

Glossary

MAINTENANCE & RELIABILITY BODY OF KNOWLEDGE

ABC Classification

The method of classifying items involved in a decision situation on the basis of their relative importance. Its classification may be on the basis of monetary value, availability of resources, variations in lead-time, part criticality to the running of a facility and other factors.

Used in Benchmarking Survey (BM Survey)

Achieved Availability (A_a)

A_a is the probability that an item, when used under design conditions in an ideal support environment, will perform satisfactorily. It includes both active repair time and preventive maintenance time, but excludes administrative and logistic delay times. Thus, it represents the steady-state availability when maintenance downtime, including shutdowns, is considered.

Achieved availability is expressed by the formula:

$$A_a = \text{MTBM} / (\text{MTBM} + \text{MDTM})$$

Where MTBM = Mean Time between Maintenance

And MDTM = Mean Downtime for Maintenance

Used in Guideline 6.0

Active Work Order

Any work order that is not closed in the maintenance management system (MMS).

Used in 5.4.11 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Orders Overdue

Actual Cost to Planning Estimate (5.3.3)

This metric is the ratio of the actual cost incurred on a work order to the estimated cost for that work order.

Used in 5.3.3 Actual Cost to Planning Estimate

Actual Hours to Planning Estimate (5.3.4)

This metric is the ratio of the actual number of labor hours reported on a work order to the estimated number of labor hours that were planned for that work order.

Used in 5.3.4 Actual Hours to Planning Estimate

Actual Preventive Maintenance (PM) & Predictive Maintenance (PdM) Interval

The actual interval or cycle for the repeated completion of a given preventive (PM) or predictive maintenance (PdM) task work order, measured in hours, days or months.

Used in 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance

Actual Production Rate

The rate at which an asset actually produces product during a designated time period.
Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP)

Actual Work Order Cost

The final cost of the work order after it is closed.
Used in 5.3.3 Actual Cost to Planning Estimate, 5.3.5 Planning Variance Index

Actual Work Order Hours

The quantity of hours reported on a work order after it is closed.
5.3.4 Actual Hours to Planning Estimate

Administrative Idle Time

The time that an asset is not scheduled to be in service due to a business decision (e.g., economic decision).
Used in 2.4 Idle Time

Administrative Meetings

Scheduled and unscheduled meetings, including safety meetings, information meetings and department meetings.
Used in 5.6.1 Wrench Time

Airborne Ultrasonic

A technology that utilizes ultrasound to locate a variety of potential problems in plants and facilities. This technology helps in leak detection, mechanical inspection of pipes and pumps and electrical inspection. It is used for condition monitoring, energy conservation and quality assurance programs. The three main problem areas in which airborne ultrasonic technology are applied include: leak detection, mechanical inspection/trending and electrical inspection. Instruments based on airborne ultrasound sense high frequency sounds produced by leaks, electrical emissions and mechanical operations. Through an electronic process, these sounds are translated into the audible range where they are heard through headphones and observed as intensity increments, typically decibels, on a display panel.
Used in BM Survey

Annual Maintenance Cost

Annual maintenance cost is the annual expenditures for maintenance labor, including maintenance performed by operators (e.g., total productive maintenance (TPM)), materials, contractors, services and resources). Includes all maintenance expenses for outages,

shutdowns or turnarounds, as well as normal operating times. Includes capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Does not include capital expenditures for plant expansions or improvements. When calculating, ensure maintenance expenses included are for the assets included in the replacement asset value (RAV) in the denominator.

Used in 1.5 Annual Maintenance Cost as a Percentage of Replacement Asset Value (RAV)

Annual Maintenance Cost as a Percent of Replacement Asset Value (RAV) (1.5)

This metric is the amount of money spent annually maintaining assets, divided by the replacement asset value (RAV) of the assets being maintained, expressed as a percentage.

Used in 1.5 Annual Maintenance Cost as Percent of Replacement Asset Value

All Work

The sum total of maintenance labor consumed during the period (differs from the standard definition of total maintenance labor hours in that it includes labor used for capital expansions and improvements).

Used in Guideline 5.0

Autonomous Work Teams

A small group of people who are empowered to manage themselves and the work they do on a day-to-day basis. The members of an autonomous work group are usually responsible for a whole process, product or service. They not only perform the work, but also design and manage it.

Used in BM Survey

Availability (2.2)

This metric is the percentage of time that the asset is actually operating (uptime) compared to when it is scheduled to operate. This is also called operational availability.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 total Effective Equipment Performance (TEEP), 2.2 Availability

Availability (component)

The percentage of the time that the asset is actually operating (uptime) compared to when it is scheduled to operate. Also called operational availability.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP), 2.2 Availability

Average Availability (A_t)

(A_t) is the average availability over a specific time period when an asset is available for use. It is also called mean availability, and is expressed by the formula:

$$A_t = \frac{\int_0^t A(u)du}{t_2-t_1}$$

Where $A(u)$ = Probability of being available during time (u)

t_1 = Beginning of time period

And t_2 = End of time period

Used in Guideline 6.0

Best Production Rate

The rate at which an asset is designed to produce product during a designated time period or the demonstrated best sustained rate, whichever is higher.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP)

Break Time

Time for scheduled and unscheduled breaks.

Used in 5.6.1 Wrench Time

Business Benefits

The financial benefits that impact the business, such as increases in worker productivity, improved work quality, reduced injuries and incidents and other related direct cost savings caused by an investment in training maintenance employees. Benefits must be translated into a cost benefit.

Used in 4.2.3 Maintenance Training ROI

Centralized Maintenance Organization

An organization wherein a single maintenance department is responsible for the entire facility reporting at the plant level.

Used in BM Survey

Combination Maintenance Organization

A combination or “hybrid” organization structure in which the best characteristics of both centralized and decentralized models are utilized. In this structure, areas will have a dedicated small staff to take care of daily /routine issues and centralized staff will be responsible major PMs and specialized repairs.

Used in BM Survey

Completion Date

The date that preventive maintenance (PM) or predictive maintenance (PdM) work order was certified complete and closed out in the maintenance management system (MMS) system.

Used in 5.4.14 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Compliance

Condition Based Maintenance (component)

An equipment maintenance strategy based on measuring the condition of equipment against known standards in order to assess whether it will fail during some future period and taking appropriate action to avoid the consequences of that failure. The condition of the equipment could be measured using condition monitoring, statistical process control, equipment performance or through the use of human senses. The terms condition based maintenance (CBM), on-condition maintenance and predictive maintenance (PdM) can be used interchangeably.

Used in 5.1.5 Condition Based Maintenance Cost, 5.1.6 Condition Based Maintenance Hours

Condition Based Maintenance Cost (5.1.5)

This metric is the percentage of maintenance labor hours used to measure, trend and compare equipment conditions against known standards to detect, analyze and correct problems before they cause functional failures.

Used in 5.1.5 Condition Based Maintenance Cost

Condition Based Maintenance Cost (component)

The cost that is used to measure the condition of equipment against known standards in order to assess whether it will fail during some future period.

Used in 5.1.5 Condition Based Maintenance Cost

Condition Based Maintenance Hours (5.1.6)

This metric is the percentage of maintenance labor hours used to measure, trend and compare equipment conditions against known standards to detect, analyze and correct problems before they cause functional failures.

Used in 5.1.6 Condition Based Maintenance Hours

Condition Based Maintenance Hours (component)

The percentage of maintenance labor hours used to measure, trend and compare equipment conditions to detect, analyze and correct problems before they cause functional failures.

Used in 5.1.6 Condition Based Maintenance Hours

Condition Based Maintenance Labor Hours (component)

The maintenance labor hours used to measure, trend and compare equipment conditions against known standards to detect, analyze and correct problems before they cause functional failures.

Used in 5.1.6 Condition Based Maintenance Hours

Consignment Stock

The inventoried items that are physically stored in the storeroom, but are owned by the vendor or supplier until issued or consumed.

Used in 5.5.35 Storeroom Transactions, 5.5.36 Storeroom Records

Contact Ultrasonic

Direct contact ultrasonic method places the transducers against the outside of the targeted component. An ultrasonic signal or sound pulse is passed into the component producing an echo read by a receiver. The characteristic of the echo helps identify discontinuities within the component.

Used in BM Survey

Continuous Improvement

An ongoing evaluation program that includes constantly looking for the “little things” that can make a company more competitive. It’s a measure of all work that increases or improves the current operating perimeters.

Used in BM Survey

Continuous Improvement Hours (5.7.1)

This metric is the percentage of labor hours of maintenance employees used on continuous improvement activities.

Used in 5.7.1 Continuous Improvement Hours

Contractor Cost (5.5.71)

This metric is the percentage of contractor costs of the total maintenance costs used to maintain assets.

Used in 5.5.71 Contractor Cost

Contractor Hours (5.5.72)

This metric is the percentage of contractor labor hours out of the total maintenance labor hours used to maintain assets.

Used in 5.5.72 Contractor Hours

Contractor Labor Hours

The hours used by contractors performing maintenance on the site. This includes all hours for routine service work, as well as those used on outages, shutdowns or turnarounds. Includes contractor hours used for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Does not include contractor hours used for capital expenditures for plant expansions or improvements.

Used in 5.5.72 Contractor Hours

Contractor Maintenance Cost

The total expenditures for contractors engaged in maintenance on site. Includes all contractor maintenance labor and materials costs for normal operating times, as well as outages, shutdowns or turnarounds. It also includes contractors used for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Does not include contractors used for capital expenditures for plant expansions or improvements.

