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Tracking and Improving Performance in Maintenance and Asset Management:

Using KPIs in Public Transport



# Why KPIs are essential for Transport Authorities and Operators

Key Performance Indicators (KPIs) are a proven method for gauging how people and organisations are doing. They set benchmarks and goals for improvement. They allow organisations to uncover inefficiencies and resolve them.

As the sayings go 'Measure what matters' and 'What gets measured, gets managed,' KPIs give everyone a clear and straightforward way to gauge a company's success. The transport industry is no different, except many of the most critical KPIs are not just for operational effectiveness but also safety.

Not following KPIs like maintaining a State of Good Repair can lead to regulatory challenges, loss of funding, or unforeseen capital expenditures in the transport industry. By tracking and following KPIs, your transport organisation can proactively address maintenance issues, improve processes, create a more efficient workplace, and discover new cost savings.

Gathering data, following metrics, and tracking against industrystandard KPIs is part of building a strong asset management culture. When deployed thoughtfully, KPIs give your staff clarity and ownership about how their daily efforts contribute to your organisation's success. By fostering an environment of continuous improvement through KPIs (measure, monitor, and improve), your department can operate more efficiently. This results in your organisation evolving into a better version of itself: making sure drivers have more reliable vehicles to safely carry passengers, ensuring the organisation is fiscally responsible, and keeping your assets in a State of Good Repair.

#### What you will learn in this Whitepaper:

- ✓ Why setting KPIs is important
- How KPIs will help your organisation
- Vhat KPIs and metrics you should use
- How to monitor and report on KPIs
- How to use KPIs to improve safety and efficiency at your transport organisation

While an organisation could integrate separate systems to capture and present data for KPIs, the Trapeze Enterprise Asset Management (EAM) system includes the data and tools you need - all in one solution. EAM can do this for two main reasons. First, Trapeze EAM's Viewpoint module offers powerful, at-a-glance dashboards to view and monitor KPIs that are critical to your asset and maintenance management programs. Second, EAM is the system of record for all key data:

- Assets and components (usage, condition, defects, warranty, etc.)
- Work orders (preventative, corrective)
- Parts inventory (usage, failures)

This whitepaper outlines the five steps you can take to set, manage, and understand asset KPIs across your organisation. While several examples are from the vehicle side of the organisation, the same principles are applicable across all asset types and departments (e.g., fleet, facilities, and tracks).

## Step 1: Setting the Stage for Success

The first step in implementing KPIs is clarifying where you are, what you want to achieve, and what success looks like. Before you start looking at which specific KPIs to measure or how you will source the data, you need to look at the bigger picture, including your organisation goals and your current challenges.



In the transport industry, there are some KPIs government regulators want to see and track but adopting KPIs for KPIs' sake will not help you be successful. There needs to be a bigger purpose everyone can align with. One common driver for many authorities to initiate KPIs is the development of an Asset Management Plan, as required by regulatory bodies.

As part of their program, transport organisations have developed KPIs to monitor both the condition of assets, as well as how much life they have remaining (useful life benchmark).

But these KPIs are only one example of many that you should consider. Other common KPIs include planned versus unplanned maintenance, repair times, inventory/stock levels, and breakdowns.



# To decide which KPIs you should be using, ask yourself:

- Why are we doing this?
- What do we hope to learn/accomplish?
- What does success look like?
- Which groups and workflows are we going to start with?
- Does it align with our organisational mission and vision?

Once you are tracking your KPIs and identifying trends, what are you hoping to learn? Are you trying to find out how to make your supervisors or technicians work more efficiently? Are you trying to encourage your inventory managers to always have the right parts on the shelf when maintenance needs them? If you picture your department a year from now, what improvements do you want to see?

One of the most essential parts of using KPIs to improve operational efficiency is: when you are not achieving a KPI target, you investigate why you missed the KPI. Was it a one-off event (maybe there were several mechanics sick that week) or a bigger pattern?

Tracking, measuring, and reporting on KPIs is easy, doing something positive with them is the hard part.

