Root Cause Analysis (RCA): A Silver Bullet or Just Plain Coveralls

Successful RCA initiatives have common threads for accomplishment. The management maintains an active role in the RCA effort. They take the responsibility to set up the support systems that will encourage the employees to go after and solve chronic issues that affect the bottom line. (See figure 1)

[1]
Figure 1 - Click to expand

Executive management decides the company will incorporate an RCA initiative and provide funding to create the environment needed for success.

The facility management must take the responsibility of determining the systems needed to support RCA at each site. Support systems are usually developed around the following areas:

- Performance Criteria
- How to Provide Time to Perform RCA Analysis
- How Recommendations will be Processed
- How Barriers will be Removed
- How to Provide Needed Technical Support
- How the Skill – Based Training will be Delivered
- How will Progress be Reported

When the front end work is completed there should be sufficient support for implementation. So far the silver bullet theory is looking more like work in coveralls. It is important to take into consideration that if RCA was easy everyone would be accomplishing huge financial benefits. In most cases things that are hard to accomplish reap the most gains and give the business edge to stand apart from the pack **(The lead wolf sees the changes first)**.

When the infrastructure is completed the management determines who will make the RCA process a reality. The “who” is extremely important, no matter how well a strategy is laid out it can fail if the right people are not chosen to carry out the mission.

Successful RCA programs have an RCA champion. The champion's primary function is to oversee the RCA effort and use the provided support systems to make RCA a part of the company culture. This position is essential for optimum RCA performance. When the champion has other major duties proaction is replaced with reaction and the focus on RCA gets sent to the Back Burner leaving the process with no clear leadership.

The champion is usually in an upper management role that dictates the attendance of many meetings. Because the champion has limited time, facility drivers are necessary. The drivers are the champion's insurance for long term success. Who the drivers are also affects the overall success of the RCA initiative. Drivers perform RCA and mentor others in RCA performance. This means they must have the internal characteristics that drive them to complete analyses without deviating from the methodology. Methodology deviations can send the analyst into wrong conclusions and possibly detract from the success rate of the RCA initiative.

RCA drivers report directly to the champion and have a relationship that encourages reporting any barriers to success. If testing is needed and no funding is currently available, the champion will work with upper management to make the case for funding the necessary test. The driver relationship with the champion must be healthy with respect to honesty. The driver must be able to talk openly without worry of being politically sacrificed because of their position.

The support systems and the champion / drivers are necessary for an RCA initiative that reaches its optimum potential.

The champion's main thrust must be to provide the RCA practitioners the time and technical support to perform RCA.

Preserving Failure Data – More Coveralls

A key component in performing RCA is gathering failure data. When RCA facilitators are asked to perform an RCA it is usually after some catastrophic event has occurred. Performing RCA is not usually in the minds eye until an unforeseeable undesired event occurs like:

- An environmental excursion
- Someone is seriously injured on the job
- Significant property damage is incurred
- Regulatory agencies require an investigation

This type of response is typical of the manufacturing world. The cultural focus would be best addressed before the undesirable event occurs. But because of reality the facilitator must perform RCA at a moments notice. For the facilitator this can present a challenge in acquiring the necessary failure data needed to perform a successful RCA.

Successful RCA initiatives have addressed this issue by creating a data collection strategy for both sporadic and chronic failures. Sporadic failures are failures that have long periods of time between occurrences and not usually for the same failure mechanism. Chronic failures are failures that occur frequently for the same failure mechanisms.

Whether the failure is Sporadic or Chronic the RCA facilitator faces data collection challenges like:

- Parts from failures are thrown in the dumpster
- Production doesn't want the investigator distracting their employees by asking them a lot of questions
- Supervision blocks data collection because of fear of being exposed for doing something wrong.
- Positional data is lost quickly because the equipment is repaired and started up as soon as possible.
- Procedures are not up to date or missing important bulletins.

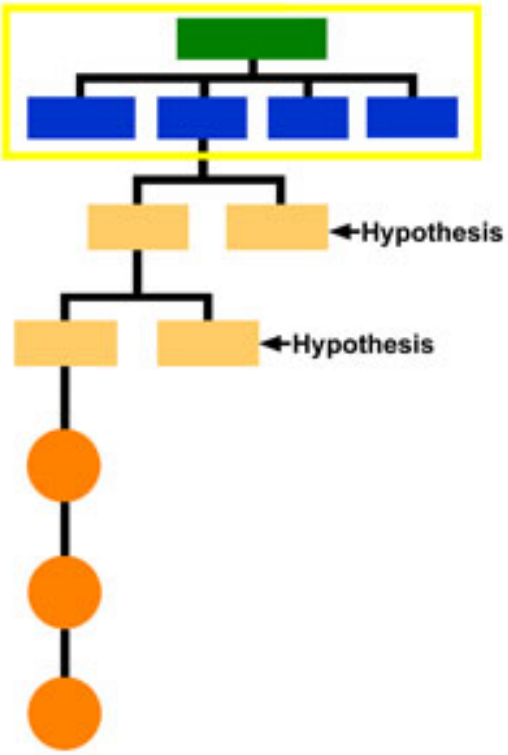

Figure 2

Successful RCA companies have overcome this challenge by creating strategies for data collection. The strategy can include:

- Educating the manager and supervisory level of the organization about RCA and its value to the company.
- Performing a Failure Modes & Effects Analysis (FMEA) to determine the most

significant losses to the facility and sharing the financial significance with area management.
- Having assistants on each shift that know what data to collect if a failure occurs on their shift.
- Plans to gather data using a test. (sometimes tests can be performed while equipment is running)

Technical Support for RCA Facilitators
Verify Each Hypothesis:
True RCA involves exposing all the possible ways a problem can occur in the form of hypotheses. The hypotheses are in the form of a logic tree as seen in Figure 2.
The backbone of the logic tree is the verification of each hypothesis. The analysis cannot stand firm without this component being completed. When hypothesis verification is complete, hypotheses that did not happen can be eliminated and the ones that did happen can be pursued to the true root causes. See Figure 3.

