MAINTENANCE

KEY PERFORMANCE INDICATORS

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e-Book Content

What is KPI's

Performance measurements for achieving key objectives

Key performance indicators (KPIs) are a set of performance measurements that demonstrate how effectively an organization is achieving key objectives. In order to excel at maintaining your company's assets, you need the insight derived from Key Performance Indicators.

CMMS KPI's are used to track performance in several areas over time and indicate when an organization is operating inside or outside of acceptable levels. The enhanced KPI reporting includes analysis of data collected by assets, work orders, labour and material history, and costs.

These useful maintenance KPI's also drive reliability growth and guide maintenance organizations decisions for improving maintenance effectiveness and efficiency.

The enhanced KPI reporting works in conjunction with Eagle's powerful CMMS suite, Proteus CMMS.

With the right CMMS KPI's, an organization can flawlessly manage their assets and know if they are practicing healthy maintenance habits.

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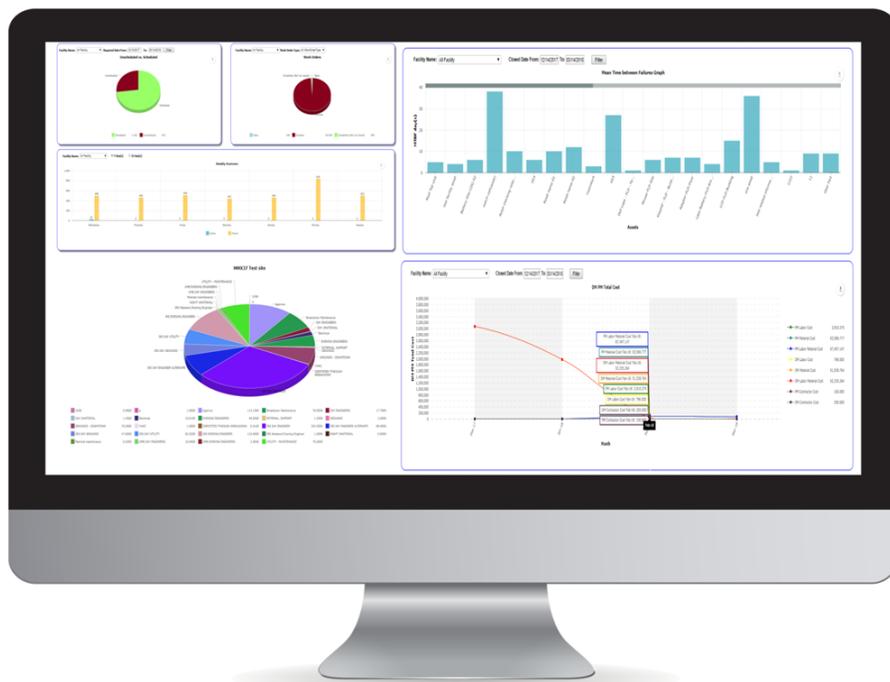
Benefits of KPI's

Drive reliability growth and guide maintenance

Benefits of KPI's

Streamline Processes

- **All-in-one facility management** means less tools are needed, and all of the necessary programs are in one place to manage assets and inspection processes
- **Integrated identification and printing** bring data from the cloud to your PC to save time and reduce errors from manual entry
- **Task alerts and assignments** allow for a more efficient and organized workflow with manual or automated task assignments, due dates and notifications
- **Cloud platform** means you have a central database for all data, allowing multiple employees to access at once

Maximize Productivity

- **User-Friendly interface** with an intuitive dashboard enables quick and easy asset and inspection management
- **Task-specific apps** are optimized to help you get work done quickly, so you can spend less time on paperwork and more time on your facility's maintenance and operations
- **Search capabilities** help you effortlessly find data, including equipment, location, assignment, fields and more
- **Training and support** Eagle provide onboarding, training and on-going customer support to keep your processes running smoothly

Improve Safety & Compliance

- **Exceptions and corrective actions tracking** enables you to improve compliance and stay up to date on NFPA fire safety and OSHA inspections by monitoring and defining the necessary steps to address issues noted

- **Inspection history** gives you easy access to inspection records for auditing and reporting purposes

- **Eagle's industry expertise** brings over 100 years of maintenance and manufacturing experience to your CMMS systems to meet the needs of our customers

- **Stable and secure software experience** means less worry and more trust in your data

What are the main KPI's for maintenance managers?