## D Click to Read the Blog

### Related blog post: How to Take Control of Your Rail Asset Data for Better Maintenance Outcomes

Transport organisations are responsible for more than just the assets that move. You have buildings, heating, ventilation, air conditioning, plumbing, electrical, shelters, infrastructure, and more to manage and maintain. All the things that make up a transport organisation need regular inspections and to be maintained in a State of Good Repair. All have defects and work orders that need to be tracked and recorded. They are all assets. And all of these assets can be managed in the Trapeze EAM system.

#### **Communication is Essential to Success**

As you form your KPI plan, make sure to gain feedback and buy-in from key stakeholders including:



To ensure a smooth project, your most frequent communications should be with staff whose actions have a direct impact on your KPIs (maintenance and materials, etc.). At the same time, your broader strategy must also include outreach to stakeholders and leaders in supporting departments.

For example, you might need IT help to ensure your EAM system is up to date and can track the data you need to calculate your KPIs. If you need specialised reports generated, you might also need IT to help have those reports created for you.

Working with stakeholders is about describing why you are doing this and what successful outcomes you hope to achieve. Many maintenance staff at transport organisations are union members, so you need to ensure the union and representatives are aware of the plan and how it affects their members. It is essential that everyone, especially union leadership, understand that KPI tracking is about making positive changes (focusing staff on priorities), not about punishing people. This is especially important if KPIs are used as part of employee performance reviews.

#### This is Not a Short-term Project

It will take time to implement KPIs. You need months to gain a sense of how things are going, and typically a year's worth of data should be captured to fully implement KPIs across a maintenance department.

The bottom line: this is not a small project you can start and finish in a few months. Using KPIs to improve effectiveness and efficiency at your organisation is a long-term project that needs dedicated time and attention.

## **Step 2: Finding Industry-standard KPIs**

You do not have to produce KPIs from scratch. There are several national and international groups with standardised metrics and KPIs.

Keep in mind, you might not be able to use all the metrics or KPIs you find, or you might need to adjust them to match your situation.

#### What makes a good KPI?

Good KPIs give you direction. They need to be simple and understandable. When anyone looks at a KPI, they should know what it means, what it tracks, and why it's important.

Example: Mean time to repair is a common industry KPI. It tracks how quickly you can get vehicles back on the road.

If the goal is four hours, and over the past month you've been averaging 24 hours, you know something is slowing things down. Why? What is keeping vehicles from being back on the road?

## 崖 Metrics vs. KPIs

People often confuse metrics and KPIs. They seem very similarnumbers you gather and report on that mean something to a company—but they each have different purposes and uses. The most confusing thing is, all KPIs are metrics, but not all metrics are KPIs. You use metrics to calculate a KPI and that KPI becomes a metric itself. So, what is the difference?

KPIs track operational improvement like repairing assets faster or having fewer unplanned repairs. KPIs are used as a barometer to gauge how your department or organisation is doing. KPIs are an indicator of how things are and can indicate there could be a problem in a certain area. But a KPI is not an answer, it is just a way to track how things are going.

#### Common KPIs for the Transport Industry

You can find standard KPIs, repair times, and other metrics for the transport industry from:

- National Institute for Transportation and Communities (NITC)
- Transportation Research and Education Center (TREC)
- National Transit Institute
- Technology and Maintenance Council
- Transit Cooperative Research Program (TRCP)
- <u>ISO (International Organization for Standardization)</u>
  <u>55000 program</u>

Industry-standard KPIs are a starting point. You might find you need your own KPIs to track a part of your operation or some KPIs are not relevant. You might also find things like mean time to repair is longer (or shorter) for you. Remember, KPIs are not measuring 'good' or 'bad', they are indicators of what is going on.

