

Implementation of an RCA Process For Front-Line Supervisors

**David J. Evans, CSP
Area Manager Safety & Security
Cliffs Natural Resources
United Taconite**

Introduction

Cliffs Natural Resources chose to implement a root cause analysis (RCA) process as part of its quest to create the safest possible mining operation while successfully competing in the marketplace. The RCA process requires us to solve concerns as soon as they arise, and more importantly, solve these concerns in such a sustained manner that we never expect to see the concern again. A key aspect of this process is solving the concern not only quickly and effectively but also as close to the floor as possible.

This process was implemented at a time of great uncertainty, both internally to the company and externally. The earliest discussions of the process were started when iron mining was undergoing the biggest boom in recent history. Process developments occurred during and after the market crashed, and our marching orders went from produce everything that you can to conserve everything that you can. Furthermore, this process was launched when all of our plants were in a restricted operations mode, both in terms of tonnage and manpower. A major concern was that we were going to launch a major new initiative requiring significant resources at a time when we had just reduced the size of our salaried workforce. To its credit our leadership, from top to bottom, met the challenge.

The RCA has many definitions; but at its base a, “Root Cause Analysis is any evidence-based process that at a minimum, uncovers underlying truths about past adverse events, thereby exposing opportunities for making lasting improvements.” (5/20/04 – Mr. William Salot)¹ We commonly think about the root cause analysis application as part of the Space Shuttle Challenger disaster and other high profile events conducted by teams of specialists with a significant amount of resources available. However, these techniques are universal and have applications at a variety of different levels.

Cliffs has leveraged these universal principles and applied them to the front-line supervisors who are closest to the process, tools, and equipment and have the authority and influence to begin resolving and owning the solutions to these harmful or potentially harmful events. The process

¹ Latino & Latino. 2006. *Root Cause Analysis*. 3rd edition. Boca Raton, FL: Taylor and Francis.

can be expanded as necessary to address concerns that are outside the supervisor's sphere of influence.

Cliffs originally adopted the RCA process to address reliability of equipment, and it worked very well for that application. However, we quickly found that we had disparate processes, with each group using different tools that did not have the same look or feel, and often came to different conclusions, creating confusion and sluggish responses. Using a standard RCA process for all equipment, process, equipment, safety and environmental events has greatly improved communications and shortened the decision cycle.

The RCA tool is flexible and expandable from a basic form, to a white board, to a computer software solution, based upon its complexity or as a result of a risk assessment. This form and the tools we have provided walk the supervisor through the RCA process and assist him not only with initial scene response but also with principles of evidence collection and preservation that will be necessary for the later development of the solution. The training and procedures we provide also ensure that we have appropriate management focus and support for the successful completion of the process.

The centerpiece, and probably initially the most daunting part of the RCA process, is the logic tree that drives the root causes. However, the process is the same for the space shuttle and an employee who slips on water while responding to an alarm. In each case it allows the supervisor and other reviewers in management clearly understand not only the event but also the thought process that the RCA team used to develop their recommendations. Again this logic tree can be expanded with additional tools and resources as the situation demands.

While many facilities have adopted a root cause process they are often the responsibility of the process, reliability or safety engineers. Cliffs has taken this tool and applied it to the front line supervisor who is most directly empowered to correct potential harmful events.

Gap Analysis

In North America, Cliffs operates five taconite processing facilities. Three of these are located in Minnesota, one in Michigan and one in Labrador, Canada. It recently acquired three underground coal operations in Alabama and West Virginia. Safety functions in the taconite operations were loosely coordinated from a Shared Services Component in Minnesota. The challenge of integrating the coal facilities into the existing structure was significant not only in terms of processes but in terms of culture.

This concern was particularly evident when you considered accident investigation. Not only where the differences in approach dramatic between coal and iron ore but even between plants. Within a facility there were also differences between approaches taken by safety and those taken by emerging business improvement and reliability functions. This lack of a common language inhibited communication and problem solving as it created inefficiencies and frustration in upper management from seeing a wide variety of report formats.

Secondly, a concern was raised on accountability and responsibility for accident investigations. Some facilities relied on the safety department to investigate incidents, others the supervisor and many relied on some combination of the two. Left out of the picture were business improvement

and reliability which were being given increased resources and had a vital skill set and desire to be part of the solution. Because of this lack of organizational unity of command, the Supervisor, who was accountable for the safety of his /her employees, was not fully engaged in the safety process.