Different types to indicate how your facility is running

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Here are the different types of KPI's maintenance managers can use to get a clear picture of how their facility is running:
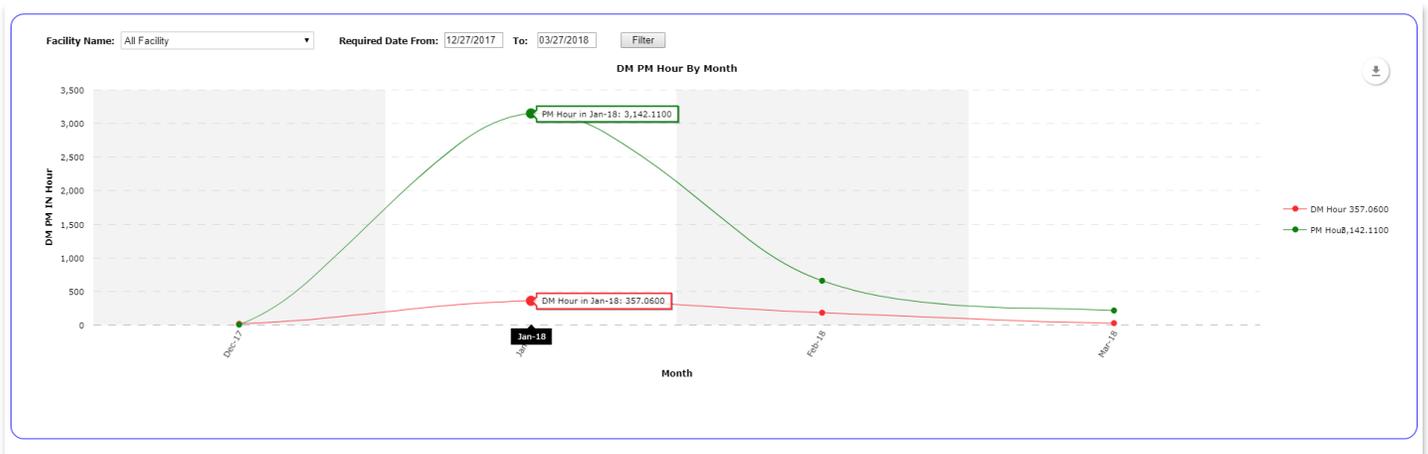
Asset Downtime

The system allows you to identify critical assets that could affect the entire production line.
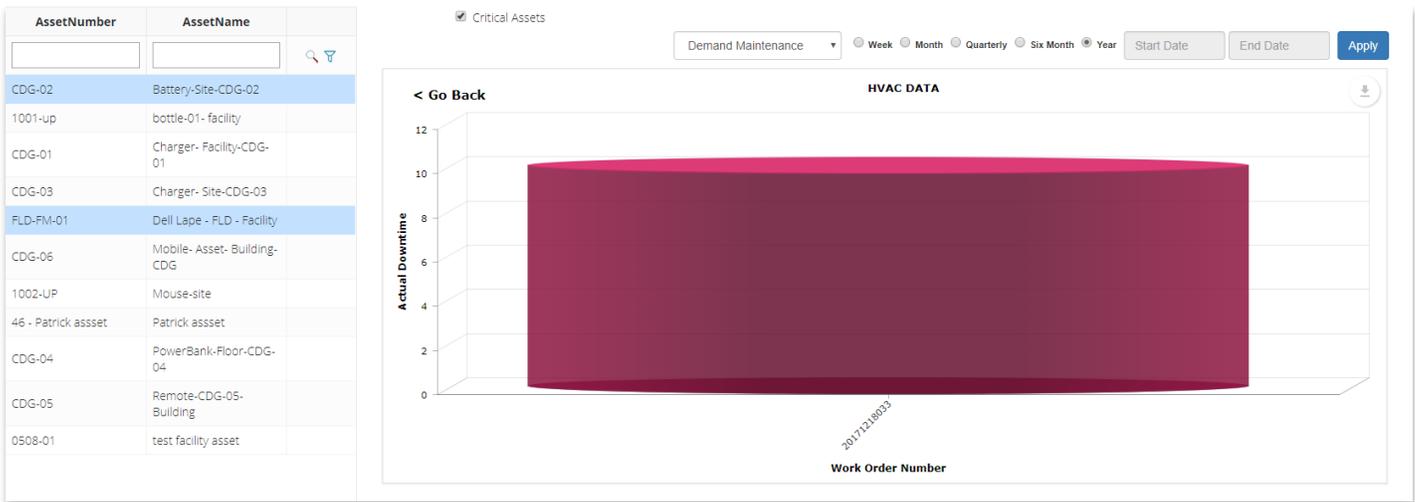

DM PM Hour by Month

Demand and preventive maintenance hours by month. The goal is to turn demand maintenance into preventive maintenance, which is more effective and takes less time.

