



An eMaint  
Whitepaper

# PERFORMANCE METRICS THAT MATTER

By: Greg Perry, Senior Consultant, Engineering Services, eMaint

So, you have implemented a CMMS system for your maintenance program – great! Now we want to help you learn what data you are able to extract, what information you are able to pull from that system, and why it is important. We want to change how you think about metrics and how you get your business to think about metrics.

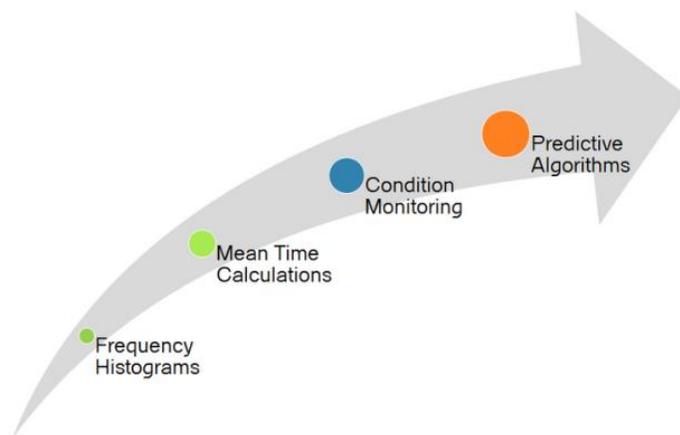
One of the most common uses of a CMMS system is to gather data you can use to make important business decisions. Without data, decisions are reached by discussions and debates that are often won by seniority. It is clear that a CMMS system can help you organize work, manage large volumes of work orders, call-ins, breakdowns, and overall tracking.

## Why Do You Need Metrics?

There is a very simple answer to this. As human beings, we strive to improve. We compete. We want to have the best score. If you don't tap into that energy, you're missing an excellent opportunity to improve your organization.

“Measurement is the first step that leads to control and eventually to improvement. If you can't measure something, you can't understand it. If you can't understand it, you can't control it. If you can't control it, you can't improve it.”

H. James Harrington



How do metrics apply to maintenance? There is a hierarchy to developing and refining metrics in maintenance. This is a roadmap for progression in data collection.

The quickest and easiest benefit of data collection with a CMMS system is creating frequency histograms. Whereas the end results of collecting data is the ability to have predictive algorithms, it makes sense that you simply cannot start at the top of this progression. However, each step of the progression is important to understand for the proper collection of data for your assets.

## Where Do You Begin?

To know where to start – you have to ask ‘What does success look like?’ Always start with the end in mind. There is no ‘cookie cutter’ approach to this. No two organizations are the same. Therefore, no one approach will work efficiently. You are trying to produce a quality product or service within a reasonable cost or profit margin safely and with consistent quality. This is not a one-time effort; this is more like a journey to improve your processes continually.

To get started, you want to think about the following questions:

- What data or reports would make your life easier?
- What information does your boss consistently ask for?
- What is your current PM:CM (Planned Maintenance: Corrective Maintenance) ratio?
- What type of PM:CM ratio does your business need?
- What are your current maintenance budget busters?
- What is your on-time PM performance or compliance?

Once you have answered some of the important questions you can start to think about the metrics you need to measure in order to make the best decisions. No matter where you are in this process, some fundamental metrics should be tracked. Below is a list of basic startup metrics, which include:

*Lagging indicators – performance measurements*

- CM to PM ratio (world class = 1 to 4)
- Mean Time Between Failure (MTBF)
- Mean Time to Repair (MTTR)
- Mean Time Between Interruptions (MTBI)
- Top 10 Analysis (cost, frequency, duration)

*Leading indicators – Performance drivers*

- PM on-time compliance
- Estimates vs. actuals
- Percentage of failures undergoing RCA

## Metrics in eMaint

The goal is to have an asset structure that is aligned with the data collection. At a minimum, the asset structure needs to include:

- Parent grouping
- Child specific assets (charge work orders)
- Child miscellaneous asset – only one per parent

The most important piece here is the work orders. The work order serves two critical purposes and must contain at least the following elements for each purpose:

The front end shows what work needs to be done including:

- Child asset – mandatory
- Parent asset information
- Work type – planned/unplanned
- Work status – open/closed
- Primary craft
- Required craft & hours
- Material needed
- Safety information/requirements
- Due date

“Anything you measure will impel a person to optimize his score on that metric. What you measure is what you’ll get. Period.”

