



# Developing a Root Cause Analysis Process: One step at a time

## A VALUABLE TOOL IN MANUFACTURING AND PRODUCTION OPERATIONS

# Root Cause Analysis (RCA) is a valuable tool for reliability, line efficiency and quality improvement in manufacturing and production operations.

Yet, most efforts to implement an effective RCA program fail to achieve meaningful results despite significant investments in employee training. What needs to be done to assure that RCA becomes a functional work process in organizations?

If you are a manager of an organization or a frustrated RCA advocate and this sounds familiar, be assured that this is a common situation in many facilities and across all industries. RCA can be one of the most difficult reliability, line efficiency and quality programs to develop, and many have struggled with their implementations.

In my opinion, RCA is currently one of the most under-utilized reliability, line efficiency and quality improvement tools available for organizations seeking to eliminate failures and reduce manufacturing costs. Virtually all manufacturing organizations can benefit from having an effective RCA program. Most will agree that it is vital for continuous improvements.

Yet, there are few organizations that have achieved the level of excellence in RCA where it is routinely used to continually improve overall facility performance. In most cases, RCA, if done at all, is used in the case of major production loss events, damage to assets, or in reaction to a crisis situation within the organization.

In these instances, the need to perform RCA is typically driven by the urgent demand within the organization to “know why this happened,” so it can be understood by others, usually senior management. Most of us have experienced this urgency situation at some point in our careers, and have seen how effective problem solving is when focused and given priority.

Unfortunately, this application of RCA does not constitute a work process for improvement. In most cases, the outcome of this analysis is focused on preventing a reoccurrence of this single event. This does not constitute strategic improvement; it is a short-term activity addressing only one issue.

## THE NEED FOR AN ORGANIZATIONAL WORK PROCESS

# To better understand why RCA is not fully utilized, we need to review the basic concepts of Organizational Work Processes.

A work process is a system that provides a frame work for organizations to accomplish tasks in a repeatable, consistent manner. An example of a work process is the payroll function.

Each pay period, there are activities that are driven by organizational objectives and timelines. There are clear expectations for the outcomes of these activities, and individual roles and responsibilities have been defined for all participants. A “system” is in place to ensure that things get done in a defined and predictable manner.

Without getting too conceptual in our discussion on work systems, it becomes apparent that most RCA programs do not have the benefit of a work process such as that described above. In many cases in an RCA program, it is unclear what is to be done; when it is to be done, who will do it and how corrective action will be initiated. Most organizations assume that RCA training is all that is required for individuals to be successful in their efforts.

In reality, those who have had RCA training are usually unable to be effective in the absence of a work process. At best, the success of these individuals will be limited to areas where they can exert their personal influence in obtaining time and resources to correct true root causes. While some individuals have been successful using RCA to eliminate problems at the root cause level, it is difficult in most cases to do without organizational support.

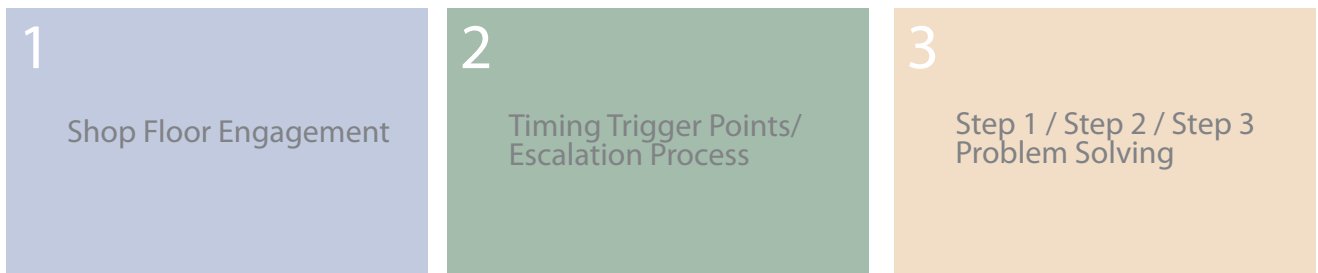
Additionally, those who attempt RCA activities as individuals will usually experience conflict with others who are not aware of their objectives for doing RCA. The reasons for this lie in organizational culture, which has been defined as “observable patterns of behavior that have been positively reinforced over time.”

Most organizations are focused on urgent, task-oriented activities. These “cultures” have encouraged individual participation in efforts to accomplish short-term objectives. Root Cause Analysts focus on improvement issues that may not be viewed as urgent or important by others. As such, analysts’ daily work priorities will be questioned by some who may see these individuals as “not helpful.”

This is a very common situation where individuals in a given department have been trained to do RCA but no overall organizational agenda exists for improvement. Management begins to view the participants in these conflicts as “problem employees,” when the true cause of the conflict is the absence of work processes and the lack of defined goals and roles for those involved.

Many RCA advocates experience the frustration of this conflict situation and lose enthusiasm for RCA. In my opinion, this is why RCA training usually fails to deliver long-term results, and most programs end up faltering.

