The Ultimate Guide to Maintenance Metrics

Measure what matters to elevate the unsung heroes on your maintenance team

Limble

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Effective maintenance programs depend on data-driven decision making.

Tracking and reporting on the right metrics helps teams better understand how their people and assets are performing and how they stack up to industry standards.

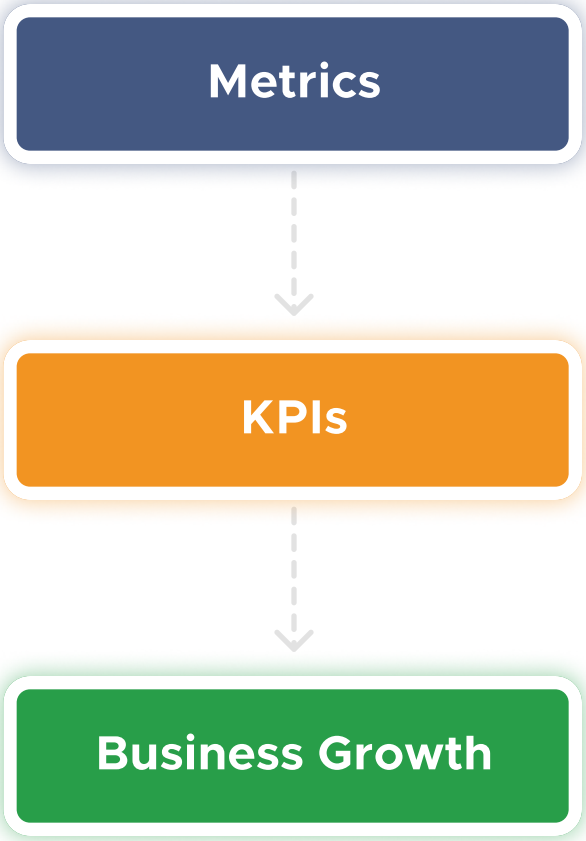
In this guide, we'll take a look at some of the most important maintenance metrics to help you set the stage for more strategic operations.

01 Metrics vs. KPIs

Before we dive into the most important data points for maintenance, let's define some terms.

You may have heard the words metrics and key performance indicators (KPIs) used interchangeably. Maybe you've switched between them during internal discussions without a second thought. While the two terms go together, they aren't quite the same thing.

KPIs are the numbers your organization sets as targets. To put it simply, your metrics help inform your KPIs and ultimately define the steps you'll take to achieve your business goals. If, for example, your goal is to maximize revenue, your most relevant KPI may be downtime. Reducing downtime will involve improving upon metrics including Mean Time to Repair (MTTR).



02 Common maintenance metrics by category

02.1 Team performance and operational metrics

These metrics can help you get a sense of how well your team is performing.

Maintenance Backlog: How many tasks are waiting to be scheduled and completed?

Your maintenance backlog contains all the approved tasks you haven't yet scheduled for completion. If the number is too large, you may have more work on your hands than your team can handle.

$$\text{Backlog Hours} = \frac{\text{Total Backlog Work Hours}}{\text{Total Available Work Hours}} \times 100$$

Planned Maintenance Percentage (PMP): How many of your total maintenance tasks are planned?

Planning maintenance tasks ahead of time saves you money and headaches. Once you've introduced a program for preventive maintenance, tracking PMP can help you assess its effectiveness.

$$\text{PMP} = \frac{\text{\# of Planned Maintenance Hours}}{\text{\# of Total Maintenance Hours}} \times 100$$

Preventive Maintenance Compliance (PMC): How closely do team members follow schedules for preventive maintenance tasks?

Transitioning from reactive to preventive maintenance pays off, but making the switch takes time and effort. PMC helps gauge your team's success in sticking to schedules for preventive maintenance tasks.

$$\text{PMC} = \frac{\text{\# of Completed PMs}}{\text{\# of Scheduled PMs}} \times 100$$

02.2 Asset and System Performance Metrics

These metrics tell you how well your individual assets and full production systems are performing.

Mean Time To Failure (MTTF): How long do non-repairable assets run before failing?

Tracking MTTF for non-repairable assets helps you predict their lifecycle to more effectively plan and schedule replacements.

$$\text{MTTF} = \frac{\text{Total Hours of Operation}}{\text{Total \# of Units}}$$

$$\text{MTBF} = \frac{\text{Total Operational Time}}{\text{Total \# of Failures}}$$

Mean Time Between Failures: How long do repairable assets run before requiring maintenance?

