5 STEPS TO COMPLETING A SUCCESSFUL ROOT CAUSE ANALYSIS

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A. FORWORD

Every manufacturing process is bound to encounter issues, such as inadequate materials, equipment malfunctions, or defective parts.

In some instances, a straightforward correction can resolve the immediate concern. However, there are situations where a more thorough approach is necessary to prevent recurrence of the issue.

Corrective actions aim to tackle systemic or persistent quality problems and are vital for effective quality management. Despite this, many organizations find it challenging to identify and rectify problems as they arise, let alone adopt a strategic perspective on corrective measures.

Root cause analysis serves as a valuable tool within the quality management framework, empowering leadership to go beyond merely addressing nonconformities. It enables improvements in designs and procedures, optimizes processes, and helps anticipate and manage potential issues.

Statically speaking, 73 percent of organizations have reported experiencing a recall at least once, with an alarm rate of increase in recalls compared to several years ago. Conducting a root cause analysis could assist in uncovering the reasons behind these recalls**.**

B. Conducting a Root Cause Analysis

The primary objective of root cause analysis is to identify the underlying source of a problem, which may stem from equipment, materials, management, processes, or technological failures. This process involves gathering data through a structured series of steps:

- Clearly define the problem and record specific symptoms.
- Assess the duration of the issue and evaluate its impact on organizational processes.
- Identify the factors that may have contributed to the problem.
- Utilize one of the established methodologies or tools to pinpoint the root cause.

- Formulate a solution aimed at mitigating or eliminating the root cause.

While some of these tasks can be handled by an individual, a cross-functional team approach is generally more effective in most organizations.

This team should consist of individuals with direct knowledge of the affected process, representatives from quality and engineering departments, and management personnel who have the authority to implement the proposed solution.

C. Three essential root cause tools

Additionally, if you expect your vendors to thoroughly evaluate their own suppliers, you can incorporate that third-party information into your Quality Management System (QMS). This will enhance your understanding of the quality management landscape. In the event of any issues, you will be positioned to respond more swiftly and effectively.

D. The Fishbone Diagram

Developed by Kaoru Ishikawa in 1968, the fishbone diagram is a valuable tool for teams seeking to identify potential root causes of issues. Its name derives from its distinctive structure, where the problem is positioned at one end, resembling the "head" of a fish, while six categories of potential failure extend outward like fishbones.

This approach is particularly effective for analyzing cause-and-effect relationships in complex situations. The process involves four key steps:

1. Define the problem.

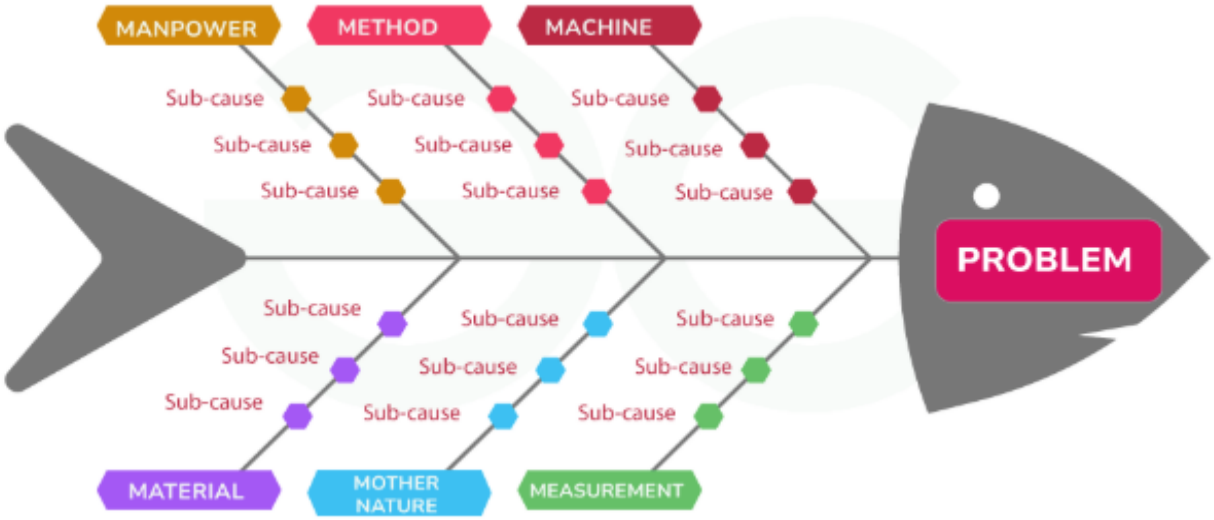
2. Pose questions to explore factors within each category, such as: "*What are the people-related causes of this issue?*" "*Are there any standardization or measurement challenges associated with this problem?*" "*Did environmental factors like temperature or pressure play a role?*"

3. Investigate the underlying reasons for any identified first-level causes (e.g., "*What caused the sudden increase in temperature?*").

4. Evaluate the diagram to assess potential cause-and-effect relationships.

While the six categories mentioned are commonly applied in manufacturing, other sectors may necessitate different classifications. For instance, marketing teams often utilize the "7 Ps," which include product, price, place, promotion, people, positioning, and packaging.

Due to its visual nature, the fishbone diagram is straightforward to comprehend, enabling teams to effectively identify and prioritize issues and solutions.



E. The 5 Whys Technique

Sakichi Toyoda, the founder of Toyota Industries, created the 5 Whys method to delve deeper than surface-level symptoms and identify the fundamental cause of an issue. This approach is effective for troubleshooting, enhancing quality, and addressing problems of moderate complexity.

