained through an apprenticeship program.

Troubleshooting: Identifying or isolating malfunctions of equipment and determine the corrective action required.

Turnaround Time: The time between repairable items is removed from use and the time it is again available.

Turnover: Measurement on either number of parts or on the monetary value that evaluates how often a part is demanded versus the average number kept in Inventory.



UL Standards: Underwriters laboratory Nationally Recognized Standards for Safety.

Unique Identification (UID): Part of the compliance process these are required identification numbers established by the US Department of Defense.

Universal Maintenance Standards (UMS): Established procedures for performing various maintenance tasks such as cleaning, repairs, parts replacement, lubrication, and maintenance data collection.

Unplanned Maintenance: Maintenance done without planning or scheduling.

Unscheduled Maintenance: Maintenance work that has not been included on any approved maintenance schedule before its start.

Uptime: Is the duration in which a machine or production plant is actively in service and operating.

Usage-Based Maintenance: Is a type of meter-based preventative, or preventative, maintenance triggered based on the actual utilization of the asset

Useful Life: The maximum length of time over which an asset or equipment will depreciate.

Utilization: The proportion of available time that an item of equipment is operating.

Validated Manufacturing: This is the process by which manufacturers document and prove that their production capabilities are consistently delivering quality products.

Value Engineering: A systematic approach to assessing and analyzing the user's requirements of an asset, and providing the necessary functions in a project at the lowest cost.

Variance Analysis: An analysis of the causes for a difference between actual and planned behavior.

Vendor Managed Inventory: The buyer provides information to a vendor and the vendor takes the responsibility of managing the inventory.

Vibration Analysis: The process of monitoring the condition of equipment, and the diagnosis of faults in equipment through the measurement and analysis of vibration within that equipment.

Vibration Sensor: A device that measures the amount and frequency of vibration in a given machine, system, or piece of equipment.

Value Stream: Identifies all the actions and steps that a product takes throughout a manufacturing process.

Visual Management: A form of communication that is used to give a snapshot of manufacturing operations.

Visual Quality Inspection: A method used in quality control that utilizes human vision, hearing, touch and smell to identify any quality defects throughout production.

Warehouse Automation: Includes software, hardware, people and processes that are needed to automate warehouse tasks to increase efficiency and improve accuracy.

Warehouse Racking: The system of shelves, configurations and location of the physical structure needed to store inventory.

Warehouse Logistics: All of the resources, processes and programs required to keep assets and equipment moving in, around and through a warehouse.

Warranty: Guarantee from a manufacturer that an item will perform as specified for at least a specified time, or will be repaired or replaced at no cost to the user.

Waste: In manufacturing, waste is anything that doesn't add value to a product or cost without benefit.

Web-Based CMMS: CMMS software empowers businesses to organize their maintenance departments and company assets. The client's database is hosted on the vendor's server and accessible via the Internet.

Wear Out: The asset is no longer in good condition due to the deterioration because of age, corrosion, temperature or friction that generally increases the failure of an asset or equipment over time.

Work Order: A formal document used by the maintenance function to manage maintenance tasks.

Work Order Management: A powerful software system that helps facilities and maintenance managers to effectively track and manage all work order tasks through a centralized system.

Work Augmentation: This term is used in manufacturing to improve how workers do their jobs.

Work Request: Also known as a Service Request provides communications and management of services needed.

Workflow: This is a step-by-step process that allows you to understand how components must come together to produce a finished product.

Workload: The number of labor hours needed to carry out a maintenance task, including all scheduled and unscheduled work and maintenance support of project work.

Workplace Safety: The process of ensuring that the health and well-being of the workplace.

X-ray Testing: Quality assurance testing method used in production to inspect and verify solder joints for accuracy and connectivity.

Yield: This is a KPI that measures the number of completed, non-defective units produced in a given amount of time.

Zero Defects: A philosophy that simply means that every process should be designed so that it is impossible to produce poor quality.

Zero Waste Manufacturing: Organizations are aiming to eliminate waste by reducing or reusing, all the products and byproducts of their manufacturing and business operations.