Used in 5.5.71 Contractor Cost

Contributing Time

The time that is directly related to accomplishing the assigned work including field level risk assessments, instruction time, loaded travel (transporting materials or tools) site cleanup, returning equipment to service and shift hand-over. This time is required to complete the work however is not included in the wrench time calculation.

Used in 5.6.1 Wrench Time Percentage

Corrective Maintenance Cost (5.1.1)

This metric is the percentage of total maintenance cost that is used to restore equipment to a functional state after a failure or when failure is imminent.

Used in 5.1.1 Corrective Maintenance Cost

Corrective Maintenance Costs (component)

The labor, material, services and/or contractor cost for work done to restore the function of an asset after failure or when failure is imminent. Includes operator costs if all operator maintenance costs are included in total maintenance cost.

Used in 5.1.1 Corrective Maintenance Cost

Corrective Maintenance Hours (5.1.2)

This metric is the percentage of total maintenance labor that is used to restore equipment to a functional state after a failure-finding task indicated a functional failure or when functional failure is imminent or has already occurred.

Used in 5.1.2 Corrective Maintenance Hours

Corrective Maintenance Labor Hours (Component)

The labor hours are the labor hours used to restore the function of an asset after failure or when failure is imminent. Labor can be internal and/or external (contract).

Used in 5.1.2 Corrective Maintenance Hours

Corrective Work

Work done to restore the function of an asset after failure or when failure is imminent.

Used in 4.1 Rework

Corrective Work Identified from Preventive and Predictive Maintenance Work Orders

Work identified from preventive maintenance (PM) and predictive maintenance (PdM) work orders is work that was identified through PM and/or PdM tasks and completed prior to failure in order to restore the function of an asset.

Used in 5.4.2 Proactive Work, 5.4.12 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Yield

Craft-Wage Headcount

The number of maintenance personnel responsible for executing work assignments pertaining to maintenance activities. Includes the number of contractors' personnel who are used to supplement routine maintenance. The headcount is measured in full-time equivalents (FTE).

Used in 1.1 Ratio of Replacement Asset Value (RAV) to Craft-Wage Head Count

Craft Worker

See Maintenance Craft Worker.

Craft Worker on Shift Ratio (5.5.6)

This metric is the ratio of the number of maintenance craft workers on shift whose primary function is to respond to unexpected failures versus the total number of maintenance craft workers.

Used in 5.5.6 Craft Worker on Shift Ratio

Craft Worker to Planner Ratio (5.5.2)

This metric is the ratio of maintenance craft workers to planners.

Used in 5.5.2 Craft Worker to Planner Ratio

Craft Worker to Supervisor Ratio (5.5.1)

This metric is the ratio of maintenance craft workers to supervisors.

Used in 5.5.1 Craft Worker to Supervisor Ratio

Crew Capacity

The portion of the weekly maintenance labor complement that is available to work on backlog jobs. It is the sum of the straight time hours per week for each individual in the crew, plus scheduled overtime, less indirect commitments (e.g., training, meetings, vacations, etc.).

Used in 5.4.8 Planned Backlog, 5.4.9 Ready Backlog

Critical Equipment

Equipment that has been evaluated and classified as critical due to its potential impact on safety, environment, quality, production and cost.

Used in BM Survey

Critical Stock Item

An item that is inventoried because having the part on-hand is considered essential to the overall reliability of the operation due to its high cost, long lead time and/or negative impact on a plant's safety, environmental impact, operation and/or downtime should the part be needed and not be in stock. Also called critical, emergency or insurance spares.

Used in 5.5.34 Inactive Stock, 5.5.36 Storeroom Record Rank

Critical Systems

The systems that are vital to continued operations, will significantly impact production or have inherent risks to personnel safety or the environment should they fail.

Used in 3.1 Systems Covered by Critical Analysis, 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance

Criticality Analysis

A quantitative analysis of events and faults and the ranking of these in order based on a weighted combination of the seriousness of their consequences and frequency of occurrence.

Used in 3.1 Systems Covered by Critical Analysis, 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance, 5.4.11 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Orders Overdue

Current Date

The current calendar date that the report is run.

Used in 5.4.11 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Orders Overdue

Current Interval Hours

The number of actual hours on a piece of equipment since the last preventive maintenance (PM) or predictive maintenance (PdM) was performed.

Used in 5.4.11 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Orders Overdue

Days

Calendar days versus operating days/time.

Used in 5.4.11 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Orders Overdue

Decentralized Maintenance Organization

An organization in which multiple maintenance groups report to specific business or production functions.

Used in BM Survey

Defective Units Produced

The number of unacceptable units produced during a time period (e.g., losses, rework, scrap, etc.).

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP)

Direct Contract Maintenance Personnel

Maintenance workers who are not company employees, but are hired or provided by an outside company to perform actual maintenance tasks, such as corrective and preventive maintenance. Examples include contract mechanics, electricians and hourly technicians.

Used in 5.5.3 Direct to Indirect Maintenance Personnel Ratio

Direct Maintenance Personnel

Maintenance employees assigned to perform actual maintenance tasks, such as corrective and preventive maintenance. Examples include mechanics, electricians, pipe fitters, mobile equipment operators and hourly technicians.

Used in 5.5.3 Direct to Indirect Maintenance Personnel Ratio

Direct Purchase Item

Non-inventoried items, typically purchased on an as-needed basis.

Used in 5.5.35 Storeroom Transactions

Direct to Indirect Maintenance Personnel Ratio (5.5.3)

This metric is the ratio of the maintenance personnel who are actively doing the maintenance work (direct) to the maintenance personnel supporting the maintenance work (indirect). Direct personnel include those workers in the maintenance department that repair, maintain, modify or calibrate equipment. Indirect personnel support the maintenance work with administration, planning, stores, condition monitoring and supervision.

Used in 5.5.3 Direct to Indirect Maintenance Personnel Ratio

Downtime Event

An event when the asset is down and not capable of performing its intended function.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP), 3.5.4 Mean Downtime (MDT)

Due Date

The required completion date of the preventive maintenance (PM) or predictive maintenance (PdM), including the grace period.

Used in 5.4.11 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Orders Overdue, 5.4.14 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Compliance

Economic Order Quantity (EOQ)

A fixed order quantity is established that minimizes the total of carrying and preparation costs under conditions of certainty and independent demand.

Used in BM Survey

Equipment Availability

A term defined by The Association for Manufacturing Technology as the percentage of potential production time during which equipment is operable. The term is applied to a single piece of manufacturing equipment (or several machines acting as a unit). Equipment availability is expressed by the formula:

Equipment Availability = [Production Time / Potential Production Time] x 100

Used in Guideline 6.0

Equipment Repair History

A chronological list of failures, repairs and modifications on equipment/assets. Also called maintenance history or maintenance record.

Used in BM Survey

Estimated Replacement Value (ERV)

Also referred to as Replacement Asset Value (RAV), it is the dollar value that would be required to replace the production capability of the present assets in the plant. Includes production/process equipment, as well as utilities, facilities and related assets. Does not use the insured value or depreciated value of the assets. Includes the replacement value of buildings and grounds if these assets are included in maintenance expenditures. Does not include the value of real estate, only improvements.

Used in 1.1 Ratio of Replacement Asset Value (RAV) to Craft-Wage Headcount, 1.4 Stocked Maintenance, Reliability and Operating Materials (MRO) Inventory Value as a Percentage of Replacement Asset Value (RAV), 1.5 Annual Maintenance Cost as a Percentage of Replacement Asset Value (RAV)

Execution Date

The date the preventive maintenance (PM) or predictive maintenance (PdM) work was executed on the asset or component.

Used in 5.4.14 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Compliance

Failure

When an asset is unable to perform its required function.

Used in 3.5.1 Mean Time between Failures (MTBF), 3.5.2 Mean Time to Repair (MTTR), 3.5.5 Mean Time to Failures (MTTF), 5.4.2 Proactive Work

Failure Modes and Effects Analysis (FMEA)

A procedure in which each potential failure mode in every sub-item (component) of an item (asset) is analyzed to determine its effect on other sub-items and on the required function of the item.

Used in BM Survey, SMRP Guideline 4.0 – Guide to Mean Metrics

Fatalities

The number of fatalities in your company during the past year. For US companies, this number is reported on section G of OSHA form 300A.

Used in BM Survey

First Aid

Injuries or illnesses that do not meet the minimum threshold to be recordable. The incident rate is calculated by taking the total number of “first aid incidents” times 200,000 and dividing the result by the number of hours of exposure.

Used in BM Survey

Free Issue Inventory

Low cost and high usage inventoried stock items that are available as needed without a goods issue transaction. Typically, these items are stored in a secured environment close to the point of usage. Examples of common free issue inventoried stock include nuts, bolts, gaskets, cable ties, etc.

Used in 5.5.36 Storeroom Record

Group Leader

A team member who may not have any authority over other members, but is appointed on a permanent or rotating basis to represent the team to the next higher reporting level, make decisions in the absence of a consensus, resolve conflict between team members and coordinate team efforts.

Used in BM Survey

Idle Time (2.4)

This metric is the amount of time an asset is idle or waiting to run. It is the sum of the times when there is no demanded administrative idle time (e.g., not scheduled for production). Does not include equipment downtime (scheduled or unscheduled) and no feedstock or raw materials.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP), 2.2 Availability, 2.3 Uptime, 2.4 Idle Time, 2.5 Utilization Time

Idle Time (component)

The time an asset is idle or waiting to run. The sum of the times when there is no demanded administrative idle time (e.g., not scheduled for production). Does not include equipment downtime (scheduled or unscheduled) and no feedstock or raw materials.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP), 2.2. Availability, 2.3 Uptime, 2.4 Idle Time, 2.5 Utilization Time

Inactive Inventory Stock Record

An inventoried maintenance, operating and repair (MRO) storeroom item with no usage for 12 months or longer.

