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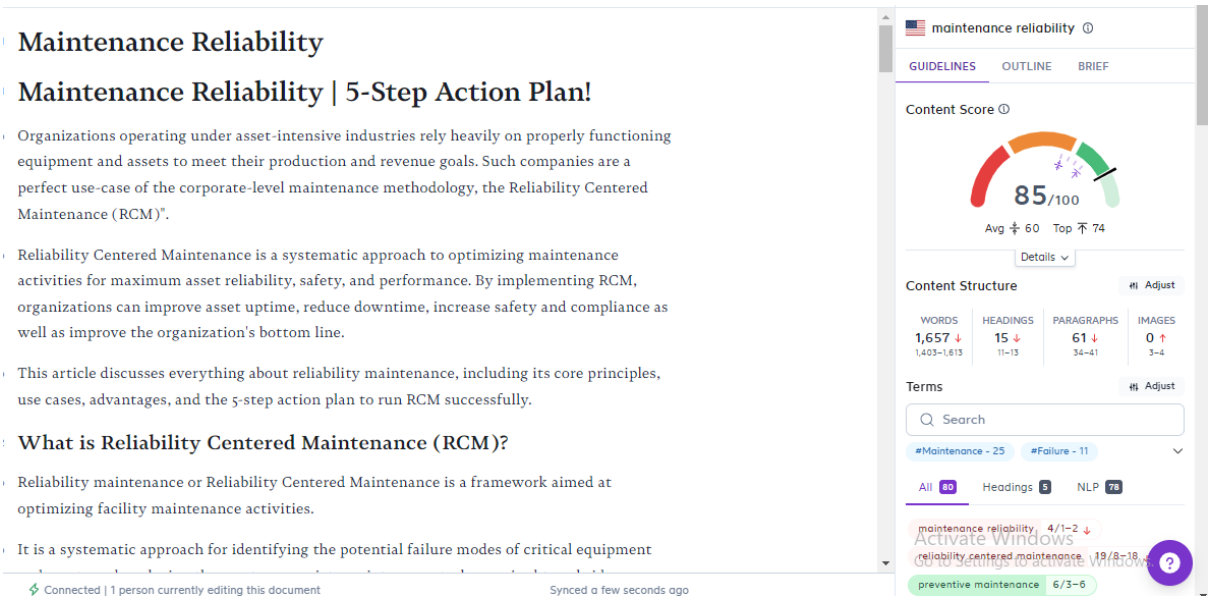

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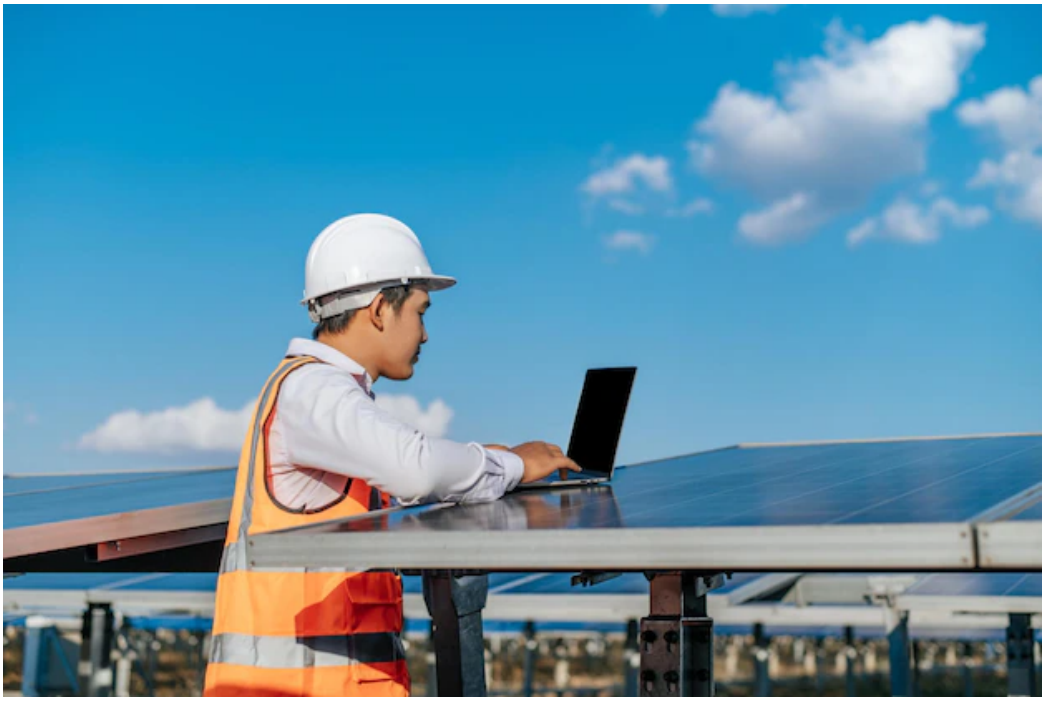