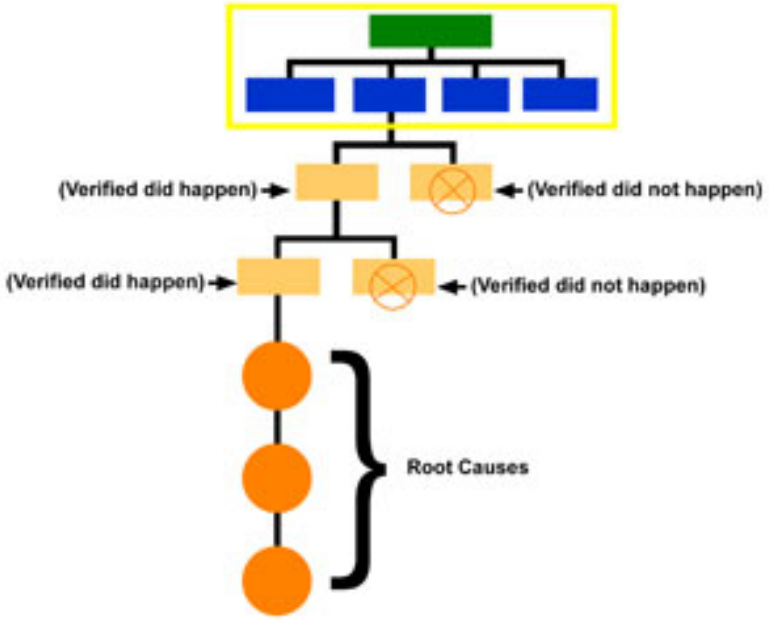

Figure 3

Without technical support the RCA process can loose momentum. Technical support can be a barrier to a successful analysis. Many companies may not have the technical expertise available to perform some of the verification tests necessary and some companies are not willing to pay outside experts to perform the testing. Still sound like a silver bullet or is it sounding more like work?

Testing can be:

- Trips to a vender to see how rebuilds are performed
- Finite element analysis
- Operating deflection shape tests
- Model analysis
- Metallurgical analysis
- Lubrication analysis
- Controlled tests to force failure

The technical support can be expensive but the ability to prove or disprove hypotheses will pay for itself by eliminating the failure mechanism.

Successful RCA initiatives can bring enough payback to finance the entire reliability effort and then some.

In every case of successful RCA the amount of support is directly related to the overall success of the initiative.

Implementing Recommendations:

Successful RCA initiatives know that a solid analysis reveals the entire failure mechanism. The mechanism will contain three levels of root cause; physical, human, and latent.

Companies with successful RCA initiatives have found you should not write recommendations for physical and human root causes because there is minimal value to the organization.

Physical root causes are generally a failed component that will be replaced out of necessity with an equally reliable new component. The human root causes are often driven by management systems and correcting them with discipline to the individual would indicate a cultural defect in learning. The latent roots (deficient management systems) are the systems that are in place and not working or systems that are not in place and need to be created.

The power of RCA is in its leverage. The leverage is writing recommendations for latent roots because the system corrections will prevent other future failures from occurring.

Conclusions:

The intension of this article is to heighten awareness about the effort involved in performing effective root cause analysis on a broad platform. To my knowledge there is no silver bullet to solving difficult problems.

The hard work it takes to solve difficult problems is well worth the investment and effort because in the long run the institutionalizing of a successful root cause analysis process will give the company an edge that most others will never attain. The effort it takes to focus and drive a strong RCA process is just too much commitment for many companies.

A company serious about a successful RCA initiative can follow the following simple set of rules listed below:

- Follow a disciplined RCA approach and adhere to the structure of the approach.
- Use a cross functional section of plant personnel and experts to participate

in the analysis.
- Do whatever it takes to verify or disprove all hypotheses (Technical Support)
- Management agrees to fairly evaluate the analysis teams finding and recommendations upon completion of the RCA analysis. (Timely fashion with rapid response)
- No one is disciplined for honest mistakes.
- A measurement process is used to track the progress of implemented recommendations.
- RCA results (lessons learned) are leveraged back into the organization.

So, put on your coveralls and let's get to work to make a difference to the bottom line.

Written By Mark A. Latino
Mark A. Latino is Vice President of Operations for Reliability Center, Inc. (RCI). Mark came to RCI after 19 years in corporate America. During those years a wealth of reliability, maintenance, and manufacturing experience was acquired. He worked for Weyerhaeuser Corporation in a production role during the early stages of his career. He was an active part of Allied Chemical Corporations (Now Honeywell) Reliability Strive for Excellence initiative that was started in the 70's to define, understand, document, and live the reliability culture until he left in 1986. Mark spent 10 years with Philip Morris primarily in a production capacity that later ended in a reliability engineering role. Mark is a graduate of Old Dominion University and holds a BS Degree in Business Management that focused on Production & Operations Management.

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