# Developing a 3-Step Root Cause Analysis Organizational Work Process



## SHOP FLOOR ENGAGEMENT

The most valuable information for good RCA lies within the people that are the closest to the problem – Operators and Mechanics. Without getting the most important resources at the point of the problem to observe and discuss the issue, you risk concluding what you think is causing the problem to what is actually the problem. It is absolutely critical to have your shop floor personnel involved in the RCA process from beginning to end. Without having the most knowledgeable people involved in the process, true root cause identification will be very difficult to identify. While formal classroom training can provide shop floor personnel a good understanding of an RCA process, it can't teach them how to use it effectively. By utilizing the Celerant Closework<sup>®</sup> methodology, you can provide hands on training that will allow employees at all levels to see how the tools work and the benefit of using them as designed in the process. People retain more information by actual usage of the tools and processes. Closework<sup>®</sup> provides that critical side by side learning experience.

## TRIGGER POINTS & ESCALATION PROCESS

Timing is everything in a good RCA process. Setting critical timing triggers to problem solving is the framework to ensuring a downtime event does not go unresolved for long periods of time impacting plant efficiency. In our experience people get so involved in trying to solve a problem on their own they lose track of time causing negative impacts on plant performance.

Setting time parameters is the next critical element. Each manufacturing operation is different so it's important to set the parameters to minimize the economic loss. These timing triggers define the sense of urgency on how a problem is addressed and what resources are required at each trigger level.

Below is an example of how timing triggers define how an issue is escalated to the next level:

- Downtime event is 5 minutes long – Operator calls Operations Supervisor
- Downtime event is 15 minutes long – Ops Supervisor calls Maintenance Supervisor
- Downtime event is 30 minutes long – Ops / Maintenance Supervisors call Ops Manager
- Downtime event is 120 minutes long – Ops Manager calls Plant Manager
- Downtime event is 240 minutes long – Plant Manager Calls Director / VP of Manufacturing

By setting the timing triggers as described above it clearly defines who gets involved at what level and who has accountability of the problem the longer it goes unresolved.

## STEP 1, STEP 2, STEP 3 PROBLEM SOLVING

The final element to developing an effective RCA work process is the utilization of fundamental RCA tools as the downtime event moves through the escalation process. The objective of using a 3 step approach is to get to 3 key pieces of information.

1. Problem Statement – What happened to cause the downtime event?
2. Root Cause - What was the true cause of the issue?
3. Countermeasure – What was done to prevent the issue from happening again?

It's important to capture as much information as possible about the problem early on. If everyone involved waits until the problem is contained, you run the risk of potentially not remembering important details. As we described above with Timing Triggers and Escalation, standardizing the approach to using RCA tools will provide the structure to capturing the right information as the problem requires more formalized RCA measures. Let's take a look at a recommended definition for each step of problem solving using our sample timing triggers and escalation we described above:

- STEP 1: This step is designed to give the Operator, Mechanic, Ops Supervisor and Maintenance Supervisor a chance to get to the root cause of the problem within 30 minutes. This is normally successful with less complex problems and will not require any formal documentation.
- Step 2: This next step formally starts once the downtime event exceeds the 30 minute timing trigger point. At this point the issue has been escalated to the Operations Manager and begins the formal documentation process. The individuals who have been involved with the downtime event to date need to be included in the Step 2 process. There are many forms that can be used as long as they are designed to use good RCA methodologies. It is essential to use a simple form that can be understood by floor operators all the way to the Plant Leadership. An effective form should capture at least the following items:
  1. Problem Description
  2. Problem Statement
  3. Point of Cause
  4. Fish Bone Analysis

5. Why Analysis
6. Containment Measure
7. Identified Root Cause
8. Corrective Countermeasure

The information collected on the Step 2 form will be critical to reviewing the issue with everyone involved and escalating to Step 3 if needed.

- Step 3: Problem solving for Step 3 requires a formal Kaizen event. It begins when the downtime event exceeds 120 minutes and needs to be escalated to Kaizen. Several other factors can lead to an issue being escalated to Step 3 such as a problem contained within 120 minutes and no root cause identified or a repeating issue that has attempted to be corrected in prior Step 2 efforts without success. If an issue is escalated to a Kaizen, it should be scheduled and conducted within 48 hours. The Kaizen needs to include all individuals associated with the problem since the beginning. This will ensure the best chance of getting the facts out for discussion and identification of the true root cause.

## IN CONCLUSION

Developing a Root Cause Analysis work process will require effort and persistence as well as new thinking about organizational structure and resource priorities. It will require linking resources from the ground floor to the Operations Leadership. Without linking these resources, RCA will not be as effective as it can be. The most important information available when trying to get to the root cause of a downtime event lies in the hands of ground floor personnel.

The potential improvements from developing an effective Root Cause Analysis work process are significant. Most manufacturing processes have opportunities for improvement and cost reduction that have not been obtainable with current efforts. In some cases, these opportunities could represent competitive advantages in manufacturing strategies and processes.

Examine your performance and review your potential. You can reach this potential in your organization by developing a Root Cause Analysis Work Process.

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or call:  
Mike Schellberg  
Manager, Operations  
570 687 0018  
[michael.schellberg@celerantconsulting.com](mailto:michael.schellberg@celerantconsulting.com)



Celerant Consulting, Inc.  
Registered Office: 45 Hayden Avenue  
Lexington, MA 02421