#### What is ISO 55000?

ISO 55000 is a program from the International Organization for Standardization (ISO) for companies that would like to improve their asset management processes and procedures. ISO certifications are often required in many regulated industries but are somewhat new to the transport industry. ISO 55000 is gaining interest around the world because it sets out frameworks, best practices, metrics, and KPIs for effective asset management. Gaining ISO certification is typically an in-depth and time-consuming project that could take several years to complete. While most organisations do not have the resources to pursue full certification, just being familiar with the ISO 55000 standards can bring your organisation tremendous benefits.

Click to Read the Whitepaper Find out more at our whitepaper: ISO 55000 and Beyond: Next-Level Asset Management





## **Common KPIs for Transport Organisations**

Business Area	КРІ	Why it is important	Industry benchmark	Metrics/Data needed	
Assets	Distance between breakdowns	Measures vehicle reliability. Reduces service interruptions and delays for passengers	> 8,000-10,000 kilometres for a bus (this is subjective to each organisation and line of business)	Employee Task Labour vs. Standard	
	Scheduled vs. Unscheduled Maintenance	A robust preventative maintenance program prevents in-service failures and delays (unplanned asset downtime)	80% (scheduled) vs. 20% (unscheduled)	Average Metre Between Defects Overview	
Workforce	Technician Productivity (% of time spent working directly on an asset compared to 'indirect' time on other tasks: shop cleanup, meetings, etc.)	Productivity is the amount of work generated.	85% is Superstar 60% is average	Proactive vs. Reactive report	
	Mean time to repair – Standard repair times (SRT)	Measures technician efficiency (the time it takes to complete) compared to a standard industry benchmark. Fundamental tool used to increase productivity.	SRT's vary for each type of equipment and task performed (e.g., 6 hours for a brake overhaul on a train)	Repair Efficiency Report and Shop Downtime Details Direct vs. Indirect Labour	
Inventory	Inventory Turn Ratio	Measures having enough inventory on hand while not having to reorder too frequently	When looking at faster moving materials, or when excluding critical spares, a value of around 3 is recommended		
	Out-of-Stock time (% of the time that a part is not available when needed)	Having parts out of stock affect how fast maintenance can carry out their required activities. Having zero out-of-stock times sets your maintenance teams up for quicker repair times; however, you must be cautious that it does not mean you are carrying too much inventory.	<2%	Inventory Valuation	
	Parts Inventory Accuracy	Helps ensure you are avoiding being out-of-stock or having excess stock.	Inventory value would be a determination based on the number of assets at an organisation. Formula: total value of parts inventory divided by replacement asset value total> multiplied by 100 to gain a percentage. Best practice is 1.5% or lower (ex: 103 buses valued at \$550,000= \$56,650,000 / Parts inventory value @ \$950,000 = 1.6%)		

Knowing your KPIs first is important to determine the data you need to calculate them. It is easy to become lost looking at reams of data in EAM if you do not have a plan. In the next section, we will cover the data you will need to calculate and understand these KPIs.

### Choosing the Right KPIs for Your Team

Do you want trains on the tracks or the buses on the road faster? Do you want fewer breakdowns and emergency repairs? Are you hitting your preventative maintenance compliance numbers? Do you want fewer out-of-stock periods in the parts room? As you achieve and maintain these KPIs, they make a real, positive difference to your organisation.

The most effective organisations define KPIs at both the organisationwide, and department level. For example, to improve maintenance performance, define specific KPIs to measure the performance of your supervisors and technicians. You can define separate parts inventory KPIs which your materials management staff are measured against. Department-based KPIs communicate to staff what 'success' looks like. When staff know how they are being measured in their jobs, they will rise to the occasion.

#### **Example KPIs for Maintenance Teams**

You do not have to track all these KPIs for all these groups, but here are some important ones you can start with and choose which are most relevant to you.