Thirdly, training around safety was weak. Cliffs had launched an extensive training process known as SLT or Safety Leadership Training early in the decade, but had not followed up with this training when a large group of new hires both salaried and hourly were brought on board. Thus many of our supervisors had not had the benefit of this training outside of their orientation and what they might have learned from their fellow supervisors. Additionally this training, had not changed the culture of that's the way we do it around here.

Process

Cliffs addressed all three of the above concerns with its RCA process.

First it gathered leadership support for the process. A key part of this support was the involvement early on of a broad based development team that included Safety, Business Improvement, Reliability, and Operations. The team was championed by two General Managers who were very active and ensured the resources needed and more importantly the leadership support and optempo were provided. Second, it established a common process was agreed by the group which aligned the efforts the different functional organizations and established a common language and frame of reference. The capstone of this common process is the Logic Tree. Cliffs has a license and several qualified operators of the excellent Proact Software package developed and described by Robert and Kenneth Latino in their book, *Root Cause Analysis*², however a goal of the process was to involve the Front Line Supervisor and make him responsible for completing the analysis. A simpler system was needed. We developed an Excel version called a logic tree that supported our five why/how can methodology. We formatted this excel document to fit on legal sized paper and then can be attached to the electronic incident tracking system used by Cliffs called CIFORM (see Table 1). This paper process as opposed to a computer base solution supported our desire that these investigations be done by Front Line Supervisors who do not have a lot of computer resources or savvy. More importantly it allowed the process to be taken to the floor where the incident happened, further supporting a good analysis. The use of this paper based electronic format also supported our goal of having the Front Line Supervisor start the investigation and then depending on the severity of magnitude of the incident we could easily transition from a supervisor led exercise to a more complicated and resource intensive analysis involving senior management using the Proact tool.

The Logic Tree supported the Five Why/How Can Methodology we chose. This system used by UAW-GM “follows a structured question and answer sequence that contains a feedback loop to the previous question. This process continues until an answer provided is unacceptable and cannot be justified.”³ The process usually stops at about 5 whys because at that point, either you

² Latino & Latino. 2006. *Root Cause Analysis: Improving Performance for Bottom Line Results*. Boca Raton: Taylor and Francis

³ UAW-GM Center for Human Resources. 1998. *Incident Investigation: The 5 Why Root Cause Analysis Process*. Detroit: UAW-GM Center for Human Resources.

are at the root cause, or the why is something that is outside your span of control. We chose to use both the term 5 why and how can to facilitate thinking about an event. Very often if a group becomes stalled in asking a why question if they simply rephrase the question from a Why Did to a How Can question the answer emerges.

In the end we had a common tool that is used by all functions of the Company from Operations to Safety and from Business Improvement to Reliability and Maintenance. This tool is used to investigate and analyze safety events from near misses to significant traumatic injuries; from minor spills to those that require outside assistance and remediation; from bearing failures to mill failures, and even operational deficiencies. All of these scenarios are covered with a common process and a common reporting format.

The second area we addressed with our Root Cause Analysis Process was Supervisor's accountability and expectations. Dan Peterson's fifth principle of safety is that the "function of safety is to locate and define the operational errors that allow accidents to occur. This can be carried out in two ways: (1) by asking why accidents happen –searching for their root causes- and (2) by asking whether certain known effective controls are being utilized.⁴ Our belief is that problems are best solved closest to their occurrence both in time and space by those who understand the event and work with the tools/equipment/processes/people day in and day out. Thus the Front Line Supervisor is in a position closest to the process, tools, equipment and people with the authority and influence to begin resolving and owning the solutions to many of the causes of everyday events. The Front Line Supervisor assigned the work, knows the process that would be followed, assigned the resources and has either supervised or actually performed the task himself.

The Front Line Supervisor has the critical responsibility to gather the evidence so critical to the RCA process. They are enabled in this responsibility by often being the first on the scene, to preserve the evidence, protect the operation from further loss and analyze, identify and help resolve the root causes and at risk behaviors leading to the event.

A key issue was timing. Completing logic trees can be a tedious and time consuming task. We understood that Supervision was extremely busy on the floor and that resources were constrained. We wanted to make sure that the exercise of conducting a RCA was a value added experience. We provided the Supervisor with a risk assessment tool which gave a recommendation based on risk severity and likelihood of occurrence. Cliffs chose to modify a Risk Assessment matrix presented in the ANSI Z10 Manual.⁵ We simply restructured this manual with the same matrix but replaced the action to be taken with a recommendation on completing a full RCA. This matrix allowed us to properly channel valuable resources to the high hazard operations. Of course, even if it was a minor event, that may have an unacceptable frequency or if the root cause is not identified by the accident analysis, then the completion of the entire process to include the logic tree is required. Additionally we trained our leadership on when to apply the RCA model to activities outside the Safety structure such as environmental events or production delays or losses.