Mean Time Between Failure (MTBF)

This is the average time that equipment operates between breakdowns or stoppages and helps maintenance managers understand the availability of their equipment. The higher the time between failure, the more reliable the piece of equipment. This is a crucial maintenance metric to measure performance, safety, and equipment design.

How to calculate MTBF: MTBF = Total uptime / # of breakdowns
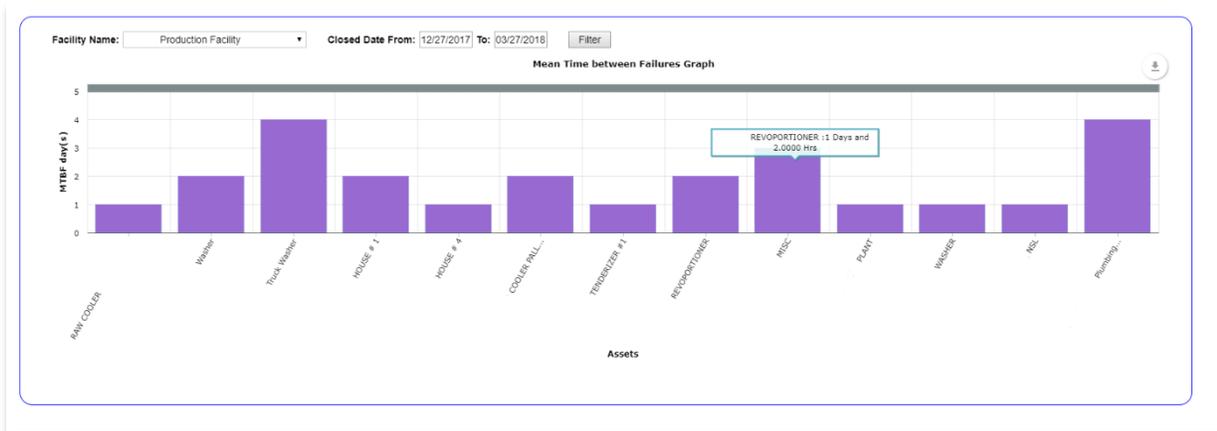

Mean Time To Repair (MTTR)

MTTR is a metric used by maintenance departments to measure the average time needed to determine the cause of and fix failed equipment. It shows how quickly the maintenance team can respond to and repair unplanned breakdowns. It is a good baseline for figuring out how to increase efficiency and limit unplanned downtime, therefore saving money on the bottom line.
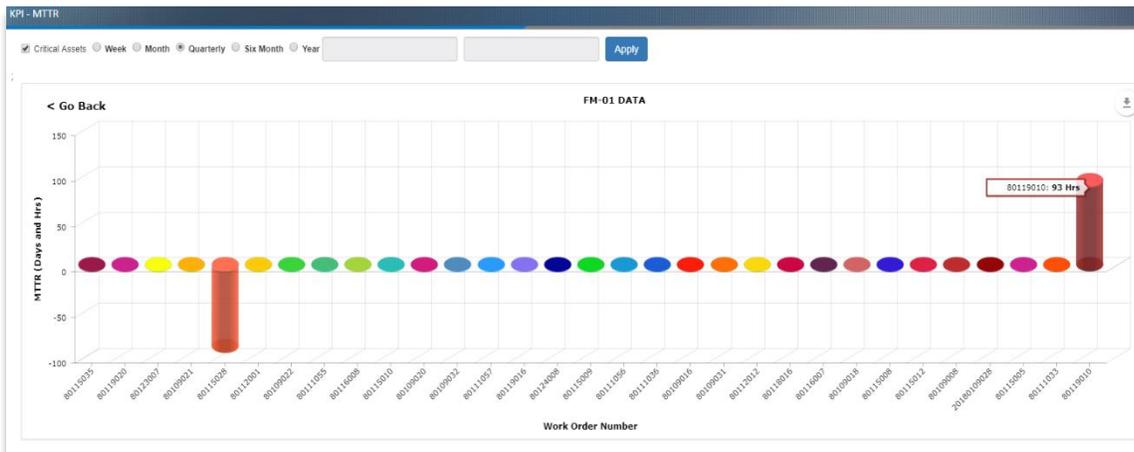
Root Cause Failure