#### **Technicians**

- Mean Time to Repair
- Direct vs Indirect Labour
- Productivity and Efficiency



## Supervisors

- Open Work Orders
- Preventative Maintenance Compliance
- Miles Between Breakdowns
- Proactive vs Reactive Maintenance



#### **Parts Department**

- Parts Inventory Accuracy
- Obsolete Parts
- Out-of-stock Items



#### **Head of Maintenance Compliance**

- Direct vs Indirect Labour
- Productivity & Efficiency
- Preventative Maintenance Compliance
- Kilometres Between Breakdowns
- Open Work Orders
- Proactive vs Reactive Maintenance



#### **Asset Management**

- Direct vs Indirect Labour
- Productivity and Efficiency
- Preventative Maintenance Compliance
- Kilometres Between Breakdowns
- Open Work Orders
- Proactive vs Reactive Maintenance
- Parts Inventory Accuracy
- Obsolete Parts
- Vehicle Condition
- Asset Cost Analysis

Looking at all these KPIs, you might be tempted to track all of them. They are 'key' performance indicators, so they all must be important, right? Not exactly. A common pitfall of well-intentioned managers is to track too many KPIs. In reality, you can only hold any team accountable for three to five KPIs. Anything more than five KPIs is hard for you and your staff to focus on.

## Setting Benchmarks

Part of your rollout plan will include a period where you are gathering data, seeing how KPIs look and setting benchmarks. Your benchmarks will have two parts:



# How your team is doing in general? How your team is doing against industry benchmarks?

When you are looking at how your team is doing overall, you are looking for emerging patterns. For example, is your mean time to repair relatively stable week to week, or does it fluctuate? Do some vehicles take longer to repair than others? The important part of this phase is knowing what 'normal' looks like for you. These early results give you an idea what parts of the maintenance program to focus on, which KPIs you want to improve first, and what will help the organisation improve the most.

## **Step 3: Laying the Foundation for Maintenance KPIs: Having Your Data in Order**

All KPIs—and metrics—rely on data to work. For most maintenancerelated KPIs, that data is sourced from your EAM system. However, many organisations do not leverage EAM fully and do not ensure their teams are putting the data into EAM that provides the data needed to calculate your KPIs.

If you are starting from nothing, with no data in EAM to work with, remember you need to gather data for a year before you start tracking KPIs and holding people accountable. When gathering data, check to see how things are trending towards 'standard' times. Maybe you have a special configuration that takes longer to repair and maintain than 'industry standard', so you adjust your target KPI for that piece of equipment. During the data gathering phase, you will learn what 'normal' is for your organisation and refine your KPIs from there.

Once you have all your data in the system, you can start rolling out KPIs. You can look at the past year and see where your trouble spots are and determine the biggest priorities.



Learn more about how asset management data can improve fleet maintenance in this episode of Transit Unplugged.

"Using data to improve operations and meet the changing needs of riders."

#### Finding the Data You Need

The first step is to figure out what data you need to report on and calculate your KPIs. Some might be obvious - the mean time for repair is based on the time it takes for something to be fixed, but others might need data from other sources.

In the example KPI table above, you will find the metrics and data you need to calculate key KPIs. As you work through implementing KPIs, keep checking the data, metrics, and KPIs to see if they make sense. Does everything match reality in the shop? Keeping a close eye on your data and double-checking with your teams that what you see reflects what is really going on is essential to your success.

#### Is Data Being Gathered and is it Correct?

In computer and data science, there is a saying 'garbage in, garbage out.' If you have bad data going into the system, you will only receive bad results. Part of having your data in order is making sure all your mechanics and technicians know:



1. What you need to track KPIs? 2. When they need to enter it? 3. How they need to enter it? 4. Where they need to enter it?

For example, a work order might say a rollingstock item needs its brakes repaired. It comes into the workshop, but no one logs in when they started working on it. When they are done, no one logs when they finished, how long it took, the parts used, or problems encountered. Maybe once a week, 'when they have time', mechanics will update all the work orders with information, but how accurate is that information?

Once a week is not often enough to make sure you are gaining accurate data into the EAM system. People forget things over time and do not estimate time well. For your KPI program to be successful, everyone needs to enter data into an EAM system immediately. Entering data needs to be part of a workflow, just like organising tools and parts.