This metric also helps predict asset lifecycles and gauge the effectiveness of maintenance processes.

02 Common maintenance metrics by category

Total Effective Equipment Performance (TEEP): How effectively does your equipment run compared to the total potential operational time?

When you calculate TEEP, you'll use the broadest possible definition of availability. The metric tells you how efficiently your systems perform as compared to all-day, every-day performance.

$$\text{TEEP} = \underbrace{\frac{\text{Runtime}}{\text{Total Hours in a Year}}}_{\text{Availability}} \times \underbrace{\frac{\text{Cycle Time}}{\text{Runtime}}}_{\text{Performance}} \times \underbrace{\frac{\text{Good Quality Part Count}}{\text{Total Count}}}_{\text{Quality}}$$

Overall Operations Effectiveness (OOE): How effectively does your equipment run compared to your plant's total operational time?

OOE assesses an asset or system's performance compared to all the available time. If your plant is operational, include that time in your OOE calculations.

$$\text{OOE} = \underbrace{\frac{\text{Runtime}}{\text{Total Available Production Time}}}_{\text{Availability}} \times \underbrace{\frac{\text{Cycle Time}}{\text{Runtime}}}_{\text{Performance}} \times \underbrace{\frac{\text{Good Quality Part Count}}{\text{Total Count}}}_{\text{Quality}}$$

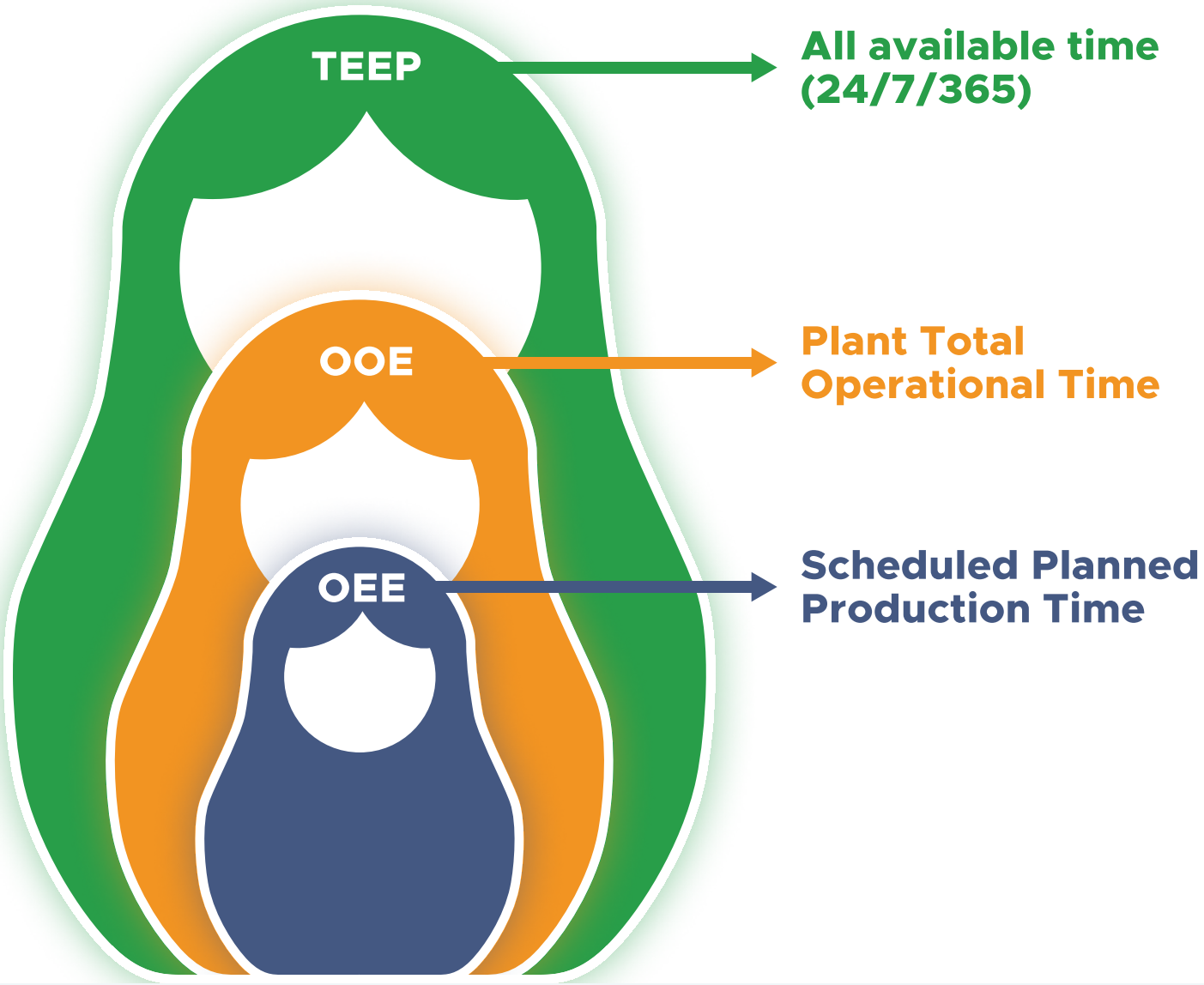
Overall Equipment Effectiveness (OEE): How effectively does your equipment run compared to its scheduled and planned production time?

