BEST PRACTICE WHEN CONFIGURING A SUCCESSFUL DOWNTIME SYSTEM

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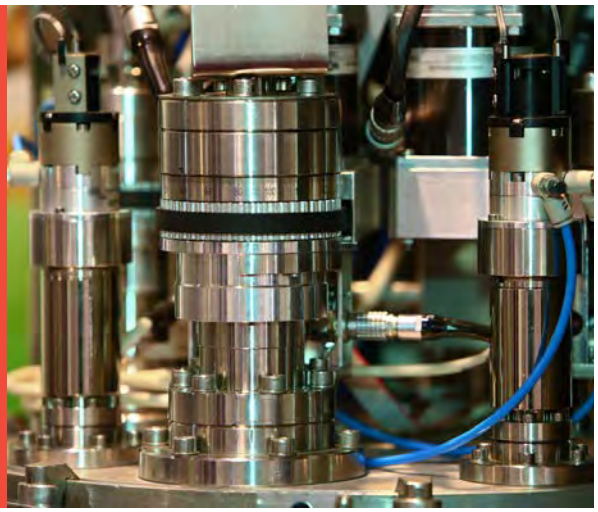


Executive Summary

Implementing a downtime system such as RtDUET is the first step to gaining better insight on your operations and drilling down to root cause of lost capacity. This white paper attempts to lay out the best practices to follow when configuring a downtime system to achieve quick ROI, greater adoption and assist the analytical process. This study will cover the following:

Part 1: Defining your Machine Centers
Part 2: Building a Useful Reason Code Tree
Part 3: Deriving KPIs from your Time Usage Model
Part 4: Triggers & Auto-classification
Part 5: Custom Attributes for Greater Context
Part 6: Tie it All Together with Actionable Reports

This six-part series should provide engineers and technicians the solid footing for configuring a robust and useful downtime accounting system.

PART 1

Defining your Machine Centers

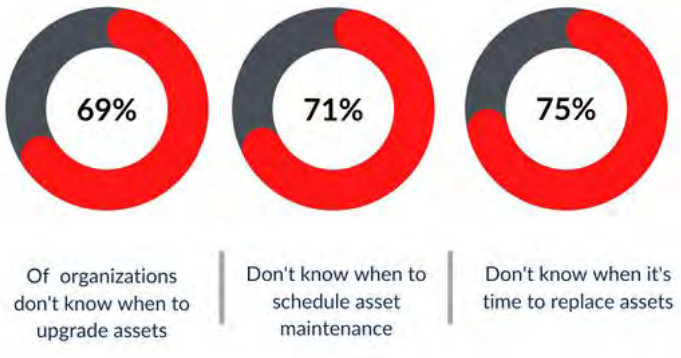
A Machine center is a single point of measurement for downtime and generating KPIs. Defining which assets, areas or processes to track will ultimately define the shape of your downtime tracking system.

- Don't feel that you must track every single asset in your plant.
  - Many pieces of equipment will be either interlocked or at least dependent on each other so think about grouping assets, processes, or areas together as a single point to track downtime against.
  - Let your reason code tree give you the detail on the sub-assets.

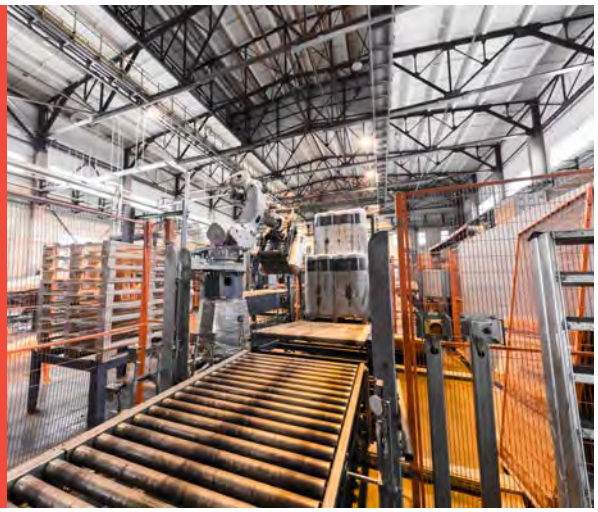
- Assets that run in parallel should have their own machine center.
  - A single machine center is possible but more complex with each parallel line triggering slowdown events.

- Start with your critical assets and then expand to your support systems.

Lack of insight leads to major bottlenecks



PART 2



Building a Useful Reason Code Tree

A well thought out reason code tree is the backbone of any useful downtime system. The reason code tree will set the foundation for your downtime analysis and uncovering the root causes of capacity loss.

- Don't worry about dividing your reasons by time usage classification (planned/unplanned or internal/external) within the reason tree, let your time usage codes do that for you.