Used in 5.5.34 Inactive Stock, 5.5.36 Storeroom Records

Inactive Inventory Stock Value

The current book value of maintenance, repair and operating supplies (MRO) in stock with no usage for 12 or more months, including consignment and vendor-managed stores. Includes the value of inactive MRO materials in all storage locations, including satellite and/or remote storeroom locations whether or not that material is included in inventory asset accounts or an allocated portion of pooled spares. Also includes estimated value for stocked material that may be in stock at zero value because of various maintenance management systems (MMS) and/or accounting idiosyncrasies, etc. Does not include raw material, finished goods, packaging materials and related materials.

Used in 5.5.34 Inactive Stock

Inactive Stock (5.5.34)

This metric is the ratio of the number of inactive maintenance, repair and operating (MRO) inventory stock records to the total number of MRO inventory stock records excluding critical spares and non-stock inventory records.

Used in 5.5.34 Inactive Stock

Indirect Contract Maintenance Personnel

Maintenance personnel are maintenance workers, who are not company employees, but hired or provided by an outside company to support the contracted maintenance services, and are not directly performing maintenance work. Examples include contract supervision, engineering, maintenance planning and scheduling, inspection, clerical, etc.

Used in 5.5.3 Direct to Indirect Maintenance Personnel Ratio

Indirect Maintenance Personnel

Maintenance employees required to support the overall maintenance operation, but not directly performing maintenance work. These personnel are generally charged to an overhead account. Examples include supervision, engineering, maintenance planning and scheduling, clerical, etc.

Used in 5.5.3 Direct to Indirect Maintenance Personnel Ratio, 5.5.4 Indirect Maintenance Personnel Cost

Indirect Maintenance Personnel Cost (5.5.4)

This metric is the cost incurred for indirect maintenance personnel for the period, expressed as a percentage of the total maintenance cost for the period.

Used in 5.5.4 Indirect Maintenance Personnel Cost

Indirect Maintenance Personnel Cost (component)

All maintenance labor costs, both straight, overtime and payroll added cost, such as taxes or insurance contributions. Does not include labor for these individuals that is used for capital expenditures or contractor labor cost.

Used in 5.5.4 Indirect Maintenance Personnel Cost

Infrared Monitoring

A monitoring technique that uses special instruments, such as an infrared camera, to detect, identify and measure the heat energy objects radiate in proportion to their temperature and emissivity.

Used in BM Survey

Inherent Availability (A_i)

A_i is a measure of the variables inherent in the design that affect availability. In the calculation of downtime, it usually includes only active repair time. It does not include preventive maintenance time and administrative or logistic delays, but does include corrective maintenance downtime. It is usually calculated during the engineering design of equipment and can be used as a measure of performance between planned shutdowns. Inherent availability is expressed by the formula:

$$A_i = \text{MTBF} / (\text{MTBF} + \text{MTTR})$$

Where MTBF = Mean Time between Failures

And MTTR = Mean Time to Repair (corrective maintenance only)

Used in Guideline 6.0

In-sourcing Maintenance

The process of moving maintenance activities performed by outside contractors in-house to be performed by company employees. This is the opposite of outsourcing.

Used in BM Survey

Instruction Time

The time when a maintenance craft worker is receiving work instruction (e.g., assignment of jobs at the beginning of a shift).

Used in 5.6.1 Wrench Time

Internal Maintenance Employees

All personnel, salaried and hourly, direct and indirect, who are responsible for executing work assignments pertaining to the maintenance of physical assets and components. Same as maintenance employee.

Used in 4.2.1 Maintenance Training Cost, 4.2.3 Maintenance Training ROI

Internal Maintenance Personnel Cost (5.5.5)

This metric is the total burdened cost incurred for plant maintenance employees for the period, expressed as a percentage of the total maintenance cost for the period.

Used in 5.5.5 Internal Maintenance Personnel Cost

Internal Maintenance Personnel Cost (component)

All internal maintenance labor costs, including benefits, both straight time and overtime. Internal maintenance personnel are plant employees only, not contractors. Includes maintenance labor costs for normal operating times, as well as outages, shutdowns or turnarounds. Includes labor for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Includes the cost for staff overhead support (supervisors, planners, managers, storeroom personnel, etc.). Also includes the cost for maintenance work done by operators. Does not include labor used for capital expenditures for plant expansions or improvements, just as it does not include contractor labor cost or janitorial cost.

Used in 5.5.5 Internal Maintenance Personnel Cost

Inventory Stock Record

The individual record describing the part that is inventoried, represented by a unique inventory number or stock keeping unit (SKU).

Used in 5.5.34 Inactive Stock, 5.5.36 Storeroom Records

Inventory Stock Value

The current book value of MRO supplies in stock, including consignment and vendor-managed inventory. Includes the value of MRO materials in all storage locations, including satellite and/or remote storeroom locations whether or not that material is included in inventory asset accounts or an allocated portion of pooled spares. Estimates the value of "unofficial" stores in the plant even if they are not under the control of the storeroom and even if they are not "on the books". Includes estimated value for stocked material that may be in stock at zero value because of various maintenance management systems and/or accounting idiosyncrasies, etc. Does not include raw material, finished goods, packaging materials and related materials.

Used in 5.5.34 Inactive Stock Change

Knowledge Management System

A system that is designed to capture the explicit knowledge of a company's employees, contractors and other people working on-site on a permanent or temporary basis.

Used in BM Survey

Labor Costs

Refer to Total Maintenance Labor Cost.

Labor Hours on Job Plans

The planner's estimate of labor hours required to complete a work order at the point when the planning is complete and the work order is sent for approval.

Used in 5.3.6 Planner Productivity

Lagging Indicator

An indicator that measures performance after the business or process result starts to follow a particular pattern or trend. Lagging indicators confirm long-term trends, but do not predict them.

Used in Guideline 3.0

Leading Indicator

An indicator that measures performance before the business or process result starts to follow a particular pattern or trend. Leading indicators can sometimes be used to predict changes and trends.

Used in Guideline 3.0

Lean Initiatives

Business improvement initiatives that are designed to remove waste from the business processes. The waste may include materials, time, scrap, poor quality, no value add tasks, buffers and work-in-progress.

Used in BM Survey

Limiting Availability (A_∞)

A_∞ is the limit of the point availability function as time approaches infinity. It is also called steady-state availability and is expressed by the formula:

$$A_{\infty} = \lim_{t \rightarrow \infty} A_t$$

Used in Guideline 6.0

Line Items in Inventory

The number of different items in inventory, each with its own unique description and stock number.

Used in BM Survey

Lost Time Incident Rate

Calculated by taking the total number of lost time incidents, multiplying it by 200,000 and dividing the result by the number of hours of exposure. Note: 200,000 is an arbitrary number established by OSHA 1904.7 and is supposed to represent the hours worked in a year by 100 employees – 100 employees multiplied by 50 weeks per year multiplied by 40 hours per week.

Used in BM Survey

Lube Oil Analysis

Performed to ensure the quality of lubricant. An analytic technique used to determine and identify problems with the lubricant and machine condition based upon quantitative and qualitative measurement of particles suspended in lubricating fluids. The magnitude of the concentration level is a measure of wear in an oil-wetted mechanism and the elements present to identify the worn components. A predictive technique used to identify machine wear and quantify lubricant condition. A sample of oil is subjected to a series of tests to determine whether the lubricant properties have deteriorated and/or the machine components wear. Tests can include any of the following: ICP Spectroscopy, Particle Count Testing, Viscosity Testing, Ferrography, Acid and Base Number, Karl Fischer Water Test, Varnishing Potential, etc. Oil analysis can identify machine wear before detection by other predictive technologies (such as vibration).

Used in BM Survey

Maintenance

The set of actions taken to ensure that systems, equipment and components provide their intended functions when required. The primary focus of this definition is on maintaining the intended function of an item rather than its design performance. Many designs provide excess performance capacity or endurance as an inherent characteristic of the design. (e.g., the pump selected for a system may be rated at 100 gpm when the system design requirement is only 75 gpm.) Maintenance that is oriented to sustaining excess capability not needed for operations expends resources without benefit. This is not good maintenance practice. This definition requires the function being maintained to be available when it is required. Since certain functions, such as weapons firing and overpressure relief, may not be required continuously, there may be a need to verify their availability. The terms "component, equipment, and systems" as used in this definition apply to hardware at the particular level where the analysis is

being performed. This may be a system, a subsystem, equipment, or a component, depending on the specific task being examined.

Used in U.S. Navy

Maintenance Action

One or more tasks necessary to retain an item in, or restore it to, a specified operating condition. A maintenance action includes corrective, as well as preventive and predictive, maintenance tasks that interrupt the asset function.

Used in 3.5.3 Mean Time between Maintenance (MTBM)

Maintenance Budget Compliance

The comparison at a given frequency (monthly, quarterly or annually) of the planned versus actual maintenance spend. Usually expressed as a percentage.

Used in BM Survey

Maintenance Contract Employees

All personnel, salaried and hourly, direct and indirect, who are hired or provided by an outside company and are responsible for executing work assignments pertaining to the maintenance of physical assets and components.

Used in 5.5.3 Direct to Indirect Maintenance Personnel Ratio

Maintenance Craft Worker

The worker responsible for executing maintenance work orders (e.g., electrician, mechanic, PM/PdM technician, etc.).

Used in 5.5.1 Craft Worker to Supervisor Ratio, 5.5.2 Craft Worker to Planner Ratio, 5.5.6 Craft Worker on Shift Ratio

Maintenance Employees

All personnel, salaried and hourly, direct and indirect, who are responsible for executing work assignments pertaining to the maintenance of physical assets and components. Same as internal maintenance employees.