Taking availability, performance, and the quality of output into account, this metric offers a detailed look at how effectively assets and systems perform.

$$\text{OEE} = \underbrace{\frac{\text{Runtime}}{\text{Planned Production Time}}}_{\text{Availability}} \times \underbrace{\frac{\text{Cycle TIme}}{\text{Runtime}}}_{\text{Performance}} \times \underbrace{\frac{\text{Good Quality Part Count}}{\text{Total Count}}}_{\text{Quality}}$$

While you can calculate OEE for an individual asset, it's more often used by managers to better understand the performance of entire production processes. When OEE is low, ineffective maintenance could be to blame.

TEEP vs. OOE vs. OEE



02.3 Downtime Metrics

Maintenance teams play a crucial role in keeping business assets up and running. Time is money and the costs of excessive downtime add up quickly. These metrics paint a picture of asset performance and your team's effectiveness at maintaining equipment.

Downtime Percentage: How much of your total available time is productive?

Taking a look at both planned and unplanned stoppages, this calculation offers a high-level look at productivity.

$$\text{Downtime Percentage} = \frac{\text{Total Downtime}}{\text{Planned Production Time}} \times 100$$

Mean Time To Repair (MTTR): How long does it take your team to get assets back up and running?

A useful way to measure maintainability, MTTR tells you how much time your team spends detecting and correcting failures for a given asset over a given period of time.

$$\text{MTTR} = \frac{\text{Total Maintenance Time}}{\text{Total \# of Repairs}}$$

Availability: How often does an asset perform as expected?

Understanding your assets' availability helps you reduce downtime and ensure on-time performance.

$$\text{Availability} = \frac{\text{Uptime}}{\text{Uptime + Downtime}}$$

Idle Time: How much time does available equipment spend out of production?

Idle time refers to a specific kind of downtime, the minutes and hours available equipment spends waiting to be used as part of a production process.

$$\text{Idle Time} = \frac{\text{Scheduled}}{\text{Production Time}} - \frac{\text{Actual}}{\text{Production Time}}$$

02.4 Inventory Metrics

When they've got the right parts at the right time, maintenance teams work more safely and efficiently.

Inventory Turnover: How quickly does inventory make its way through your storeroom?

This calculation gives you a sense of how efficiently you use the tools and components that make up your inventory.

$$\text{Inventory Turnover} = \frac{\text{Value of Good Purchased}}{\text{Value of Goods on Hand}}$$

Obsolete parts percentage: How many parts, components, or pieces of equipment are just taking up space?

Also known as *slow-moving parts percentage*, this formula helps you improve inventory management and get rid of parts that can no longer be used. Typically, these parts are the ones you spend more storing than you would if you ordered each replacement on an as-needed basis.

$$\text{Obsolete Parts Percentage} = \frac{(\text{\# of Obsolete Spare Parts} \times 100)}{\text{\# of Spare Parts}}$$

Stock-outs: How often are parts unavailable when you need them?