It relates to your industry and business personalized to the organization's needs.
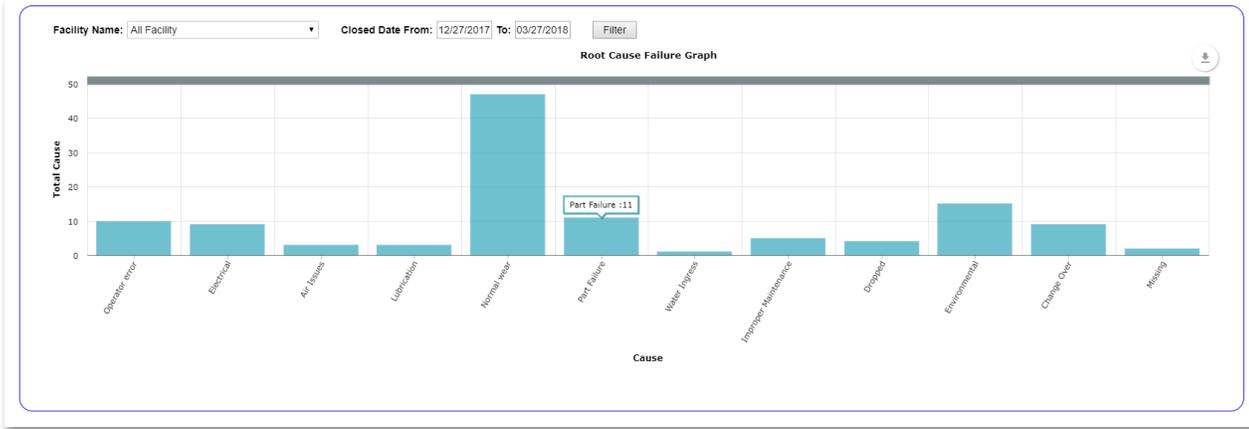
Work Orders

Work order KPI's show maintenance work that is approved. Work requests can be submitted to maintenance by people within a company or one of their many types of customers, which depend on the type of business, industry, and/or facility being managed.

Work Order Costs

All costs are critical, knowing when a piece of equipment is costing you more to repair and to maintain than it would be to buy a new piece of equipment.

Total Hours by Trade

Looking at the percentage of how total hours are spent within our organization helps you manage resources more effectively.
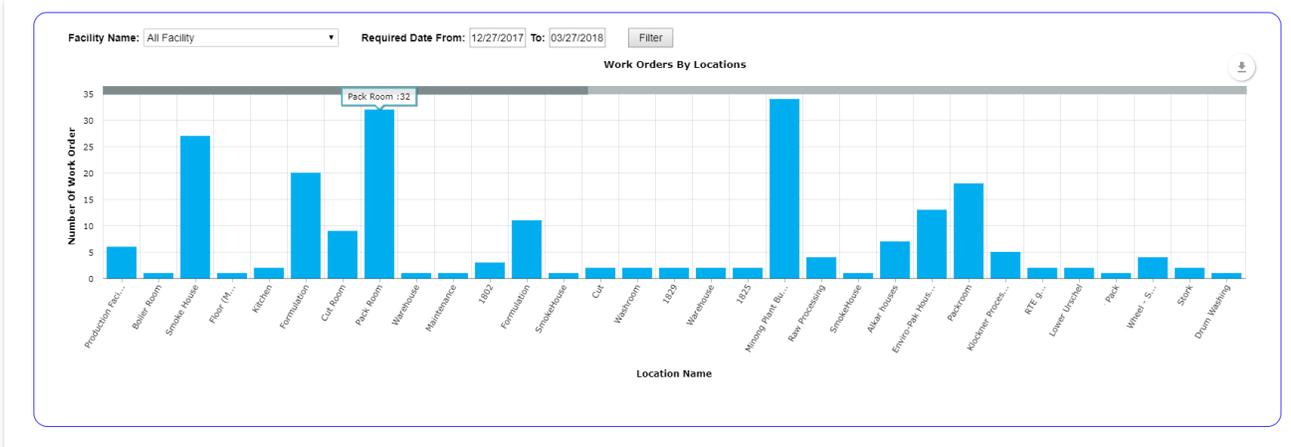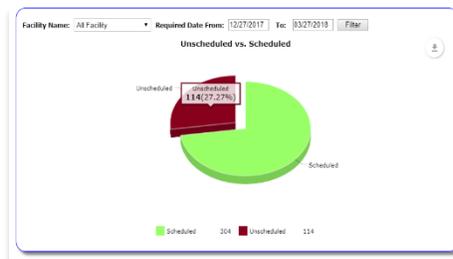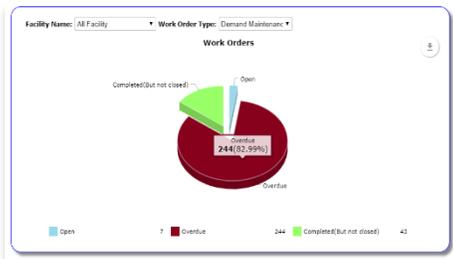
6 Useful KPI's for Maintenance