*Used in 4.2.1 Maintenance Training Costs, 4.2.2 Maintenance Training Hours
4.2.3 Maintenance Training ROI, 5.5.3 Direct to Indirect Maintenance Personnel Ratio, 5.7.1
Continuous Improvement Hours*

Maintenance Job Plan

Also known as a job plan package, it is the assembly of written and other information that provides guidelines for completing the job safely and efficiently with high quality. Elements to include: labor estimate, material requirements, asset documents, drawings, bills of material,

tool list, applicable procedures and safety related items. Should contain enough information to enable the craftsperson to complete the job without having to spend additional time searching for the information, tools, equipment or material. A minimum job plan includes the work order, labor estimate, material requirements and work order feedback form.

Used in 5.3.6 Planner Productivity

Maintenance Labor Hours Used for Continuous Improvement

Used for continuous improvement are the total direct and indirect maintenance labor hours used on continuous improvement activities. Examples of continuous improvement activities are: lean, six sigma, work process redesign, work practice redesign, work sampling and other similar performance improvement activities. Examples of areas that could be improved include: availability, reliability, maintainability, quality, productivity, safety, environment and costs. Do not include labor hours for capital expenditures for plant expansions or improvements.

Used in 5.7.1 Continuous Improvement Hours

Maintenance Materials Cost (5.5.38)

This metric is the total cost incurred for materials, supplies and consumables needed to repair and maintain plant and facility assets for a specified time period, expressed as a percentage of the total maintenance cost for the period.

Used in 5.5.38 Maintenance Materials Cost

Maintenance Materials Cost (component)

The cost of all maintenance, repair and operating material (MRO) used during the specified time period. Includes stocked MRO inventory usage, outside purchased materials, supplies, consumables and the costs to repair spare components. Also includes materials used for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Does not include material used for capital expenditures for plant expansions or improvements.

Used in 5.5.38 Maintenance Materials Cost

Maintenance Shutdown Cost (5.1.9)

This metric is the total cost incurred in association with a planned maintenance shutdown expressed as a percentage of the total maintenance cost for the period in which the shutdown(s) occurred.

Used in 5.1.9 Maintenance Shutdown Cost

Maintenance Shutdown Cost (component)

The total cost incurred to prepare and execute all planned maintenance shutdown or outage activities. Includes all staff costs incurred for planning and management of the maintenance

activities performed during the shutdown. Includes all costs for temporary facilities and rental equipment directly tied to maintenance activities performed during the shutdown. Does not include costs associated with capital project expansions or improvements that are performed during the shutdown. Calculated and reported for a specific time period (e.g., monthly, quarterly, annually, etc.).

Used in 5.1.9 Maintenance Shutdown Cost

Maintenance Training Cost (4.2.1)

This metric is the cost for formal training that internal maintenance employees receive annually. It is expressed as cost per employee.

Used in 4.2.1 Maintenance Training Cost

Maintenance Training Hours (4.2.2)

This metric is the number of hours of formal training that maintenance personnel receive annually. It is expressed as hours per employee.

Used in Maintenance Training Hours

Maintenance Training ROI (4.2.3)

This metric is the ratio of the benefit to the cost of training internal maintenance employees.

Used in 4.2.3 Maintenance Training ROI

Maintenance Unit Cost (1.3)

This metric is the measure of the total maintenance cost required for an asset or facility to generate a unit of production.

Used in 1.3 Maintenance Unit Cost

Mean Downtime (MDT) (3.5.4)

This metric is the average downtime required to restore an asset or component to its full operational capabilities. Mean downtime (MDT) includes the time from failure to restoration of an asset or component, including operations activities such as locking out and cleaning equipment.

Used in 3.5.4 Mean Downtime (MDT)

Mean Life

A term used interchangeably with mean time between failures (MTBF) and mean time to failure (MTTF).

Used in 3.5.1 Mean Time between Failures (MTBF)

Mean Time between Failures (MTBF) (3.5.1)

This metric is the average length of operating time between failures for an asset or component. Mean time between failures (MTBF) is usually used primarily for repairable assets of similar type. Mean time to failures (MTTF), a related term, is used primarily for non-repairable assets and components (e.g., light bulbs and rocket engines). Both terms are used as a measure of asset reliability and are also known as mean life. MTBF is the reciprocal of the failure rate (λ), at constant failure rates.

Used in 3.5.1 Mean Time between Failures (MTBF)

Mean Time between Maintenance MTBM (3.5.3)

This metric is the average length of operating time between one maintenance action and another maintenance action for an asset or component. This metric is applied only for maintenance actions which require or result in function interruption.

Used in 3.5.3 Mean Time between Maintenance (MTBM)

Mean Time to Failure (MTTF) (3.5.5)

This metric is the average length of operating time to failure of a non-repairable asset or component (e.g., light bulbs, rocket engines). Another term, mean time between failures (MTBF), is primarily used for repairable assets and components of similar type. Both terms are a measure of asset reliability and are also known as mean life.

Used in 3.5.5 Mean Time to Failure (MTTF), BM Survey

Mean Time to Repair or Replace MTTR (3.5.2)

This metric is the average time needed to restore an asset to its full operational capabilities after a failure. Mean time to repair or replace (MTTR) is a measure of asset maintainability, usually expressed as the probability that a machine can be restored to its specified operable condition within a specified interval of time regardless of whether an asset is repaired or replaced.

Used in 3.5.2 Mean Time to Repair or Replace MTTR

Meeting Time

Scheduled and unscheduled meetings including safety meetings, information meetings, department meetings and other similar meetings.

Used in 5.6.1 Wrench Time

Motor Current Analysis

Monitoring the motor current during start-up (surge-current) and the current trace over time (decay) to detect friction forces. A predictive technique used to analyze current and voltage supplied to an electric motor or generator to detect abnormal operating conditions in induction

motor applications. Can be used to identify incoming winding health, stator winding health, rotor health, load issues, system load and efficiency, bearing health, air gap static and dynamic eccentricity and coupling health.

Used in BM Survey

Motor Testing (Hi-Pot, Insulation)

Done to confirm the reliability of an electrical insulation system where a high voltage (twice the operating voltage plus 1000 volts) is applied to cables and motor windings. Typically a “go/no-go” test. Industry practice calls for HiPot tests on new and rewound motors only. This test stresses the insulation system and can induce premature failures in marginal motors.

Used in BM Survey

MRO (Maintenance, Repair and Operating Materials)

An acronym to describe maintenance, repair and operating materials (MRO) and spare parts.

Used in 1.4 Stocked Maintenance, Reliability and Operating Materials (MRO) Inventory Value as a Percentage of Replacement Asset Value (RAV)

Necessary Preventive Maintenance (PM) & Predictive Maintenance (PdM) Corrective Work Orders

Work where a defect or a potential failure was identified and corrected as a result of preventive maintenance (PM) and predictive maintenance (PdM) inspections or tasks.

Used in 5.4.13 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Effectiveness

No Demand

The time that an asset is not scheduled to be in service due to the lack of demand for the product.

Used in 2.4 Idle Time

No Feedstock or Raw Materials

The time that an asset is not scheduled to be in service due to a lack of feedstock or raw material.

Used in 3.4 Unscheduled Downtime

Non-Contributing Time

The time not directly related to accomplishing the assigned work (e.g., breaks, personal time, signoff and wash-up, administrative meetings, unloaded travel (not carrying materials or tools), planning, waiting, and training).

Used in 5.6.1 Wrench Time

Non-destructive Testing (NDT)

A collection of technologies that provide a means of assessing the integrity, properties and condition of components or material without damaging or altering them. Methods include: ultrasonic testing, eddy current testing, radiography, thermography, visual inspection, magnetic particle testing, dye penetrate testing, acoustic testing and others. Also termed non-destructive examination (NDE).

Used in BM Survey

Non-Productive Work Time

The time not directly related to accomplishing the assigned work (e.g., breaks, personal time, meetings, travel, planning, instruction, waiting, procuring tools and materials and training).

Used in 5.6.1 Wrench Time

Non-stock Item

An item documented in the inventory system that is not physically in the storeroom, but is documented for use on a parts list and/or for repetitive purchasing purposes. Also referred to as order on request or demand.

Used in 5.5.34 Inactive Stock, 5.5.35 Storeroom Transactions, 5.5.36 Storeroom Records

Number of Inventory Requests with Stock Out

An inventory request is a stock out if the requested item is normally stocked on site and the inventory request is for a normal quantity of the item, but the inventory on hand is insufficient to fill the request.

Used in 5.5.33 Stock Outs

Number of Work Orders Performed as Scheduled

The number of work orders on the maintenance schedule that were executed when scheduled are considered performed as scheduled.

Used in 5.4.4 Schedule Compliance – Work Orders

On Shift

Maintenance craft workers who rotate with or who are assigned work hours aligned with a production shift are considered “on shift.” Maintenance craft workers on shift typically work on emergency work and are not identified with the main group of maintenance craft workers that work day shift.