The Technician Portal module within the Trapeze EAM system gives mechanics a quick and easy way to track work orders and enter the data required for your KPIs. Technician Portal was designed to eliminate paperwork, streamline ordering parts, and automate time entries. Technician Portal lets technicians get back to what they are there to do -fix and maintain all your organisation's assets.

There will be a transition period for people to create the habit of entering data. Therefore, it takes time to ramp up before you can start tracking KPIs and be confident in the reports you are reading.



Related article: EAM – A Deep Understanding Find out how the Trapeze EAM system is designed with the rail worker in mind

Making data entry easy is the first and most important step to populating the EAM system with the right data.

## **Step 4: Building Reports**

As data starts coming in, you can start building your first KPI reports and dashboards and undertake some preliminary analysis. These are not the final reports you will use once your KPI program launches; these are the first glances at the data to give you a sense of what you have.

> Click to Read Case Stufy Related case study: MRT Corp. Rail Enterprise Asset Management System

Trapeze EAM and ViewPoint are your power tools to create reports, dashboards, and views into your data. These tools-and the EAM API—let you analyse data and even pull in data from other systems into your reports and dashboards. As you work with your reports, you will refine and iterate them.





Our key performance targets were realised by minimising manpower usage, mitigating failures in advance, and having an organised chain of command to manage maintenance costs efficiently in terms of manpower, time and spares utilisation.,,

> Theyagarajan Bala Krishnan, Senior Project Engineer and Technical Specialist at MRT Corp.

The more you learn, the more questions you will have, and the more sophisticated your reports will become.

These reports are the keys to revealing bottlenecks and inefficiencies that keep your team from working at its best. Finding things like problems sourcing parts, not having the right parts in the right places, or not having the right people assigned to work orders are all things you can uncover as you dive into your reports.

The goal is to create reports everyone can understand immediately. Anyone looking at the report should be able to see if you are meeting KPIs, exceeding KPIs, or have areas for improvement.



Example KPI dashboard

#### Here are some reports Trapeze EAM users find most helpful:

- Preventative Maintenance Compliance
- Proactive vs. Reactive Maintenance
- Obsolete Parts
- Inventory Count Reconciliation
- Asset Cost Analysis
- Employee Labour
- Direct vs. Indirect Labour

Not all of these reports relate directly to KPIs-some give you additional insight into your KPIs and other important metrics. Trapeze EAM Customer Care can help you build, customise, and troubleshoot your reports and dashboards. Customer Care has worked with hundreds of transport authorities and operators and are experts in helping you gain the most out of your EAM system.

## **Step 5: Putting KPIs Into Action**

This is where you start to see how KPIs improve your operations. The first several months of your rollout plan are to have people become used to seeing KPIs regularly - not for taking action or changing things. Talking about how the team is doing against the KPIs you are tracking is fine. People should know if they are already exceeding KPIs or have areas to improve. Doing more than that is premature.

#### **Uncovering Issues and Increasing Performance**

After you have gathered a couple of months' worth of KPIs, it is time to use what you have observed to make positive changes. When you are making changes, break them down into four types:

- **1.** Ongoing issues with a group
- 2. One-off issue with a group
- 3. Ongoing issue with an individual
- 4. One-off issue with an individual

Ongoing issues are when you are not meeting KPIs for several weeks or months and it is an ongoing (or worsening) trend. This points to a systemic issue with either the group or person, something that might be caused by a problem with a process or staffing. Your team probably already knows their mean time to repair (for example) is longer than it should be. They might even have some ideas for why and how to fix it. Listening to the people doing the job is the most important part of finding the cause of the issue. One-off issues, regardless of with a person or group, are when a KPI is missed significantly that it raises a red flag. For example, everything is fine for months and then suddenly for one week, things have gone off the rails.

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You need to find out what is going on before a one-off problem becomes an ongoing problem. Maybe it was just a one-off—a lift was broken, many people were away sick, and a parts shipment was late all in one week—and probably won't happen again. But something like seeing a new kind of repair that is taking far longer than expected to complete is important to look at carefully.