Get a clear picture of how to keep enterprises running smoothly

Here are 6 of the most critical KPIs that organization can use to get a clear picture of how to keep their enterprise running as smoothly as possible today and years into the future.

1. How Reliable Is Your Equipment? – A Look at Mean Time Between Failure

This is an extremely important measure for asset heavy enterprises. The mean time between failure, or MTBF, refers to the time in between unexpected breakdowns of an asset or production stoppages. The goal of your maintenance efforts is to have the MTBF continue to increase. For a fairly accurate measurement, the mean times are usually assessed annually.

2. Where Are the Root Causes of Failure Within the Life Cycle?

If the MTBF is indicating poor performance, then the next step is to identify which part of the equipment's life cycle is causing the issue – the original quality, the severity of day-to-day operations, the quality of replacement pieces, or the actual maintenance workmanship and routine.

Collecting information on why failures are occurring is an important key performance indicator that can help your business adopt better life cycle practices. Could your operators benefit from increased equipment training? Is the machinery breaking down because it is simply too old? Is your maintenance team ensuring that high quality parts are being used to keep company assets in excellent working condition?

3. How Many Work Orders Are Performed on Time?

While building a performance trend line with lagging indicators like the MTBF is crucial, so too is checking to see if your organization is practicing healthy maintenance habits with leading indicators. Evaluating the percentage of condition inspection work orders that are performed on time is a useful indicator of how likely breakdowns are to occur. This is also a simple and inexpensive KPI to utilize with a robust CMMS product.

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4. How Effective Is Your Maintenance?

To get a clearer picture of the quality of your maintenance work, take a look at the ratio of planned maintenance to how much reactive maintenance is being performed. This Key Performance Indicator (KPI) will give your organization a good idea of where maintenance expenses are going.

Preventative maintenance is almost always less costly than reactive maintenance work. It is also helpful to keep track of how many training and refresher courses are being taken each year per maintainer to get an idea of how much energy is being put into keeping those in charge of maintenance up-to-date and knowledgeable.

5. The Number of End-User Complaints

Your product is as good as your customers perceive it to be. This is why tracking the number of end-user complaints is an essential KPI for maintenance. In order to understand the true quality of your products, collecting and analyzing user feedback is essential. Effective CMMS software will be easily customizable, allowing your organization to track the important end user feedback that will help you to be proactive about making positive changes when necessary.

6. Cost of Maintenance per Asset

How much are you spending on maintenance per asset? How do the actual maintenance costs compare to the budgeted costs? Keep track of these numbers to find out where all the resources are being used to maintain your equipment – and to determine if this is money well spent or not.

Using KPI's to track asset criticality

Rank asset criticality and create a maintenance strategy

Smart facility managers know that all assets are not created equal. But determining which assets are critical to the workflow and operation of your company can be a challenge. Using key performance indicators (KPI's) will help you rank asset criticality and create a maintenance strategy that will optimize asset performance and reduce costs and risks.