Used in 5.5.6 Craft Worker on Shift Ratio

Operating Time

An interval of time during which the asset or component is performing its required function.
Used in 2.5 Utilization Rate, 3.5.1 Mean Time between Failures (MTBF), 3.5.3 Mean Time between Maintenance (MTBM), 3.5.5 Mean Time between Failures (MTTF)

Operational Availability (A_o)

A_o is the probability that an item, when used under design conditions in an operational environment, will perform satisfactorily. It includes active repair time, preventive maintenance time and administrative and logistic delays and represents the availability that is actually experienced. Operational availability is expressed by the formula:

$$A_o = \text{MTBM} / (\text{MTBM} + \text{MDT})$$

Where MTBM = Mean Time between Maintenance and MDT = Mean Down Time
Used in Guideline 6.0

Operator Maintenance

When operators perform inspections and minor routine and recurring maintenance activities to keep the asset working efficiently for its intended purpose (e.g., cleaning, pressure checks, lube checks etc.).
Used in BM Survey

Operational Availability

The percentage of time that the asset is capable of performing its intended function (uptime plus idle time). Also called availability.
Used in 2.2 Availability, 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP)

OSHA Recordable Rate

OSHA Recordable Rate (per 200,000 hrs.) - OSHA Recordable Incident Rate is calculated by taking the total number of "recordable incidents" multiplied by 200,000 and dividing the result by the number of hours of exposure.
Used in BM Survey

Outsourcing Maintenance

The act of having maintenance performed by vendors or outside contractors.
Used in BM Survey

Overall Equipment Effectiveness (OEE) (2.1.1)

This metric is a measure of equipment or asset performance based on actual availability, performance efficiency and quality of product or output when the asset is scheduled to operate. Overall equipment effectiveness (OEE) is typically expressed as a percentage.

Used in 2.1.1 Overall Equipment Effectiveness (OEE)

Overtime Maintenance Cost (5.5.7)

This metric is the cost of overtime maintenance labor used to maintain assets divided by the total cost of maintenance labor used to maintain assets, expressed as a percentage.

Used in 5.5.7 Overtime Maintenance Cost

Overtime Maintenance Hours (5.5.8)

This metric is the number of overtime maintenance labor hours used to maintain assets, divided by the total maintenance labor hours to maintain assets, expressed as a percentage.

Used in 5.5.8 Overtime Maintenance Hours

Overtime Maintenance Labor Cost (component)

The cost of any hours worked beyond the standard work period or shift (e.g., eight hours per day or 40 hours per week) multiplied by the labor rate. Includes production incentives, but not profit sharing. Includes labor costs for normal operating times as well as for outages, shutdowns or turnarounds. Also includes labor cost for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Does not include labor cost used for capital expenditures for plant expansions or improvements. Typically, overtime labor cost does not include temporary contractor labor overtime cost.

Used in 5.5.7 Overtime Maintenance Cost

Overtime Maintenance Labor Hours (component)

Any hours beyond the normal standard work period or shift (e.g., eight hours per day or 40 hours per week). Include overtime maintenance labor hours for normal operating times as well as outages, shutdowns or turnarounds. If operator hours spent on maintenance activities are captured, they should be included in the numerator and denominator of all applicable metrics. Overtime maintenance labor hours include labor hours for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. It does not include labor hours used for capital expenditures for plant expansions or improvements. Typically, overtime maintenance labor hours does not include temporary contractor labor overtime hours.

Used in 5.5.8 Overtime Maintenance Cost

Percentage of Work Orders with Kitted Materials

The measure of the number of work orders for which required parts have been identified, secured (pick listed), packaged and available to do the job divided by all work orders x 100.

Used in BM Survey

Performance Efficiency (Rate/Speed)

The degree to which the equipment operates at historical best speeds, rates and/or cycle times.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP)

Performance Trending

The process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources transformed into goods and services, outputs, the quality of those outputs, how well they are delivered to the customers and the extent to which customers are satisfied.

Used in BM Survey

Personal Time

The time when a worker is taking care of personal business (e.g., making or receiving a personal phone call, meeting with Human Resources or a union steward, using the restroom and other similar personal activities).

Used in 5.6.1 Wrench Time

Planned Backlog (5.4.8)

This metric is the combination of the quantity of work that has been fully planned for execution, but is not ready to be scheduled and work that is ready to be performed. Also known as ready work.

Used in 5.4.8 Planned Backlog

Planned Cost

The planner's estimate of cost to complete the work order. Contingencies should not be included.

Used in 5.3.3 Actual Cost to Planning Estimate, 5.3.5 Planning Variance Index

Planned Interval Hours

The number of planned operating hours on a piece of equipment between scheduled preventive maintenance (PM) or predictive maintenance (PdM) events.

Used in 5.4.11 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Orders Overdue

Planned Labor Hours

The planner's estimate of the labor hours required to complete a work order.

Used in 5.3.6 Planner Productivity

Planned Preventive Maintenance (PM) & Predictive Maintenance (PdM) Frequency

Planned frequency or cycle over which a given preventive maintenance (PM) or predictive maintenance (PdM) task is to be repeated, measured in hours, day or months.

Used in 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance

Planned Work (5.3.1)

This metric is the amount of planned maintenance work that was completed versus the total maintenance labor hours, expressed as a percentage. Planning adds value for the craft worker through preparation and an understanding of work request prior to the commencement of work. Maintenance planning is a highly skilled function that requires a basic knowledge of the maintenance work process, operations, project management, maintenance management system (MMS) and related systems, as well as a practical understanding of the work to be performed. Planning is the "what's required" and "how to" part of any maintenance job.

Used in 5.3.1 Planned Work

Planned Work (component)

Work that has gone through a formal planning process to identify labor, materials, tools, and safety requirements. This information is assembled into a job plan package and communicated to craft workers prior to the start of the work.

Used in 5.3.6 Planner Productivity, 5.4.8 Planned Backlog, 5.5.2 Craft Worker to Planner Ratio, Guideline 5.0

Planned Work Executed

Labor hours for work that were formally planned and completed.

Used in 5.3.1 Planned Work, 5.3.5 Planning Variance Index

Planned Work Order Hours

The planner's estimate of hours needed to complete the work order.

Used in 5.3.4 Actual Hours to Planning Estimate

Planner

A formally trained maintenance professional who identifies labor, materials, tools and safety requirements for maintenance work orders. The planner assembles this information into a job

plan package and communicates it to the maintenance supervisor and/or craft workers prior to the start of the work.

Used in 5.3.6 Planner Productivity, 5.5.2 Craft Worker to Planner Ratio

Planner Productivity (5.3.6)

This metric measures the average amount of planned work a maintenance planner prepares per month. This metric can be calculated as the number of planned labor hours, number of job plans or the number of planned work orders per month.

Used in 5.3.6 Planner Productivity

Planning Time

The time when a maintenance craft worker is planning a job. Includes planning emergency and unscheduled work, including scope creep.

Used in 5.6.1 Wrench Time

Planning Variance Index (5.3.5)

This metric measures the percentage of planned work orders closed in which the actual cost varied within +/- 20% of the planned cost.

Used in 5.3.5 Planning Variance Index

Point Availability (A_t)

A_t is the probability that a device, system or component will be operational at any random point in time. It is also called instantaneous availability and is expressed by the formula:

$$A_t = R(t) + \int_0^t R(t-u)m(u)du$$

Where R(t) = Probability of operating during time (t)

m(u) = The renewal density function

And u = The last repair time (0 < u < t)

Used in Guideline 6.0

Predictive Maintenance (PdM)

An equipment maintenance strategy based on assessing the condition of an asset to determine the likelihood of failure and then taking appropriate action to avoid failure. The condition of equipment can be measured using condition monitoring technologies, statistical process control, equipment performance indicators or through the use of human senses.

Used in 5.4.2 Proactive Work, 5.4.12 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Yield, 5.4.13 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Effectiveness

Preventive Maintenance (PM)

Actions performed on a time- or machine-run-based schedule that detect, preclude or mitigate degradation of a component or system with the aim of sustaining or extending its useful life through controlling degradation to an acceptable level.

Used in 5.1.3 Preventive Maintenance Cost, 5.1.4 Preventive Maintenance Hours, 5.4.2 Proactive Work, 5.4.12 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Yield, 5.4.13 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Effectiveness

Preventive Maintenance Cost (5.1.3)

This metric is the maintenance cost that is used to perform fixed interval maintenance tasks, regardless of the equipment condition at the time. The result is expressed as a percentage of total maintenance costs.

Used in 5.1.3 Preventive Maintenance Cost

Preventive Maintenance Cost (component)

The labor, material and services cost, including maintenance performed by operators (e.g., total productive maintenance (TPM), by company personnel or contractors for work performed as preventive maintenance. Includes operator costs if all operator maintenance costs are included in total maintenance cost.

Used in 5.1.3 Preventive Maintenance Cost

Preventive Maintenance Hours (5.1.4)

This metric is the percentage of maintenance labor hours used to perform fixed interval maintenance tasks, regardless of the equipment condition at the time.

Used in 5.1.4 Preventive Maintenance Hours

Preventive Maintenance Hours (component)

The maintenance labor hours to replace or restore an asset at a fixed interval regardless of its condition. Scheduled restoration and replacement tasks are examples of preventive maintenance.

Used in 5.1.4 Preventive Maintenance Hours

Preventive Maintenance Labor Hours (component)

The maintenance labor hours to replace or restore an asset at a fixed interval regardless of its condition. Scheduled restoration and replacement tasks are examples of preventive maintenance.

Used in 5.1.4 Preventive Maintenance Hours

Preventive Maintenance (PM) & Predictive Maintenance (PdM) Compliance (5.4.14)

This metric is a review of completed preventive maintenance (PM) and predictive maintenance (PdM) work orders, wherein the evaluation is against preset criteria for executing and completing the work.

Used in 5.4.14 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Compliance

Preventive Maintenance (PM) & Predictive Maintenance (PdM) Corrective Work Orders

All corrective work orders that are generated from a preventive maintenance (PM) or predictive maintenance (PdM) inspection or task.