The 5 Whys process consists of five sequential steps:

1. Gather a team that has knowledge of the issue or process requiring resolution.

2. Clearly articulate the problem with a specific statement (e.g., “Customer X received products that do not meet their specifications”).

3. Inquire "why." Responses should be factual, supported by data, and concentrate on errors within processes or systems. The team must then assess whether the identified issue would persist if the problem mentioned in the response were resolved. If the answer is “yes,” continue to ask why. If the answer is “no,” you have pinpointed the root cause. It is important to note that reaching the root cause may not require five iterations of asking why.

4. Formulate a corrective action based on the root cause(s) identified.

5. Track and evaluate the outcomes of the corrective actions to confirm their effectiveness.

One benefit of the 5 Whys technique is its ability to uncover multiple contributing root causes. For instance, if there are two possible answers to the initial "why," the 5 Whys chart can branch out to explore these additional avenues.

Example:

A manufacturing plant produces 10% below its expected volume on a single day. The plant manager meets with three factory workers to assess the situation with the following five whys line of questioning:

***Problem:** Reduced plant output*

1st Why?	*One machine was not functioning properly.*
2nd Why?	*A belt was out of place.*
3rd Why?	*The machine did not receive its scheduled routine maintenance this month.*
4th Why?	*No service provider was scheduled to perform the maintenance.*
5th Why?	*The company is negotiating a contract with a new service provider.*

The manager realizes that no plan is in place for machine maintenance while the company negotiates the new contract. They can now develop a plan to make sure routine maintenance and repairs still occur during the negotiation period

F. The Pareto Chart

The Pareto chart is named after Vilfredo Pareto, who introduced the "80/20" principle, suggesting that 80% of issues stem from just 20% of the causes. This quality management tool assists teams in determining where to concentrate their efforts for maximum improvement.

A Pareto chart integrates a bar graph with a line graph; each bar illustrates a defect or issue arranged in descending order, while the line indicates the cumulative percentage of problems. This tool is effective for helping teams prioritize significant issues among many and for analyzing overarching causes by reviewing individual elements.

The process for creating a Pareto chart involves the following steps:

1. Identify relevant categories and metrics for the issues at hand, such as frequency, quantity, or cost. Establish the timeframe for the chart, which could be one week, one sales cycle, or one month.

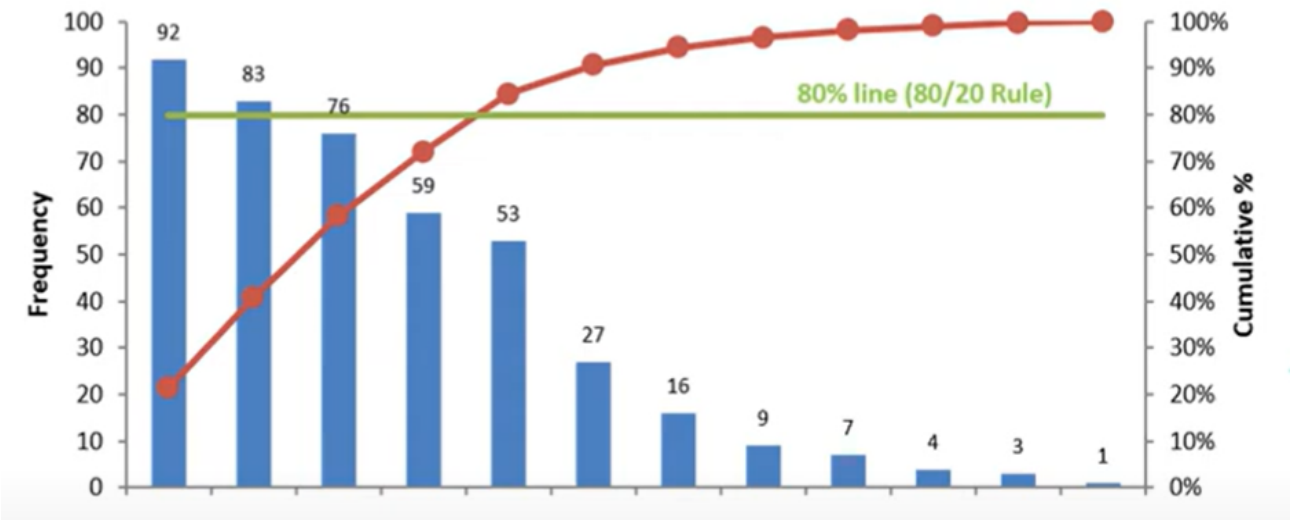
2. Gather and compile the data, summing the measurements for each category.

3. Create and label the bars on the horizontal axis in descending order, and indicate percentages on the vertical axis.

4. Calculate and plot cumulative totals, connecting them with a line. The point above the second bar should represent the total of the first and second bars, while the point above the third bar should reflect the sum of the first three bars. Continue this process until the final point reaches 100%.

The Pareto chart serves various purposes in the quality improvement process. It can be utilized in the initial phases to help teams identify which business challenges are causing the most losses or complaints, allowing them to allocate resources to high-impact quality initiatives.

Additionally, it can be employed to focus efforts on complex problems with multiple contributing factors. For instance, if shipping delays are affecting several areas of the business, a Pareto chart can help identify which root causes have the most significant effect.



G. Summary

Utilizing the effective resources in our Root Cause Analysis Toolkit will enable you to enhance quality through a systematic and data-informed approach. By identifying the underlying causes of any nonconformance, your organization can implement quality measures earlier in the product lifecycle, ideally starting from the initial product design phase.

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