

How to Learn from Things that Go Wrong
- Recommended Corporate Approach -

How to Learn from Things that Go Wrong, Without Hurting People in the Process

A Recommended Corporate Approach

Failsafe Network, Inc.

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Preface

There are many "Root Cause Analysis" methods, procedures, and approaches on the market today. Failsafe's methods are considered one of these. It is the position of Failsafe Network that none of these methods define "root causes," including Failsafe's. Why, then, use the phrase "Root Cause Analysis?"

The people that develop Root Cause Analysis methods, as well as those who practice these methods, have confused one another. No-one can agree on "what is a root cause," and yet everyone says they're defining "root causes." Saying it differently, everyone says they do "Root Cause Analysis" these days, and yet everyone is doing something different. Think about it... hundreds of thousands of people all over the world are doing "Root Cause Analysis," with few people having the same understanding of what it is. Few other pursuits in life exhibit such a variation in understanding.

With this in mind, it is the position of Failsafe Network that the phrase "Root Cause Analysis" has become problematical.

Although the general pursuit of a "root cause understanding" seems ultimately worthy, business people will not want to pursue this understanding. This is because when they pursue "the cause of the cause of the cause of the cause..." they quickly find themselves addressing things outside their control. Inquiries of this sort begin to question "how Joe was raised as a child." Even more, the way Joe's parents and then grandparents were raised can easily become "causal factors," as well as many other cultural and societal issues of each age. This "cause of the cause..." pursuit is never-ending, and in-the-limit would take an investigation back to "the beginning of time" (literally).

Failsafe is not aware of any "Root Cause" Analysis method that suggests tracing the causes of a problem all the way back to "the beginning of time." And yet, this is where a true "Root Cause Analysis" would have to end. The test is simple: if you ask "why," and there is an answer, you're not at the "root cause." In other words, even things that are beyond our control are causal factors, even though we do not intend to address them. Herein lays the problem. No-one intends to trace our problems to "the beginning of time," or to "things beyond our control" (including Failsafe) and yet everyone is using the phrase "Root Cause Analysis."

Because we do not intend to trace our problems to "the beginning of time", we choose other ending-points for our inquiries. Even more, we choose what kinds of things to look for, and by default, what kinds of things to ignore. Each Root Cause Analysis consulting company has chosen to pursue different kinds of issues, in different ways – each of them calling their product "Root Cause Analysis."

Companies hire these consultants to train their people in "Root Cause Analysis." Typically, after being trained, most companies "pick and choose" what they want to embrace (from amongst the consultants advice). Everyone involved, from the consultant, to the trained company, to the individuals within the trained companies have made choices: "this is the depth I'm willing to probe; these are the kinds of things I'm willing to ask; this is how far I'm willing to take the inquiry." Hundreds of

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thousands of people all over the world are doing "Root Cause Analysis," based on millions of limiting choices – splintering, diluting, and confounding the endeavor called "Root Cause Analysis." A few years ago an 850 member web-based forum, with Root Cause Analysis professionals from all over the world, tried to define "what is Root Cause Analysis." They could not come to a consensus! Everyone is doing Root Cause Analysis, yet no-one agrees on what it is.

This present situation is absurd (at best), and deadly (at worst).

In today's world, where most people are going as fast as they can, few people spend much time thinking about "why things go wrong." When people are forced to do some sort of analysis of their problems, they try to fit it into everything else they are already doing. Typically, people search the internet or talk to contacts in other companies to find a quick way to accomplish this requirement. They find various offerings of Root Cause Analysis, each suggesting something different – none of them (including Failsafe) addressing "root cause."

*But when the people who've given little thought to this think they have arrived at a root cause understanding of something (consciously or subconsciously), they naturally stop their inquiry. In our fast-paced world, this has caused many people to have been lulled into a false sense of security. They think they have understood the root of their problems, but they have not. Suddenly and unexpectedly ugly, even deadly problems continue to emerge, all caused by unacknowledged and underlying issues that were hiding behind the cloak named "Root Cause Analysis." Because of this, **it could even be said that the endeavor we call "Root Cause Analysis" has become one of the causes of our problems.** The repetitive misuse of the phrase has lulled hundreds of thousands of people into believing that they actually have a "root" understanding of something, when they've only scratched the surface.*

Because of this, Failsafe will no longer use the phrase "Root Cause Analysis!"