Used in 5.4.13 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Effectiveness

Preventive Maintenance (PM) & Predictive Maintenance (PdM) Effectiveness (5.4.13)

This metric is a measure of the effectiveness of the corrective work that results directly from preventive maintenance (PM) and predictive maintenance (PdM) strategies. The measure is the amount of corrective work identified from PM/PdM work orders that was truly necessary.

Used in 5.4.13 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Effectiveness

Preventive Maintenance (PM) & Predictive Maintenance (PdM) Frequency

Cyclical period of a specific unit of measure in which preventive maintenance (PM) and predictive maintenance (PdM) activities are repeated.

Used in 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance

Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance (5.4.10)

This metric measures the percentage of preventive maintenance (PM) and predictive maintenance (PdM) work orders that were completed past the expected date (e.g., overdue) for a given completion date range. The overdue variance is calculated for each work order. It is recommended that results are grouped in ranges of overdue variance (%) and by criticality rank.

Used in 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance

Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Orders Overdue (5.4.11)

This metric measures all active preventive maintenance (PM) and predictive maintenance (PdM) work orders (e.g., ongoing, not closed) in the system not completed by due date.

Used in 5.4.11 PM & PdM Work Orders Overdue

Preventive Maintenance (PM) & Predictive Maintenance (PdM) Yield (5.4.12)

This metric measures the volume of corrective work that results directly from preventive maintenance (PM) and predictive maintenance (PdM) work orders. The amount of repair and replacement work that is identified when performing PM or PdM work compared to the amount of PM or PdM work being done.

Used in 5.4.12 PM & PdM Yield

Proactive Work (5.4.2)

This metric is maintenance work that is completed to avoid failures or to identify defects that could lead to failures. Includes routine preventive and predictive maintenance activities and corrective work tasks identified from them.

Used in 5.4.2 Proactive Work

Proactive Work (component)

Maintenance work that is completed to avoid failures or to identify defects that could lead to failures. It includes routine preventive and predictive maintenance activities and work tasks identified from them.

Used in Guideline 5.0

Production Planner

The person responsible for determining production details and timelines.

Used in BM Survey

Quality

The percentage of "first pass, first time" saleable production to the actual production.

Used in Guideline 2.0

Quality Rate

The degree to which product characteristics meet the product or output specifications.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP)

Ratio of Replacement Asset Value to Craft-Wage Headcount (1.1)

This metric is the replacement asset value (RAV) of the assets being maintained at the plant divided by the craft-wage employee headcount. The result is expressed as a ratio in dollars per craft-wage employee.

Used in 1.1 Ratio of Replacement Asset Value to Craft-Wage Headcount

Reactive Work (5.4.1)

This metric is maintenance work that interrupts the weekly schedule, calculated as a percentage of the total maintenance labor hours.

Used in 5.4.1 Reactive Work

Reactive Work (component)

Maintenance work that breaks into the weekly schedule.

Used in Guideline 5.0

Ready Backlog (5.4.9)

This metric is the quantity of work that has been fully prepared for execution, but has not yet been executed. It is work for which all planning has been done and materials procured, but is waiting to be scheduled for execution.

Used in 5.4.9 Ready Backlog

Ready Work

Work that has been prepared for execution (e.g., necessary planning has been done, materials procured and labor requirements have been estimated).

Used in 5.4.8 Planned Backlog, 5.4.9 Ready Backlog

Reliability Analysis

A technique (with predictive tools) used to estimate the "life" of an asset (product). Usually expressed in terms of hours as mean time between failures (MTBF). Reliability analysis of system/assets ensures delivery of good products or services. Analysis helps to identify and to avoid some catastrophic events due to failure of component(s).

Used in BM Survey

Reliability Information Systems

Systems that take data collected by a maintenance management system (MMS) and apply reliability algorithms for the purpose of identifying opportunities to improve reliability in the company's manufacturing systems/assets.

Used in BM Survey

Repair/Replacement Event

The act of restoring the function of an asset after failure or imminent failure by repairing or replacing the asset.

Used in 3.5.2 Mean Time to Repair (MTTR)

Repair/Replacement Time

The time required to restore the function of an asset after failure by repairing or replacing the asset. The duration of the repair or replacement begins when the asset ceases to operate to the time operability is restored. Includes time for checking the asset for its functionality prior to handing it over to operations.

Used in 3.5.2 Mean Time to Repair (MTTR)

Replacement Asset Value (RAV) (component)

Also referred to as estimated replacement value (ERV), it is the dollar value that would be required to replace the production capability of the present assets in the plant. Includes production/process equipment as well as utilities, facilities and related assets. Also includes the replacement value of buildings and grounds if these assets are included in maintenance expenditures. Does not include the insured value or depreciated value of the assets, nor does it include the value of real estate, only improvements.

Used in 1.1 Ratio of Replacement Asset Value (RAV) to Craft-Wage Headcount, 1.4 Stocked Maintenance, Reliability and Operating Materials (MRO) Inventory Value as a Percentage of Replacement Asset Value (RAV), 1.5 Annual Maintenance Cost as a Percentage of Replacement Asset Value

Report Date Range

The selected calendar period in which work order completion occurs.

Used in 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance, 5.4.14 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Compliance

Required Date

The date when the preventive maintenance (PM) or predictive maintenance (PdM) work is scheduled to be completed.

Used in 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance, 5.4.14 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Compliance

Return on Net Assets (RONA)

Calculates how well a company converts assets to sales and then to income. The simple calculation is sales minus expenses divided by net assets.

Used in BM Survey

Rework (4.1)

This metric is corrective work done on previously maintained equipment that has prematurely failed due to maintenance, operations or material problems. The typical causes of rework are maintenance, operational or material quality issues.

Used in 4.1 Rework

Root Cause Failure Analysis (RCFA)

An analysis used to determine the underlying cause or causes of a failure so that steps can be taken to manage those causes and avoid future occurrences of the failure.

Used in BM Survey, SMRP Guideline 4.0 – Guide to Mean Metrics

Schedule Compliance

The ratio of the actual number of work orders completed each week divided by the total number of work orders that were on the weekly schedule.

Used in BM Survey

Schedule Compliance – Hours (5.4.3)

This metric is a measure of adherence to the maintenance schedule, expressed as a percent of total time available to schedule.

Used in 5.4.3 Schedule Compliance - Hours

Schedule Compliance – Work Orders (5.4.4)

This metric is a measure of adherence to the weekly maintenance work schedule, expressed as a percent of total number of scheduled work orders.

Used in 5.4.4 Schedule Compliance – Work Orders

Scheduled Downtime (3.3)

This metric is the amount of time an asset is not capable of running due to scheduled work, (e.g., work that is on the finalized weekly schedule).

Used in 3.3 Scheduled Downtime, 3.5.4 Mean Downtime (MDT)

Scheduled Downtime (Hours) (component)

The time required to work on an asset that is on the finalized weekly maintenance schedule.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP), 2.2 Availability, 3.2 Total Downtime, 3.3 Scheduled Downtime, 3.5.4 Mean Downtime (MDT)

Scheduled Hours of Production

The amount of time an asset is scheduled to run (e.g., total available time, less idle time and less scheduled downtime).

Used in 2.1.1 Overall Equipment Effectiveness, 2.1.2 Total Effective Equipment Performance (TEEP)

Scheduled Work Performed (Hours)

The actual hours worked on scheduled work per the maintenance schedule.

Used in 5.4.3 Schedule Compliance – Hours

Self-directed Work Teams

Self-organized, semi-autonomous small groups whose members determine, plan and manage their day-to-day activities and duties in addition to providing other supportive functions, such as production scheduling, quality assurance and performance appraisal, under reduced or no supervision. Also called self-directed team, self-managed natural work team or self-managed team.

Used in BM Survey

Six Sigma

A set of practices designed to improve manufacturing processes and eliminate anything that could lead to customer dissatisfaction. Six sigma has a clear focus on achieving measurable and quantifiable returns on each executed project.

Used in BM Survey

Sound Monitoring (Audible)

The use of instruments or the human ear to detect changes in loudness, pitch, tone or frequency that could indicate pending problems with the functioning of equipment. Personal noise dosimetry is recommended to ensure that noise exposure for the full-shift (typically 8-hours) is captured to compare results directly with the OSHA limits. The results of this survey will determine if actions are necessary to ensure compliance with the OSHA Standard (1910.95) and minimize the potential for noise induced hearing loss. The enrollment in a hearing conservation program (hearing conservation program (HCP) is required if results of testing indicate that employee exposures exceed the Action Level of 85 dBA. The use of hearing protection and the implementation of feasible engineering and administrative controls are also required if exposures exceed the Permissible Exposure Limit of 90dBA.

Used in BM Survey

Standard Units Produced

A typical quantity produced as output. The output has acceptable quality and consistent means to quantify. Examples include: gallons, liters, pounds, kilograms or other standard units of measures.

Used in 1.3 Maintenance Unit Cost

Standing Work Orders (5.4.5)

This metric is the ratio of the hours worked on standing work orders to the total maintenance labor hours, expressed as a percentage.

Used in 5.4.5 Standing Work Orders

Standing Work Order (component)

A work order opened for a specific period of time to capture labor and material costs for recurring or short duration maintenance work and for work that is not associated with a specific piece of equipment where tracking work history or formalizing individual work orders is not cost effective or practical. Examples include: shop housekeeping, meetings, training, etc. Standing work orders are also referred to as a blanket work orders.

In some cases involving specific equipment, a standing work order may be used if the time and cost associated with the work is insignificant and if there is no need to capture maintenance history (e.g., time required to perform a routine daily adjustment).

Used in 5.4.5 Standing Work Orders

Statistical Process Control

A method of monitoring, controlling and improving a process through statistical analysis. Its four basic steps include measuring the process, eliminating variances in the process to make it consistent, monitoring the process and improving the process to its best target value.