Measuring stock-outs can help you better understand and improve reliability. It refers to the likelihood that your team won't have immediate access to a necessary part.

$$\text{Stock-outs} = \frac{\text{Total \# of Stock-outs}}{\text{Total \# of Inventory Requests}} \times 100$$

02.5 Cost Metrics

Calculations related to maintenance spending and the value of business assets can help promote smarter purchasing, simplify repair vs. rebuild discussions, and contribute to a culture of continuous improvement.

Annual Maintenance Cost =

Labor Spend
+
Parts and Materials Spend
+
Other Expenses

Annual maintenance costs: How much does managing a maintenance program cost your organization each year?

Determining your annual maintenance spending is a crucial first step for assessing the cost effectiveness of your program and identifying opportunities to improve resource allocation.

Excessive downtime could leave you spending more on overtime, or outdated equipment could be contributing to costly repairs throughout the year.

Maintenance Cost as a Percentage of Replacement Asset Value (MC/RAV):
How does your spending on assets compare to their total value?

Calculating MC/RAV is a great way to measure the performance of individual assets or your maintenance team as a whole. The formula compares your total maintenance expenditure against the cost of replacing assets.

$$\text{MC/RAV} = \frac{\text{Annual Maintenance Costs}}{\text{Asset Replacement Value}} \times 100$$

03 Which metrics matter to your maintenance team?

Collecting performance data alone won't do you any good. **Metrics are only valuable when they inspire action**, empowering your maintenance team to make positive changes. When selecting metrics to track and report on, make sure to ask yourself these questions:

1. **What are your organization's goals?**
2. **How will you assess performance against these goals?**
3. **Who will help you achieve these goals and how?**
4. **How will specific metrics help you deliver on your performance KPIs?**

Consult all relevant stakeholders and ensure your processes for measuring performance, delivering reports, and iterating on opportunities evolve with time.

How do maintenance metrics make a difference?

1. **Drive down costs:** Close attention to the right maintenance metrics can help you identify areas where you're spending more than you should or persistent process inefficiencies. Tracking these to their root cause and addressing them will help you avoid excess costs and make the most of each asset.
2. **Reduce downtime:** Calculating and examining certain metrics can help you determine the sources of excess downtime and take corrective actions to eliminate them.
3. **Create a safer, more efficient work environment:** Insights into the health and performance of key assets helps ensure operators and technicians are aware of any potential safety risks and prepared to take risk-averse actions.
4. **Make the case for maintenance's game-changing value:** In many organizations, maintenance is known as an unsung hero. Taking the time to showcase impressive performance data can aid you in advocating for more investments to make maintenance all it can be.

Limble

Empower the unsung heroes

Manually calculating maintenance metrics is tedious, time consuming, and prone to human error. **Limble automates reporting** so you can dive into data with the click of a button and its platform offers **all the tools you need** for managing a world-class program.

In 2023, we empowered customers to:

Save **$351M** on downtime costs

Reduced parts spend by **$55M**

Cut back **$798M** on labor costs

Sick of doing calculations and creating reports by hand?

>> Schedule a demo today to learn more about Limble's top-rated platform.

Maintenance Metrics Cheat Sheet

Team Performance and Operational Metrics

$$\text{Backlog Hours} = \frac{\text{Total Backlog Work Hours}}{\text{Total Available Work Hours}} \times 100$$

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Asset and System Performance Metrics

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Downtime Metrics

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$$\text{MTTR} = \frac{\text{Total Maintenance Time}}{\text{Total \# of Repairs}}$$

$$\text{Availability} = \frac{\text{Uptime}}{\text{Uptime + Downtime}}$$

$$\text{Idle Time} = \frac{\text{Scheduled}}{\text{Production Time}} - \frac{\text{Actual}}{\text{Production Time}}$$

Inventory Metrics

$$\text{Inventory Turnover} = \frac{\text{Value of Good Purchased}}{\text{Value of Goods on Hand}}$$

$$\text{Obsolete Parts Percentage} = \frac{(\text{\# of Obsolete Spare Parts} \times 100)}{\text{\# of Spare Parts}}$$

$$\text{Stock-outs} = \frac{\text{Total \# of Stock-outs}}{\text{Total \# of Inventory Requests}} \times 100$$

Cost Metrics

$$\text{Annual Maintenance Cost} = \text{Labor Spend} + \text{Parts and Materials Spend} + \text{Other Expenses}$$

$$\text{MC/RAV} = \frac{\text{Annual Maintenance Costs}}{\text{Asset Replacement Value}} \times 100$$