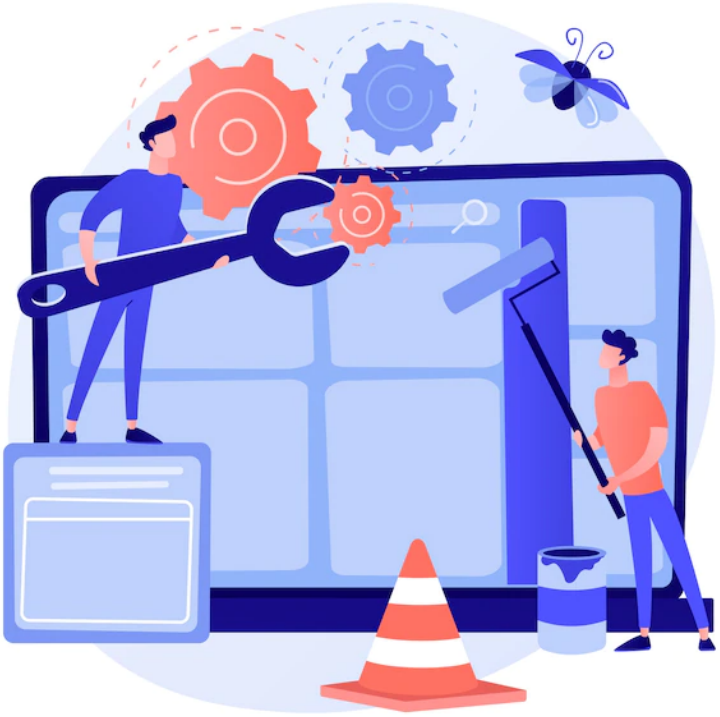

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Primary Keyword:

Maintenance reliability

Title Choices:

1. Maintenance Reliability: Strategies and Implementation Techniques
2. Maintenance Reliability in Practice: A Guide for Industrial Plants and Facilities
3. Reliability Centered Maintenance | Improve Equipment Reliability and Safety!
4. Reliability Centered Maintenance | 5-Step Action Plan!

Reliability Centered Maintenance | 5-Step Action Plan!

Organizations operating under asset-intensive industries rely heavily on properly functioning equipment and assets to meet their production and revenue goals. Such companies are a perfect use-case of the corporate-level maintenance methodology, the Reliability Centered Maintenance (RCM).

Reliability Centered Maintenance is a systematic approach to optimizing maintenance activities for maximum asset reliability, safety, and performance. By implementing RCM, organizations can improve asset uptime, reduce downtime, increase safety and compliance as well as improve the organization's bottom line.

This article discusses everything about reliability maintenance, including its core principles, use cases, advantages, and the 5-step action plan to run RCM successfully.

What is Reliability Centered Maintenance (RCM)?

Reliability maintenance or Reliability Centered Maintenance is a framework aimed at optimizing facility maintenance activities.

It is a systematic approach for identifying the potential failure modes of critical equipment and assets and analyzing the most appropriate maintenance tasks required to subside or mitigate those breakdowns. The key objective of RCM is to achieve maximum reliability and safety while reducing maintenance costs.

Developed in the 1960s by the aviation industry, the concept of RCM was primarily used to maintain highly complex systems and equipment, such as aircraft, in a safe and reliable manner. Today, maintenance reliability is widely accepted as a corporate-level maintenance strategy across asset-intensive industries, including manufacturing, power generation, petrochemical, and transportation.