Used in BM Survey

Stock Item

An inventoried item that is physically stored in the storeroom, including consignment stock, and that the storeroom manages at a specified quantity.

Used in 5.5.35 Storeroom Transactions, 5.5.36 Storeroom Records

Stocked Maintenance, Repair and Operating Materials (MRO) Inventory Value

The current book value of maintenance, repair and operating (MRO) supplies in stock, including consignment and vendor-managed inventory. Stocked MRO inventory value includes the value of MRO materials in all storage locations including satellite and/or remote storeroom locations, whether or not that material is included in inventory asset accounts or an allocated portion of

pooled spares. Estimates the value of unofficial stores in the plant, even if they are not under the control of the storeroom or are not on the books. Includes estimated value for stocked material that may be in stock at zero value because of various computerized maintenance management systems (CMMS) and/or accounting idiosyncrasies, etc. Does not include raw material, finished goods, packaging materials and related materials.

The monetary cost of an individual storeroom item is calculated as: Monetary Cost of Individual Storeroom Item = Quantity on Hand × Individual Item Cost

The aggregated cost of all storeroom items is calculated as: $\sum N$ (Quantity on Hand × Individual Item Cost)_i.

Used in 1.4 Stocked Maintenance, Reliability and Operating Materials (MRO) Inventory Value as a Percentage of Replacement Asset Value (RAV), 5.5.32 Vendor Managed Inventory, 5.5.34 Inactive Stock change definition term and definition in this metric

Stocked Maintenance, Repair and Operating Materials (MRO) Inventory Value as a Percent of Replacement Asset Value (RAV) (1.4)

This metric is the value of maintenance, repair and operating materials (MRO) and spare parts stocked onsite to support maintenance, divided by the replacement asset value (RAV) of the assets being maintained at the plant, expressed as a percentage.

Used in 1.4 Stocked MRO Inventory Value as a Percent of Replacement Asset Value (RAV)

Stock Outs (5.5.33)

This metric is the measure of the frequency that a customer goes to the storeroom inventory system and cannot immediately obtain the part needed.

Used in 5.5.33 Stock Outs

Storeroom Clerk

Any employee who has responsibility for the day-to-day activities in the storeroom measured as a full time equivalent (FTE). May also be known by other titles, such as storekeeper, storeroom attendant, etc. Typical duties include, but are not limited to, the following: issuing parts; stocking and labeling parts; organizing inventories; shipping equipment and materials (e.g., vendor returns, repairable spares, etc.); picking, kitting, staging, delivering and related activities; counting inventory (e.g., cycle counting); housekeeping; receiving activities (e.g., opening boxes, checking packing slips, noting discrepancies, etc.); and performing stock equipment and material maintenance activities (e.g., rotating shafts, inspecting belts, etc.).

Used in 5.5.35 Storeroom Transactions, 5.5.36 Storeroom Records

Storeroom Records (5.5.36)

This metric is the ratio of the number of maintenance, repair and operating (MRO) inventory stock records as individual stock keeping units (SKU's) of all MRO stock and non-stock items, including active stock, inactive stock and critical spares, to the total number of storeroom clerks used to manage the inventory.

Used in 5.5.36 Storeroom Records

Storeroom Transactions (5.5.35)

This metric is the ratio of the total number of storeroom transactions to the total number of storeroom clerks used to manage the inventory for a specified time period.

Used in 5.5.35 Storeroom Transactions

Storeroom Transaction (component)

Any materials management activity that results in the physical handling of an inventory item (stock or non-stock) or direct purchased item or that results in the exchange of data with the storeroom inventory management system. Inventory transactions occur any time an item is 'touched' either physically or electronically (e.g., a pick list with ten items picked would equal ten transactions). Inventory transactions include: receiving, stocking, adding, picking, kitting, staging, issuing, delivering, returning, adjusting, counting inventory stock item, EOQ analysis, etc.

Used in 5.5.35 Storeroom Transactions

Stores Inventory Turns (5.5.31)

This metric is a measure of how quickly inventory is flowing through the storeroom inventory system. It can be applied to different categories of inventory, including spares and operating.

Used in 5.5.31 Stores Inventory Turns

Supervisor

A first-line leader who is responsible for work execution by craft workers.

Used in 5.5.1 Craft Worker to Supervisor Ratio

Supervisor to Craft Worker Ratio (5.5.1)

This metric is the ratio maintenance craft workers to supervisors.

Used in 5.5.1 Supervisor to Craft Worker Ratio

Systems

A set of interrelated or interacting elements. In the context of dependability, a system will have the following: (a) a defined purpose expressed in terms of required functions; (b) stated conditions of operation and (c) defined boundaries.

Used in 3.1 Systems Covered by Criticality Analysis, 5.4.10 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Work Order Compliance

Systems Covered by Criticality Analysis (3.1)

This metric is the ratio of the number of systems in a facility for which a criticality analysis has been performed divided by the total number of systems in the facility, expressed as a percentage.

Used in 3.1 Systems Covered by Criticality Analysis

Temperature Monitoring

A monitoring technique that looks for potential failures that cause a rise in the temperature of the equipment itself, as opposed to the material being processed. If related to electrical circuitry, temperature monitoring can protect electronic components from being subjected to high temperatures.

Used in BM Survey

Today's Date

The current work day.

Used in 5.4.6 Work Order Aging

Total Available Time

Annual Basis: 365 days/year x 24 hours/day = 8760 hours per year (Note: The addition of one more day per year must be made for leap year.) Daily Basis: 24 hours

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP), 2.2. Availability, 2.3 Uptime, 2.4 Idle Time, 2.5 Utilization Time, 3.2 Total Downtime, 3.4 Unscheduled Downtime

Total Available Time to Schedule

The total number of craft hours available to schedule. It does not include vacation, illness or injury and other similar time off.

Used in 5.4.3 Schedule Compliance - Hours

Total Downtime (3.2)

This metric is the amount of time an asset is not capable of running. The sum of scheduled downtime and unscheduled downtime.

Used in 3.2 Total Downtime

Total Downtime (component)

The amount of time an asset is not capable of running. The sum of scheduled downtime and unscheduled downtime.

Used in 2.3 Uptime, 3.2 Total Downtime, 3.5.4 Mean Downtime (MDT)

Total Effective Equipment Performance (TEEP) (2.1.2)

This metric is the measure of equipment or asset performance based on actual utilization time, availability, performance efficiency and quality of product or output over all the hours in the period. Total effective equipment performance (TEEP) is expressed as a percentage.

Used in 2.1.2 Total Effective Equipment Performance (TEEP)

Total Internal Maintenance Employee Labor Cost

Includes all internal maintenance labor costs (including benefits), both straight time and overtime, for all direct and indirect maintenance employees. Includes maintenance labor costs for normal operating times, as well as outages/shutdowns/turnarounds. Also includes labor for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Includes the cost for maintenance work performed by operators. Does not include labor used for capital expenditures for plant expansions or improvements or contractor labor cost. Does not include janitorial cost or other similar costs not associated with the maintenance of plant equipment.

Used in 4.2.1 Maintenance Training Cost, 5.5.5 Internal Maintenance Employee Cost

Total Maintenance Cost

The total expenditures for maintenance labor, including maintenance performed by operators such as total productive maintenance (TPM), materials, contractors, services and resources. Includes all maintenance expenses for outages, shutdowns or turnarounds, as well as normal operating times. Also includes capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Does not include capital expenditures for plant expansions or improvements.

Used in 1.3 Maintenance Unit Cost, 1.5 Annual Maintenance Cost as a Percentage of Replacement Asset Value (RAV), 5.1.1 Corrective Maintenance Cost, 5.1.3 Preventive Maintenance Cost, 5.1.5 Condition Based Maintenance Cost, 5.1.9 Maintenance Shutdown Cost, 5.5.4 Indirect Maintenance Personnel Cost, 5.5.5 Internal Maintenance Personnel Cost, 5.5.38 Maintenance Material Cost, 5.5.71 Contractor Cost

Total Maintenance Cost as a Percent of Replacement Asset Value (RAV) (1.5)

This metric is the amount of money spent annually maintaining assets, divided by the replacement asset value (RAV) of the assets being maintained, expressed as a percentage.
Used in 1.5 Total Maintenance Cost as a Percent of Replacement Asset Value (RAV)

Total Maintenance Employee Hours

All internal maintenance labor hours, both straight time and overtime. Internal maintenance personnel are plant employees only, not contractors. Includes hours for normal operating times, as well as outages, shutdowns or turnarounds. Includes hours for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Include the hours for staff overhead support (supervisors, planners, managers, storeroom personnel, etc.). Include the hours for maintenance work done by operators. Does not include hours used for capital expenditures for plant expansions or improvements.

Used in 5.7.1 Continuous Improvement Hours

Total Maintenance Employee Labor Costs

Maintenance employee costs, including all internal maintenance labor cost benefits (both straight time and overtime) for all direct and indirect maintenance employees. Include maintenance labor costs for normal operating times, as well as outages, shutdowns or turnarounds. Include labor for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked and the cost for maintenance work done by operators. Do not include labor used for capital expenditures for plant expansions or improvements, nor do they include contractor labor cost. Total maintenance employee labor costs also do not include janitorial cost or other similar costs not associated with the maintenance of plant equipment. Same as total internal maintenance employee labor cost.

Used in 4.2.1 Maintenance Training Cost

Total Maintenance Labor Cost

Expressed in dollars, including overtime. Total cost includes all maintenance labor hours multiplied by the labor rate, plus any production incentive, but not profit sharing. Includes maintenance labor costs for normal operating times, as well as outages, shutdowns or turnarounds. Includes labor for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Does not include labor used for capital expenditures for plant expansions or improvements. Typically, does not include temporary contractor labor cost.