⁴ Dan Peterson. 2003. *Techniques of Safety Management: A Systems Approach*. 4th edition. Chicago: American Society of Safety Engineers.

⁵ Fred Manuele. 2008. *Advanced Safety Management-Focusing on Z10 and Serious Injury Prevention* Hoboken, NJ. John Wiley and Sons

Going back to its original use we provided guidance on when to use it for mechanical failures and unexpected repairs.

The Front Line Supervisor can perform these tasks within their sphere of influence, and as necessary additional levels of management can become involved based on the severity of the event. It is the responsibility of the Middle Manager to ensure that the RCA is completed in a timely and satisfactory way and determine additional steps which may need to be taken such as requesting a more detailed analysis with additional resources.

The process allows the Front Line Supervisor a lot of flexibility. The central idea is to get the investigation out of the office and on to the floor. Having a paper logic tree facilitates this. Sometimes, it is useful to brainstorm solutions with a group of hourly employees with our approach any place with a white board will do. No computer resources are necessary. The process can be scaled up or down as the situation requires.

The third area we addressed was training. Training was critical since we had several issues to address. First we had a diverse group of Supervisors to train. Some had the benefit of the previously delivered training while some were new hires that may or may not have had experience in incident analysis. In the case of our Coal Operations, they had been trained on an entirely different process. In all cases, we found that we had a deficiency in our training with our accident investigation reporting system. Some were comfortable with the system especially those who were computer savvy but most were intimidated by the system to some extent.

The second area of training we wanted to address was content. Not only was our target audience diverse in terms of skills we wanted to provide additional training to our Middle Managers so that they felt competent with facilitating the process and mentoring the Front line Supervisors. Our training process was set up with slightly different curriculum for each group.

Initially an overview of the process was given to the senior leadership to confirm their concurrence and receive their buy in and final process suggestions. Then the Sites presented the process to the Site Leadership Teams, so they knew the strategy, expectations and the resources that would be required. It was extremely helpful here to have the General Managers at each Site involved in the process from the beginning. After the site presentations were completed, a short presentation was given to all salaried employees explaining the rationale for the training and what would be involved and specifically to the Front Line Supervisors concern; how does it affect me!

The actual training was broken down into two curriculums. The first was directed specifically at our Front Line Supervisors. This training was developed at our Michigan Operations and was piloted at a small section of the operation. After this pilot was completed and lesson learned applied, training was developed and expanded for the Middle Level Managers. This pilot was conducted at United Taconite in Minnesota. The Front Line Supervisors were given the training that was refined based on the lessons learned from Michigan Operations and our Middle Managers were given additional training to assist them in their mentoring and facilitating role. While the training at Michigan involved a small section of the Operation, the training at United was expanded to include the entire processing plant. At this point, we were scheduled to turn it over to one last site for a full pilot launch of process. However, because of the significant enthusiasm generated by the process and the success of the previous pilots we went to full implementation across Cliffs immediately and dispensed with the final pilot.

The third area of training which we wanted to address was timing. Training was traditionally a one shot affair. While this made scheduling and completion of the task easy, it hindered learning. We divided the training up into three phases.

The first phase of the training included the rationale of the training, and overview of the RCA Process. This training directed at the Front Line Supervisor lasted 3-4 hours. The training modules included: 1 The RCA Process; 2. Preserve and Collect Evidence; 3. The Cause and Effect Principle; 4. The 5 Whys and How Can/Why Did; 5. Building the Logic Tree; 6; Use of the Evidence; 7. Solutions to Root Causes. Phase 1 training for Middle Managers followed the same format but went over the material in greater depth, and took 6-7 hours.

Following the first phase of training a period of 2-4 weeks elapsed where the group was allowed to practice the techniques which they learned in Phase 1 in actual scenarios on the floor. This allowed the Front Line Supervisors to practice, understand the process and formulate questions. At this point the Front Line Supervisors needed a lot of help and were unsure of the process and their responsibility in a real life scenario. It was critical that the trainers and the middle managers were available to mentor and coach the process. Often we would just grab a couple Supervisors on a break and run through imaginary scenarios with them. Sometimes we would have a canned RCA that we could review with them on the spot. This constant practice and mentoring was also crucial to demonstrate that we were there to help and that we weren't just dumping a new requirement on them during a period of rightsizing and uncertainty.