Companies combine Reliability Centered Maintenance with Computerized Maintenance Management Systems (CMMS) to further the efficiency of this maintenance methodology. While RCM identifies and addresses the root causes of equipment breakdown, a CMMS is software that helps organizations plan, schedule, and track maintenance tasks.

Consequently, companies are able to increase equipment lifespans, enhance reliability, and minimize corrective and reactive maintenance expenditures.

Core Principals of Reliability Centered Maintenance strategy

Enlisted below are the four core principles of Reliability Centered Maintenance that lays the foundation of a comprehensive RCM program:

1. **Identify the functions of equipment:** RCM looks at the specific tasks that certain equipment is designed to perform and the conditions under which the equipment must operate.

2. **Identify potential failure modes:** Reliability maintenance determines the possible ways the equipment could fail to meet its functional requirements and the potential reasons behind these breakdowns.

3. **Determine the consequences of failure:** The RCM strategy evaluates the impact of potential failure modes on the equipment, the system functions, and the overall operations.

4. **Identify maintenance tasks to manage failure:** Based on all the equipment assessments, the RCM strategy suggests the most appropriate maintenance tasks to control failure modes effectively.

Getting these four principles right in the RCM plan helps your maintenance facility improve equipment performance and reliability, minimize downtime and maintenance costs, and prevent unexpected breakdowns.

Reliability Centered Maintenance (RCM) vs. Risk-Based maintenance (RM) vs. Preventive Maintenance (PM)

Reliability Centered Maintenance (RCM), Risk-Based maintenance (RM), and Preventive maintenance (PM) are three related but distinct maintenance approaches. The primary difference lies in their focal point and the strategies they employ.

Illustrated with the help of a table, the following are the characteristics of the three different types of maintenance:

RCM vs. RM vs. PM			
	Reliability Centered Maintenance (RCM)	**Risk Based Maintenance (RM)**	**Preventive Maintenance (PM)**
Purpose	Determines the highest-priority failure modes and identifies the most effective maintenance tasks with the core objective of maximizing equipment reliability.	Addresses the potential failure modes and thier impact on the system performance with the primary goal of reducing the overall risk to the system.	The modern preventive maintenance program emphasizes on performing regular maintenance tasks on the equipment, with a critical focus on preventing equipment breakdowns.
Maintenance Strategy	Proactive	Proactive	Proactive
Maintenance Type	Condition-based	Risk-based	Time-based
Data collection and analysis	Extensive	Moderate	Minimal
Cost	High	Moderate	Low

Maintenance schedule	As needed	Risk-based	Regular and predefined

The table above clearly establishes all three maintenance methodologies as different approaches. Nevertheless, it is essential to note that they all complement each other to streamline the path to achieving your facility's maintenance goals.

Why is Reliability Maintenance Important For Your Organization?

RCM is a powerful maintenance strategy with implications in a wide range of asset-heavy industries such as steel manufacturing, sanitation for food distribution, pharmaceutical manufacturing, and military equipment manufacturing.

These industrial sectors pose a high risk and severe consequences of equipment failure. Hence, RCM serves as a predominant practice to facilitate organizations to maintain their assets in a structured and consistent manner, all while improving reliability and decreasing cost.

When implemented the right way, RCM can benefit your organization in the following ways:

- **Increased Equipment Uptime:** RCM focuses on regular maintenance of assets and equipment, which prolongs their lifespan, leading to fewer failures, minimum lost production hours, and higher production.
- **Reduced Downtime:** Reliability maintenance helps companies identify and address potential issues before they translate into failure, calling for unplanned downtime and corrective repairs.
- **Minimized Costs:** Reliability maintenance can save on costs by prolonging the lifespan of equipment, reducing the need for emergency repairs, and increasing energy efficiency.
- **Improved Safety:** A carefully planned Reliability Centered Maintenance program aids in predicting potential hazards and risks, which can increase workers' safety.
- **Compliance:** Reliability maintenance helps companies comply with industry regulations and standards by ensuring that the assets and equipment are operating in good condition.
- **Enhanced Performance:** Reliability maintenance assists in optimizing the effectiveness of maintenance tasks and maximization of resources to keep equipment's performance intact.

Pro Tip: Use The NonStop Suite in conjunction with your company's Reliability Centered Maintenance plan to amplify its advantages and unlock greater insight into equipment performance, condition and trends.