- Let your reason code tree give you the detail you need on your sub-assets.
  - Have the reason code tree reflect your asset hierarchy.
  - Drill down through areas, assets, and components to arrive at failure modes.
  - Line level, or external reasons can be at the top

- Avoid creating too basic or too detailed of a reason tree.
  - Having a flat reason code tree will be simple for operators to navigate but will lack the detail required to understand the root-cause of downtime.
  - Best to have between 4 & 6 levels to drill down through. Anymore and your operators will be spending a lot of time clicking through trees.

- Periodically revisit your reason code tree.
  - Review repeated operator comments which could be turned into its own reason code.

In the mining industry, the loss of 1 excavator for 1 day can cost upwards of $5 Million.

PART 3

Deriving KPIs from your Time Usage Model

A standard time usage model is critical for accurately monitoring asset performance and comparing plants and assets throughout an enterprise.

- A standard time usage model will allow for apples to apples comparisons across assets, sites, and divisions within an enterprise.

- Start with your industry technical society for guidance on common practice for time usage models. For example:
  - SMRP
  - Global Mining Guidelines Group

- Map every reason code to a time usage code.
  - Don't let your operators decide how to classify the time. Agree on that beforehand and lock it in.

- Obtain agreement across departments on the classifications and definitions so that the resulting KPIs are meaningful.

Unplanned downtime is estimated to cost 10X the cost of scheduled downtime

PART 4

Triggers and Auto-classification

Downtime and slowdown triggers should closely represent the actual productive run time of your assets. Where possible, take advantage of the data in your systems to classify the events and limit the workload on your operators.

- If possible, use production rate to trigger events. If not possible, motor status or ready status will suffice.

- Not every down/slow time may be relevant for you. Many small events may be inconsequential.
  - Utilize minimum-event duration, timers, dead-band and moving averages to obtain the right event capture level
  - You may want to capture these small stoppages and auto-classify them as short events and review their impact later.

- Your control system or historian may have the reason why the asset stopped.
  - First-out analysis, drive fault codes and sub-assets run status.
  - This may not be the root-cause but can point you in the right direction.

PART 5

Custom Attributes for Greater Context

Your PI System holds a wealth of information about who, what, when, where and why an asset stopped. Integrate this data into your downtime records to reveal relationships previously unknown.

- Track contextual data which will give you greater insight on what is driving the downtime and slowdown events.
  - Shift, season, operator, feed characteristics, SKU and quality.

- Pull in process data to understand what were the operating conditions which led to the event.
  - Pressures, temperatures, flows, setpoints etc.

- Your historian may be integrated with your CMMS or ERP system. In this case, applying the work order number to the event can “link” the two events for further analysis and cost accounting.

Total estimated loss in industrial manufacturing equals over $50 Billion/Year

The automotive industry looses $22k for every minute of downtime

The oil & gas industry incurs an annual loss of $38 Million due to unscheduled downtime

PART 6

Tie it All Together with Actionable Reports

Once you have started to collect this data it will be key to arrange it in a meaningful way to drive action which leads to higher productivity and lower costs.

- Start with the Pareto graph to show what were the top 10 reasons for downtime and slowdowns.
    - Consider translating time into lost production capacity or lost opportunity ($). This is more tangible than hours and minutes and leads to action.
    - Allow for drill down into each column of your Pareto. This leverages the extra context added to the events to better understand the driving forces behind the issue.

- Assign ownership to KPIs.
    - Availability (Available Time / Scheduled Time) is the KPI for your maintenance department.
    - Use of Availability (Utilized Time / Available Time) is the KPI for value chain planning and logistics.
    - Operating Efficiency (Operating Time / Utilized Time) is the KPI for your operations team.

The cost of unplanned downtime is equal to approximately 5% of total output.

PART 6

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- Review the KPIs on a time series graph. Benchmarking across industries is difficult, compare yourself against your previous performance and track if you are getting better.

- Take advantage of business intelligence tools to further slice and dice your data.
  - Power BI and Tableau are great for visualizing the analytical results
  - Excel is widely known and accessible and has many features for drilling into root-causes.

CONCLUSION

The downtime tracking solution is critical for identifying the key capacity losses in your operation. Configuring your solution to accurately track downtime events, provide meaningful reasons, and roll them up to a standard reporting infrastructure is the foundation of any successful downtime system. This six-part study should provide the team deploying a downtime solution the foundation required to achieve a faster ROI on implementation and quickly identify opportunities for improved operational performance.

81% of organizations believe digital tools play a significant role in reducing unplanned downtime.

NEXT STEPS

To learn more about how RtDUET can be the right fit for your operation, visit www.rttechsoftware.com or reach out to one of our implementation experts.

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