Dan Ariely, Harvard Business Review

The back end shows what work was to be done (or has been done) including:

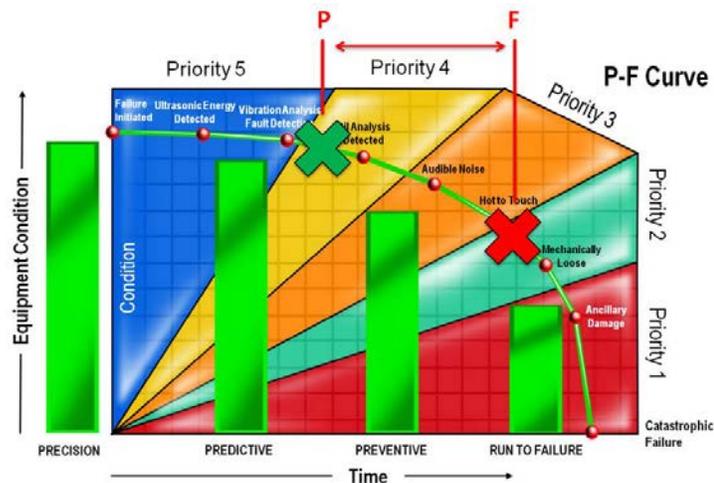
- Actual labor used
- Date job was completed
- Time it took to complete the job
- Comments on significant deviations
- Parts actually consumed
- Problem code

This is the bare minimum of information that should be collected for each work order. You want to think about capturing the important information. First, you want to tell the worker what to do and how to do it properly. Then you want to capture the actual work coming back because the information coming back is where the data comes from to drive the metrics for your business. This data (and more) is easily set up and tracked in the eMaint CMMS system.

## CM Analysis

The PF curve (predictive failure vs. actual failure) shows what happens over time if you continue to ignore a problem that is starting to be detected. You will eventually get to a point of catastrophic failure.

Your equipment has telltale signs of damage. Our job is to identify them and address them before there is a failure. You'll notice that in the early sections (4 and 5) the curve is fairly flat. So we want to detect any issues early enough to provide time to plan and schedule – without panic, without reactivity, and without increasing cost.



## Data Collection

The good news here is that there are tools now available to be used for data collection making it easier and faster. Tools such as hand held thermography, fixed position infrared, and hand held acoustic emission devices that make collecting the data easier, faster, and more accurate. The goal is to monitor the assets so that you can move away from unplanned maintenance toward primarily planned maintenance.

There are also automated data collection systems that can aid in collecting data for factories that have a geographical footprint that doesn't lend itself to physical surveillance. eMaint has a simple CMMS data collection system that can handle this type of scenario.

You start out by identifying which asset you want to collect data from remotely. You then set up the data collection device, which can be infrared, wired, or even wireless. You get the data from the device into a local server. The local server would run the algorithms or the condition monitoring min/max levels. Then it sends a signal to your eMaint CMMS system, which triggers

eMaint to automatically generate a work order for investigation. That work order can be tracked for completion and information of what was discovered.

The main benefit is that you are able to detect issues ahead of time that allow you to properly plan for needed maintenance – before it becomes catastrophic. This is the progression of metrics and why it is encouraged to get on the journey; because no matter where you start it is a journey meant to improve your organization.

## Conclusion

Understand the main benefits of how to use your CMMS system to gather and report the important data for your decision-making processes.

- Begin with the end in mind
- Set up an asset hierarchy
- Create supporting fields in work order form
- Monitor the work order process – establish training and disciplines
- Monitor the asset performance
- Prioritize asset improvement areas – daily
- Move up the P-F curve

Remember, this is the journey of using data to manage your maintenance programs. Of course, it starts with having a CMMS that is properly structured to collect that data for you.



*Greg Perry, Senior Consultant, Professional Services at eMaint, has over 15 years' experience working in World Class Maintenance and CMMS Implementations. He delivers a broad range of project management, implementation and training services to eMaint clients.*