How to Identify the Evaluation Criteria for Reliability Maintenance Tasks?

RCM takes facility maintenance one step further by taking a more comprehensive and proactive approach. It enables your company to successfully predict the asset and equipment's performance, planned maintenance, and spare parts inventory.

However, to devise an operational RCM plan, facility managers need to outline the goals they plan on achieving with RCM as well as organize the required resources. Resources, technology, and budget should be sufficient to supplement the maintenance strategy. Although this process might sound excruciating, the ROI in terms of maintenance efficiency is noteworthy.

The Society of Automotive Engineers (SAE) states the evaluation criteria for reliability-centered maintenance. Evaluate your assets and equipment, organized by phase, by asking the seven following questions:

Decision

- What is the functionality of the equipment, and what are its performance standards?
- In what ways can a piece of equipment fail to perform as intended?
- What are the root causes of each of the potential failure scenarios?

Analysis

- What is the possible impact of each type of failure?
- How would each failure affect the facility, system, and operations?
- What should be done in order to predict or prevent equipment failures successfully?

Action

- What steps must be taken if the facility fails to address a suitable proactive task?

How to Implement Reliability Centered Maintenance in an Asset-intensive Company?

Reliability Centered Maintenance helps align and optimize maintenance activities with the system's reliability, safety, and performance. However, running an effective Reliability Centered Maintenance program in an asset-intensive company can take time and effort.

To simplify the job for your maintenance facility, we have broken down the RCM plan into five steps:

Step 1: Prioritize Assets for RCM Analysis

First and foremost, your facility managers must prioritize an asset or equipment to perform the RCM analysis. Select an asset based on parameters like its criticality to operations, maintenance history, corrective repair, and preventive maintenance costs.

Pro Tip: Use The NonStop Suite's smart NFC tagging features to access the maintenance history of all your equipment in a quick scan!

Step 2: Describe How The Chosen Asset's System Works

Before any asset or equipment goes down to the downtime status for Reliability Centered Maintenance, it's indispensable to address its associated system's function. What is the functionality of the system that the equipment is attached to, and what are the system's inputs and outputs? Lay the groundwork beforehand to prevent stopping critical operations for longer hours.

Step 3: Conduct a Failure Modes and Effects Analysis (FMEA)

FMEA is where facility managers identify all the possible ways a piece of equipment can fail. This is paramount to assess the impact of different failure modes on workers' safety and production in a timely manner. Hence, the maintenance departments can take the necessary precautions before the failure occurs and cause a catastrophe.

Step 4: Decide on The Maintenance Strategy for Each Failure Mode

In this step, companies need to select an appropriate maintenance strategy for each failure mode. Condition-based maintenance (CBM), preventive maintenance (PM), or predictive maintenance (PdM) are the most commonly used maintenance strategies to support maintenance goals.

Step 5: Implement. Evaluate. Improve.

Based on the work done in the four steps above, now is the time to implement a meticulously devised reliability maintenance strategy. To make your company's RCM plan a success, continuously monitor, track and review the performance of the equipment and systems. Make adjustments to the maintenance strategy as needed.

Pro Tip: The NonStop Suite streamlines asset maintenance by offering a suite of solutions, including on-the-go asset management, dynamic eForms, smart NFC tags, GxP & ISO compliance, and NC-CAPA capabilities. Hence, your organization can identify and track assets in real-time and achieve its maintenance goals successfully.

Amplify Your Reliability Centered Maintenance With The NonStop Suite!

Reliability Centered Maintenance is a predominant maintenance methodology used to achieve the optimal balance between equipment performance, safety, and cost. To facilitate your company's RCM plan, The NonStop Suite brings asset-management and maintenance solutions.

Presented by The NonStop Group, The NonStop Suite is an EAM-based software designed to provide cutting-edge technology and features like Dynamic eForms, smart NFC tags, and On-The-Go Asset Management. Hence, your company can unlock access to real-time monitoring, diagnostics, and reporting capabilities to enhance equipment reliability, reduce downtime and maintenance costs, and improve overall performance.

Should you want to amplify your company's RCM effectiveness, consult with The NonStop Suite today and book a free product tour.