Used in 5.5.7 Overtime Maintenance Cost

Total Maintenance Labor Hours

Expressed in hours and includes all maintenance labor hours for normal operating times as well as outages, shutdowns and turnarounds. If operator hours spent on maintenance activities are captured, they should be included in the numerator and denominator of all applicable metrics. Include labor hours for capital expenditures directly related to end-of-life machinery replacement so that excessive replacement versus proper maintenance is not masked. Does not include labor hours used for capital expansions or improvements. Typically, total maintenance labor hours do not include temporary contractor labor hours.

Used in 4.1 Rework, 5.1.2 Corrective Maintenance Hours, 5.1.4 Preventive Maintenance Hours, 5.1.6 Condition Based Maintenance Hours, 5.3.1 Planned Work, 5.3.2 Unplanned Work, 5.4.1 Reactive Work, 5.4.2 Proactive Work, 5.4.5 Standing Work Orders, 5.5.8 Overtime Maintenance Hours, 5.5.72 Contractor Hours

Total Maintenance Training Cost

The sum of all costs for formal training that is directed at improving job skills for maintenance employees. Training cost should include all employee labor, travel expenses, materials, registration fees, instructor fees, etc.

Used in 4.2.1 Maintenance Training Costs, 4.2.3 Maintenance Training ROI

Total Number of Inventory Requests

The total of all requests for items listed as stocked in the storeroom inventory system.

Used in 5.5.33 Stock Outs

Total Number of Scheduled Work Orders

The total number of work orders on the weekly schedule.

Used in 5.4.4 Schedule Compliance – Work Orders

Total Reactive Work (Hours)

Maintenance labor hours that were not scheduled and breaks into the weekly schedule. This is usually emergency and unplanned work as a result of unscheduled downtime (SMRP Metric 3.4).

Used in 5.4.1 Reactive Work

Total Time Available to Schedule

The total number of craft hours available to schedule. It does not include vacation, illness or injury and other similar time off.

Used in 5.4.3 Schedule Compliance

Total Units Produced

The number of units produced during a designated time period.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP)

Total Work

See total maintenance labor hours.

Total Work Time

The total time that maintenance craft workers are being paid to accomplish work, commonly referred to as being "on the clock." This includes straight time and overtime, whether scheduled or unscheduled.

Used in 5.6.1 Wrench Time

Training

Instruction provided in a formal setting, and it will typically include classroom and hands-on training with testing to confirm comprehension. Examples of training are safety (LOTO, JSA, etc.), interpersonal skills development (leadership, ESL, supervisory, etc.), math skills, computer skills, use of CMMS, job planning, reliability (FMEA, RCFA, etc.), problem solving, blueprint reading, alignment, balancing, lubrication, welding, all certifications (CMRP, CMRT, vibration, thermography, ultrasound, etc.), pneumatics, hydraulics, fasteners, use of specialized tools, equipment specific training, etc. Attendance at conventions and seminars is also credited as training, as long as the subjects fall within the SMRP Body of Knowledge.

Used in 4.2.1 Maintenance Training Costs

Training Hours

All time spent on formal technical training that is designed to improve job skills. Training provided in a formal setting and typically includes classroom and hands-on training with testing to confirm comprehension. Training can include, but is not limited to, safety, leadership, technical, computer, planning, reliability, problem solving and similar topics. Attendance at conventions, seminars and workshops is credited as training, as long as the subjects fall within the SMRP Body of Knowledge.

Used in 4.2.2 Maintenance Training Hours

Training Time

The time when a maintenance craft worker is receiving formal or informal training. Can be in a classroom or on the job.

Used in 5.6.1 Wrench Time

Unloaded Travel Time

The time when a maintenance craft worker is traveling, regardless of the reason or the mode of transportation (e.g., not carrying materials or tools while walking, riding, etc.)

Used in 5.6.1 Wrench Time

Unplanned Work (5.3.2)

This metric is the amount of unplanned maintenance work (hours) that was completed versus the total maintenance labor hours, expressed as a percentage. Planning adds value for the craft worker through preparation and an understanding of work request prior to the commencement of work. Maintenance planning is a highly skilled function that requires a basic knowledge of the maintenance work process, operations, project management, maintenance management system (MMS) and related systems, as well as a practical understanding of the work to be performed. Planning is the “what’s required” and “how to” part of any maintenance job. A high percentage of unplanned work is an indication of a reactive work environment and a lack of proper planning.

Used in 5.3.2 Unplanned Work

Unplanned Work (component)

Work that has not gone through a formal planning process.

Used in 5.3.2 Unplanned Work, Guideline 5.0

Unplanned Work Executed

Equal to labor hours for work in which all labor, materials, tools, safety considerations and coordination with the asset owner have not been estimated and communicated prior to the commencement of work.

Used in 5.3.2 Unplanned Work

Unscheduled Downtime (3.4)

This metric is the amount of time an asset is not capable of running due to unscheduled repairs (e.g., repairs not on the finalized weekly maintenance schedule).

Used in 3.4 Unscheduled Downtime

Unscheduled Downtime (component)

The time an asset is down for repairs or modifications that are not on the weekly maintenance schedule.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP), 2.2. Availability, 3.2 Total Downtime, 3.4 Unscheduled Downtime, 3.5.4 Mean Downtime (MDT)

Unscheduled Work

Work not on the weekly schedule.

Used in 2.2 Availability

Uptime (2.3)

This metric is the amount of time an asset is actively producing a product or providing a service. It is the actual running time.

Used in 2.3 Uptime

Uptime (component)

The amount of time an asset is actively producing a product or providing a service. It is the actual running time.

Used in 2.1.1 Overall Equipment Effectiveness (OEE), 2.1.2 Total Effective Equipment Performance (TEEP), 2.2 Availability, 2.3 Uptime

Utilization Time (2.5)

This metric measures the percent of total time that an asset is scheduled to operate during a given time period, expressed as a percentage. The time period is generally taken to be the total available time (e.g., one year).

Used in 2.5 Utilization Time

Utilization Time (component)

Time when the asset is scheduled to run divided by total available time, expressed as a percentage.

Used in 2.1.2 Total Effective Equipment Performance (TEEP), 2.5 Utilization Time

Ultrasonic Testing

A technique of locating defects in a material by passing acoustic energy in the ultrasound range through it. Can be used for pinpointing surface, as well as deep defects.

Used in BM Survey

Value of Stock on Hand

The current value of the stock in inventory.

Used in 5.5.31 Stores Inventory Turns

Value of Stock Purchased

The value of the inventory items purchased in the period for which the metric is being calculated.

Used in 5.5.31 Stores Inventory Turns

Vendor Managed Inventory (5.5.32)

This metric is the ratio of the number of stocked items measured as individual stock keeping units (SKUs) that are managed by a vendor or supplier to the total number of stocked items held in inventory.

Used in 5.5.32 Vendor Managed Inventory

Vendor Managed Inventory (component)

Stocked items measured as individual stock keeping units (SKUs) that are managed by a vendor or supplier.

Used in 5.5.32 Vendor Managed Inventory

Vibration Monitoring

A monitoring technique used to determine asset condition and potentially predict failure. Assets are monitored using instrumentation, such as vibration analysis equipment or the human senses.

Used in BM Survey

Waiting Time

The time when a maintenance craft worker is waiting, regardless of the reason.

Used in 5.6.1 Wrench Time

Weekly Schedule

The list of maintenance work to be done in the week. It is usually finalized three to four days before the start of the work week.

Used in 3.2 Total Downtime, 3.3 Scheduled Downtime, 3.4 Unscheduled Downtime, 5.4.1 Reactive Work, 5.4.4 Schedule Compliance – Work Orders

Work Distribution by Priority

The act of scheduling work based on priority. Priority is driven by asset criticality and defect severity.

Used in BM Survey

Work Order Aging (5.4.6)

This metric measures the age of active work orders by using the work order creation date and comparing it to today's date to calculate the work order age, expressed in number of days.

Used in 5.4.6 Work Order Aging

Work Order Completion Date

The date the work order was closed in the maintenance management system. This is considered the technical completion date and includes that all data is captured within the MMS, including work done, hours worked, parts used, etc.

Used in 5.4.7 Work Order Cycle Time

Work Order Creation Date

The date the work order was written and entered into the maintenance management system. This could also be called a work request or notification date, depending on the maintenance management system in use.

Used in 5.4.6 Work Order Aging, 5.4.7 Work Order Cycle Time

Work Order Cycle Time (5.4.7)

This metric is the time from the creation of a work order until it is closed in the maintenance management system (MMS).

Used in 5.4.7 Work Order Cycle Time

Work Orders Necessary

Work where a defect or a potential failure was identified and corrected as a result of preventive maintenance (PM) and predictive (PdM) inspections or tasks.

Used in 5.4.13 Preventive Maintenance (PM) & Predictive Maintenance (PdM) Effectiveness

Work Sampling

The process of making a statistically valid number of observations to determine the percentage of total work time workers spend on each activity.

Used in 5.6.1 Wrench Time

Work Types

Classifications of maintenance work according to the nature of work performed.

Used in Guideline 5.0

Wrench Time (5.6.1)

This metric is a measure of the time a maintenance craft worker spends applying physical effort or troubleshooting in the accomplishment of assigned work. The result is expressed as a percentage of total work time. Wrench time is measured through a process called work sampling.

Used in 5.6.1 Wrench Time

Wrench Time (component)

The time when a maintenance craft worker is applying physical effort or troubleshooting in the accomplishment of assigned work.

Used in 5.6.1 Wrench Time