## Tips for using KPIs with your teams

- **1.** Have a daily huddle with your team to reinforce entering information into the EAM system.
- **2**. Reinforce the 3Cs: Complaint, cause, correction. Make sure these are in the notes for work orders.

#### **Example:**



Being successful at implementing KPIs is as much about leadership as it is about data. Build trust with your team. Be open and honest with people. Explain the whys. Don't point fingers and focus on collaboration, not confrontation.

#### How Not to Use KPIs

Organisations that employ KPIs effectively use them as tools to help people grow, improve, become more efficient, and set everyone up for success. If you use KPIs to punish people, ultimately you will not make any progress or even gain accurate data.

Being successful at implementing KPIs is as much about leadership as it is about data. Build trust with your team.

Be open and honest with people. Explain the whys. Don't point fingers. Focus on collaboration, not confrontation.

## **Remember, KPIs are Dynamic**

KPIs can be adjusted. They are not set in stone. Adapt your KPIs to your unique situation. Your acceptable mean time to repair might be longer than another organisation. You might have specialised equipment with complicated maintenance routines. You need to listen and understand what is getting in their way, then clear those roadblocks to help your team improve. There will never be a one-size-fits-all solution, or even KPI, except for one thing—good communication. Good, open communication between you and your team will always beat the best dashboards and technology. You need to constantly review your reports (daily, weekly, monthly, quarterly, yearly) and make sure the results make sense. Is there something you are not tracking? Does the data look wrong? Are you learning what you set out to learn?

# Here are the KPIs you should be tracking daily, weekly, monthly, and quarterly:

#### Daily

- Employee Labour
- Direct vs Indirect Labour
- Open Work Orders

#### Weekly

- Preventative Maintenance Compliance
- Proactive vs Reactive Maintenance
- Distance Between Breakdowns
- Inventory Count Reconciliation

#### Monthly

- Obsolete Parts
- Mean Time to Repair Standard Repair Times

#### Quarterly

- Preventative Maintenance Compliance
- Proactive vs Reactive Maintenance
- Distance Between Breakdowns
- Inventory Count Reconciliation
- · Productivity and Efficiency



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Making a habit of checking these reports helps you stay in a metrics and KPI mindset, but does not overwhelm you with information. Each time you look at a report, you should think about four things:

Is this normal/acceptable?
 Is this something I need to monitor (a trend that is

not good, but could resolve itself)?

- 3. Is this something I need to fix now (a KPI is off and needs to be brought back on track)?
- 4. What is the next action?

This mindset is essential to use KPIs effectively. Always think about what the data is telling you and if you need to take action.





Example of a dashboard that gives a daily high-level look (configurable)

PM Compliance							(Trapeze"			
PM Performed Date Range: 1/1/200 Time Late 4 over: 0 Distance Late 4 over: 0 All Shop Locations All PM Tasks	11 to 9/22/2021									
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Example of a report. Reports can be scheduled regularly. It would be the organisation's decision on the frequency of the various reports. You can also pull reports on demand if necessary. KPIs, like all continuous improvement exercises, are simply tools. You adapt them as you progress and improve. You might decide to bring in a new KPI or make one KPI the focus for a period of time. KPIs will help you learn, adapt, and improve your operations, but only if you give them your time and attention.

## Trapeze EAM Helps Your Organisation Manage and Improve Operations

Trapeze EAM is an asset management solution purpose-built for the unique needs of transport operators. From work management, technician portal, asset configuration, reporting, and even an illustrated parts catalogue, Trapeze EAM gives your organisation the essential tools it needs to maintain and repair everything from your vehicles to your buildings.

You can learn more about EAM at our <u>EAM for rail solution page</u> and our <u>EAM resources hub</u>.



Trapeze Group works with public transport agencies and their communities to develop and deliver smarter, more effective public transport solutions. For more than 25 years we have been *Here for the Journey*, evolving with our customers around the world to help them move people from point A to Z and everywhere in between.

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