Key Performance Indicators (KPI's) for Maintenance Management

Having a well-developed maintenance process forms the foundation for all maintenance functions within the organization. Here are some examples of leading key performance indicators:

- Business goals and objectives
- Identification of maintenance work processes
- Work planning and scheduling
- Execution of maintenance activities
- Maintenance follow-up and analysis

The actual results of your maintenance activities are known as lagging key performance indicators. Lagging KPI's vary depending on your industry and facility-type, but typically fall under these general categories:

- Asset performance
- Reliability and efficiency ratings
- Repair and failure rates
- Life cycle costs
- Mean time between failure (MTBF) rates

- Safety issues and risks
- Regulatory compliance
- Human safety and well-being
- Environmental issues and risks
- Business objectives, including ROI

Using KPI's to Determine Asset Criticality

Regardless of the maintenance strategy you currently employ, knowing which assets are critical to your operation and why can optimize operational ROI and reduce costs and risks. Ranking asset criticality depends on your individual facility's operation and objectives.

Darrin Wikoff, author of an article in ReliablePlant.com, recommends setting up a criticality analysis model:

Step One: Using these business attributes, assign each characteristic a rating from zero to 10, with the total not to exceed 100 for each asset.

- Mission and customer impact
- Safety and environmental impact
- Single-point-failures
- Preventive Maintenance (PM) history
- Corrective Maintenance (CM) history
- MTBF (Mean time between failures) rate
- Failure probability
- Spare parts lead time
- Asset replacement value
- Planned utilization rate

Step Two: Once you have identified the top 15%-20% of your critical assets from Step One, determine the primary characteristic that makes each asset critical. The asset data from your computerized maintenance management system (CMMS) provides asset life cycle costs, repair history, failure modes, and more—depending on the type of system you have—and should give you the data you need.

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Step Three: By analyzing the asset data from the CMMS, especially the single-point failure rating, you can adjust your maintenance approach to these important assets, lowering their criticality ranking, and reducing your overall risks.

Every facility manager has their "worse asset nightmare"… asset failure that has serious or even catastrophic consequences. By using key performance indicators to identify and rank critical assets, you can create an effective asset plan. A proactive management strategy, such as a Reliability-Centered Maintenance (RCM) approach, offers the best opportunity to align your maintenance management with organizational goals and objectives. You can prevent and even predict failure modes and optimize asset function and integrity.

Use the CMMS Key Performance Indicators to Manage Asset Criticality

A CMMS can help you track, measure, and prioritize your maintenance management activities:

- Scheduling preventive maintenance (PM) tasks can ensure that assets are managed for optimal performance, including re-assigning and re-scheduling critical asset activities.
- Failure modes and MTBF rates allow you to plan for timely asset replacements before they fail or ensure that adequate inventory is on hand to minimize downtime.
- Tracking spare parts inventory through your CMMS can prevent repair backlogs or costly delays in production.
- Failure analysis, asset reports, and life-cycle costing data are important tools for adopting maintenance "best practices" and a continuous improvement methodology.

Setting up and using key performance indicators lets you plan, track, and measure asset activity and performance. With an accurate picture of what assets are critical to your organization, you can make sound asset management decisions for both short-term and long-term goals and objectives. Adopting a "plan, improve, control" approach is the best way to ensure optimal asset reliability at optimal cost.

Beyond the Big 3 CMMS KPI's

Keep your enterprise running as smoothly as possible

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The first step on the road to Predictability is to calculate the key performance indicators (KPIs) that will help you achieve your goals. KPI's are used to track performance in several areas over time and indicate when an organization is operating inside or outside of acceptable levels. Here are the top KPIs that your organization should be using to get a clear picture of how to keep your enterprise running as smoothly as possible today and years into the future:

1. Mean Time Between Failure (MTBF)

Mean Time Between Failure (MTBF) is an extremely important measure for asset-heavy enterprises. MTBF refers to the time in between unexpected breakdowns of an asset or production stoppages. The goal of your maintenance efforts is to have the MTBF continue to increase. For the most accurate measurement, mean times are usually assessed annually.

