OCTAVE

WHITE PAPER

7 steps to predictive maintenance

Technical evolution requires maintenance evolution

Plant assets play a key role in enterprise efficiency.

Many organizations struggle to manage preventive care and keep pace with the complexity of operational assets. Without a practical and prescriptive asset reliability process in place, these companies will continue to take random hit-or-miss shots at maintenance targets, often wasting resources and experiencing disappointing results. As operations grow more complex, maintenance strategies need to keep pace. That's why more manufacturers are turning to reliability-centered maintenance (RCM), a structured approach to protecting asset performance and reducing the impact of delays and unplanned downtime.

RCM replaces guesswork with a repeatable, data-driven approach – turning reactive maintenance into a structured system for managing risk.

Maintenance built for today's complexity

Technology has changed how plant assets fail. Increased complexity means broader risk exposure and a greater need for early insight into failure probability. Traditional time-based strategies, such as replacing bearings every six months, can fall short. Components may be replaced too early or too late. A more adaptive approach to maintenance is required, one that aligns with digital systems, sensor-based data, strict compliance mandates and escalating customer demands. The RCM process provides a framework for doing exactly that.

01. Identify assets in a master asset list

Determine the selection criteria, decide the data components and organize the criteria to aid in finding, maintaining and analyzing data. When selecting criteria, focus on distinguishing characteristics. The definition of an asset establishes the physical scope of the program. The criteria must speak to what an organization does regarding maintenance, quality and supply chain activity. These aspects of the business keep personnel and the environment safe while promoting throughput without the adverse effects of a breakdown.

A typical operation may have hundreds to thousands of assets, depending on the operation's size and how an asset is defined. Establishing the standard asset data components enables companies to group assets effectively.

02. Determine the asset criticality ranking

To create a ranking of priorities, define the factors to be considered and the potential impact a failure would have on the enterprise. When considering the criticality of an asset or asset group, look at all facets of how a failure would impact the business. Typical factors in the asset criticality ranking (ACR) calculation include operational, utilization, quality, safety and environment. This can be customized to any distinct drivers an operation may have. Defining their impact proves essential to achieving consistency and consensus throughout the organization. These factors should be well-documented to ensure the ranking can be objective. The higher the ACR number, the more important it is to track failure symptoms and plan intervention. In the end, the rankings must be trusted, used to set priorities and effectively drive improvements.

03. Optimize the predictive maintenance program

Once asset groups are prioritized, the next step is to define preventive maintenance (PM) schedules and task plans with proactive maintenance optimization (PMO). This starts with identifying the failure modes, understanding associated risks, aligning the right maintenance strategy to each scenario. From there, organizations can assign targeted, proactive tasks to each asset.

Precision matters. The most critical assets should be evaluated with the highest level of rigor, focusing on the failure modes that carry the greatest operational impact. The calculation used to classify failure modes is the risk priority number (RPN). The standard RPN factors are severity, likelihood and detectability.

04. Analyze spare parts

Spare parts strategy should follow the same logic as maintenance planning.

A structured spare parts analysis (SPA) links inventory directly to failure modes and risk levels, ensuring the right parts are available when needed. Running PMO and SPA in parallel creates alignment between maintenance strategy and inventory planning.

High-risk components should be stocked on-site. Medium-risk items should be pre-defined for rapid ordering. Lower-risk parts can be sourced on demand.

The approach is flexible, balancing readiness with efficiency.

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05. Monitor the PM program

Analytics bring the strategy to life. By measuring asset reliability and program effectiveness, organizations can validate what's working and what needs to change. That requires clearly defined criteria, aligned teams and trusteddata sources . Work orders and closing code histories are common sources of reliability data.

06. Determine failure causes

With failure modes listed, these values can be linked to reactive maintenance work orders. Linking failure data to maintenance activity enables deeper analysis, surfacing root causes and guiding targeted improvements. This is where insight turns into action.

07. Refine and repeat

Continuous improvement is built on data. Collecting and analyzing accurate information takes time but drives better decisions As insights evolve, maintenance strategies and spare parts planning should evolve with them. Over time, this creates a closed-loop system that steadily improves performance, reliability and efficiency.

With a structured RCM system in place, organizations gain control over asset performance and risk to drive more predictable outcomes and stronger operational results.

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property, and assets– for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency, and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.