The second phase followed the same format of the first both in terms of timing and content. Topics covered in the second phase included: 1. A refresher of topics learned in Phase One; 2. Risk Analysis and the RCA Process; 3. Understanding decision making and how it applies to the RCA process; 4. Behavioral aspects utilizing the ABC model; and 5. A review of the CIFORM data Entry Process. Phase 2 training for middle managers added team facilitation and mentoring skills as well.

As with Phase 1 we waited around 1 month to start the 3rd and final phase of the process. As before we used this time to check, coach and mentor understanding of the process.

Phase 3 is the final phase of the training. This phase normally lasted several hours and was a final check of the process. No new information was shared by the Training Team, but a lot of sharing went on as the participants discussed what situations they encountered and how they were able to resolve them.

We asked each Supervisor to bring in a completed RCA to review with the group. And the Training Team was on a constant lookout across the company for excellent RCA to show with the group. We also tried to show participants RCAs that were not applied correctly or provided a good lesson learned.

As you might expect the process, while applicable across the functional teams at Cliffs was focused initially heavily in the safety functional area. We tried to share RCAs that had been completed by the Environmental or Reliability Departments to expand the horizons of the participants.

In addition to allowing us to constantly check for understanding by using this 3 phase approach, it led credence to the process being one of continuous improvement for the Front Line Supervisor and Middle Level Manager as well as the Safety, Business Improvement, Reliability and Operations functions. It served to remind everyone that this was a long term process and not a flavor of the month to be tolerated.

Conclusion

The RCA process that Cliffs has adopted has met its objectives of providing a comprehensive, standardized approach to incident analysis across the relevant functional areas across Cliff's sites. It has reinforced our commitment to safety not only to our salaried workforce but our hourly workforce as well. It has established clear accountability for incident analysis with the Front Line Supervisor, supported by the Middle Level Managers and above. Finally it has provided a common reporting format so that sites can easily share information and learning from harmful events.

The tool is scalable to deal with a simple near miss to a traumatic injury. It is easily understandable to the Supervisor and the employee on the floor. Its focus on evidence collection up front and puts a premium on conducting a good analysis on the floor as opposed to entering into the computer whatever the participants in the event tells you. Furthermore it allows senior managers the insight into how the RCA team approached the issue, allowing for senior management to offer thoughtful and precise advice to the Team. The tools that go along with the process such as the investigation guideline, the logic tree and the electronic software "how to" guide are invaluable tools for the supervisor. The analysis of a harmful event is stressful enough and these tools help assure the Supervisor that he has done the right thing and asked the right questions.

Most importantly the training has stressed to our Front Line Supervisors that they own safety. We have taken the mystery out of incident investigation and given it to the leaders in our company, who can most likely make changes in conditions and behaviors on the floor. Their leadership results in solutions which do not hinder safety, but rather support safety when the boss is not around. They provide direct evidence to the employees the Supervisor affects so directly that s/he truly does care about their safety and has the tools and knowledge to make a difference.

The success of this process on a corporate level was largely due to the upfront planning that took place. We had built so much ownership and enthusiasm in early that our leadership team was clamoring at the bits for us to launch the process. Our biggest challenge going in was conducting the pilots, prior to the complete launch.

At this point it is too early to tell how it will affect our metrics though early results are encouraging. In terms of qualitative feedback the process has been a success in several key areas. First it has dramatically improved the qualities of our incident analysis. We are much more likely to find out not only what happened, but how it happened. By driving for root causes we are beginning to get beyond the concept that inadequate training and employee instruction are the keys to all harmful events. It has bolstered our efforts to tackle "at risk" behaviors with an analysis of what at risk behavior the employee chose, but what in the management system allowed him to choose an undesired behavior.

References

Latino, Robert and Kenneth. 2006. *Root Cause Analysis: Improving Performance for Bottom Line Results*. 3rd Ed. Boca Raton: Taylor and Francis.

UAW-GM Center for Human Resources. 1998. *Incident Investigation: The 5 Why Root Cause Analysis Process*. Detroit: UAW-GM Center for Human Resources.

ABS Consulting. 2005. *Root Cause Analysis Handbook: A Guide to Effective Incident Investigation*. Brookfield, CT: Rothstein Associates.

Manuele, Fred. 2008. *Advanced Safety Management-Focusing on Z10 and Serious Injury Prevention*. Hoboken, NJ: John Wiley and Sons

Peterson, Dan. 2003. *Techniques of Safety Management: A Systems Approach*. 4th Edition. Chicago: American Society of Safety Engineers.