MBTF = Σ (Start of Downtime − Start of mean Time Between Fail (MTBF)

2. Mean Time to Repair (MTTR)

Mean Time to Repair (MTTR) is the average time required to troubleshoot and repair failed equipment and return it to normal operating conditions. It is a basic technical measure of the maintainability of equipment and repairable parts. Maintenance time is defined as the time between the start of the incident and the moment the system is returned to production (i.e. how long the equipment is out of production). This includes notification time, diagnostic time, fix time, wait time or cool down time, reassembly, alignment, calibration, test time, back to production and so on. It's also important to remember that MTTR generally does not consider lead-time for parts.

MTTR = Total Maintenance Time / # Maintenance Repairs

3. Overall Equipment Effectiveness (OEE)

Overall Equipment Effectiveness (OEE) is made up of three components: Availability (the system is functioning when it is needed), Performance (throughput divided by its maximum throughput), and Quality (# of good units divided by total units produced). OEE can be used to monitor the efficiency of your manufacturing processes and to help identify areas of improvement.

OEE = Availability x Performance x Quality

4. How Effective Is Your Maintenance?

To get a clearer picture of the quality of your maintenance work, look at the ratio of planned maintenance to how much reactive maintenance is being performed. This KPI will give your organization a good idea of where maintenance expenses are going.

Preventative maintenance is almost always less costly than reactive maintenance work. Your Preventative Maintenance Compliance (PMC) score is the percentage of scheduled PM work orders that get done in a defined time interval. PMC formula is:

PMC % = # Completed Work Orders/# Work Orders Scheduled

5. How Many Work Orders Are Performed on Time?

Evaluating the percentage of condition inspection work orders that are performed on time is a useful indicator of how likely breakdowns are to occur.

6. Where Are the Root Causes of Failure Within the Life Cycle?

If the MTBF is indicating poor performance, then the next step is to identify which part of the equipment's life cycle is causing the issue – the original quality, the severity of day-to-day operations, the quality of replacement pieces, or the actual maintenance workmanship and routine. Collecting information on why failures are occurring is an important key performance indicator that can help your business adopt better life cycle practices. Could your operators benefit from increased equipment training? Is the machinery breaking down because it is simply too old?

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8. Cost of Maintenance per Asset

How much are you spending on maintenance per asset? How do the actual maintenance costs compare to the budgeted costs? Keep track of these numbers to find out where all the resources are being used to maintain your equipment – and to determine if this is money well spent or not. With the right CMMS KPI's, your organization can flawlessly manage your assets.

Year End Reporting

CMMS Data for Year-End Reporting and Strategic Planning

With end of the year reporting and budgeting just around the corner, now's the time to ensure that your CMMS/EAM system is giving you and your organization the critical data you need to make sound maintenance management decisions for 2021 and beyond.

CMMS Asset Data

The lifeblood of maintenance is work order management. A robust, flexible CMMS/EAM solution should allow you to efficiently and effectively track, monitor, and measure demand maintenance (DM) and preventive maintenance (PM) work orders using methodology that relates to your specific plant or facility industry and needs. You can't manage what you don't measure.

CMMS Key Performance Indicators (KPI's)

All data is not created equal. Your CMMS should track the key performance indicators (KPI's) that have significant relevance to your organization's maintenance needs—but it's up to you to determine what those indicators are. Examples include equipment performance, productive and unproductive asset utilization, including idle time, preventative maintenance and demand maintenance downtime, breakdowns, and labor costs, as well as less obvious factors like occupant comfort, risk management issues, and energy conservation initiatives.

CMMS Reporting Functionality

Reports turn data into information. The right CMMS solution collects and sorts the data you think is important, and then gathers that data into relevant and easy-to-understand reports on asset costs, maintenance trends, and resource allocation—whatever you use as decision-making tools. Make sure the CMMS you use has the reporting functionality you need for day-to-day decisions and long-range planning.

CMMS Data Integration for Year-End Planning

Given the global economic outlook and increasingly competitive marketplace, strategic asset management is a critical business tool that no plant or facility can afford to ignore. Asset and maintenance information should be an integral part of your organization's financial, operational, and strategic objectives including:

- Capital expenditures and budgeting
- Energy use management
- Labor resource allocation
- Risk management
- Sustainability initiatives
- Continuous improvement and benchmarking

Maintenance Management made easy with Proteus CMMS

Discover how you can use Proteus MMX to schedule preventive maintenance, manage inventory, capture maintenance data and so much more.

[FREE DEMO]

www.eaglcmms.com
sales@eaglecmms.com
1-262-241-3845