The intent of this preface, therefore, is to explain what you are about to see when you delve into this document. You will not find the phrase "root cause," "Root Cause Analysis," "RCA," or any of the other phrases that are currently being misused. Instead, Failsafe has decided to use names and phrases which are more fitting to its suggested endeavor. As described in this document, Failsafe's approaches will help people discover the Physical, Human, and LATENT (inherent) Causes of their problems. Because Failsafe's inquiry ends at "Latent Causes," Failsafe's brand of RCA is called:

Latent Cause Analysis

Latent Causes, as you will see, are defined by the people most directly involved in the incident. After defining the "physical" and "human" causes of an event, these people are required to answer two questions:

What is it about the way we are that contributed to this event?

What is it about the way I am that contributed to the event?

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It is Failsafe's position that these questions take us as close to "root cause" as we can practically attain (although they do not take us to root cause).

No-one is currently doing "Root Cause Analysis," and yet everyone thinks they are. This is a dangerous situation, lulling people into a false sense of security. Failsafe has no illusions that it can change a phrase that has become such a part of our lives. On the other hand, Failsafe will not be part of the problem! Failsafe will help people see themselves as part of their problems. This is as close as we can come to identifying "root causes" without going back to "the beginning of time." Yet even this is not "Root Cause Analysis." It is Latent Cause Analysis."

Thank you,

*C. Robert Nelms
Founder, Failsafe Network, Inc.*

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1. Purpose of this Document

Interest in Root Cause Analysis has mushroomed since the mid 1980's. Whereas only a few practitioners were teaching and leading LCA's in the past, dozens of companies are now providing training, consulting, and investigative services. Each of the current providers has a unique approach to Root Cause Analysis.

The purpose of this document is to distinguish the difference between Root Cause Analysis and Failsafe Network's approach to Latent Cause Analysis so people can:

- Decide whether to embrace Failsafe's approach to LCA and, if embraced,
- Approach LCA in a comprehensive and consistent manner.

The audience for this document is:

- People who are evaluating Failsafe's approach to LCA.
- Organizations who are establishing their own corporate LCA practices based on Failsafe's approaches (they can use this as a seed document).
- Individuals who are trying to champion a Failsafe-based LCA effort within their organizations.
- Investigators who wish to follow a definitive investigative method.
- Failsafe Network's Licensed Affiliates.

2. Scope / Application

This Latent Cause Analysis Process can be used to investigate all kinds of things that go wrong.

LCA's have been historically associated with either catastrophic failure in our physical systems, or severe injuries to our physical bodies. This is unfortunate because unresolved small problems are the cause of these catastrophic problems. LCA's, therefore, ought to be focused on the unresolved small problems that cause big problems. In the limit, therefore, the Latent Cause Analysis process described in these pages can be applied to everything that goes wrong, both large and small problems.

Because of the potential comprehensiveness of the endeavor of Latent Cause Analysis, a pre-defined and well-understood structure must be in place to suggest:

- What is Latent Cause Analysis?
- How is a Latent Cause Analysis performed?
- How can an organization migrate from its present state to that where everything that goes wrong is subject to various forms of LCA?

3. Evolution of Latent Cause Analysis

Admittedly, Failsafe has changed its emphases since 1985. This is bound to have happened, and will certainly continue to happen as we learn more about why things go wrong. Whereas in the early years, we were intrigued with the physical

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causes of specific problems, we have increasingly migrated towards people. People cause problems. More accurately, "the way people think" causes problems.

The following chart helps explain the evolution of Failsafe's approach to Latent Cause Analysis.

Early years	Middle Years	Current
Solve One Particular Physical Problem	Prevent Future System Problems	Prevent Future People-Related Problems
Address Physical Causes	Address Management System (Work Process) Causes	Address Latent Causes (What is it about the way we <u>are</u> that contributed to this incident?)
Avoid the human issues	Avoid the human issues	Confront the human issues
Purely technical quest	Largely systems quest	Largely human quest
Little, if any method	Much emphasis on method	Much emphasis on attitude
Emphasized changing physical things	Emphasized changing the management system	Emphasizes changing PEOPLE
Performed by metallurgists on specific problems	Performed by a few people who have been trained in a specific method for use on specific problems	Intuitively performed by everyone on all problems

It is important to note that in Failsafe's evolutionary LCA process, nothing has been discarded along the way – everything has more-or-less been kept. In essence, Failsafe's LCA process has simply expanded its scope. For example, we still make physical changes when necessary after doing LCA's. Likewise, we still change our Management Systems when we find flaws. Metallurgists are still heavily involved in the analysis of physical failure, and highly trained people still lead the investigation of complex failures.

Instead of eliminating important past facets of LCA's, there have been two major changes in emphases.

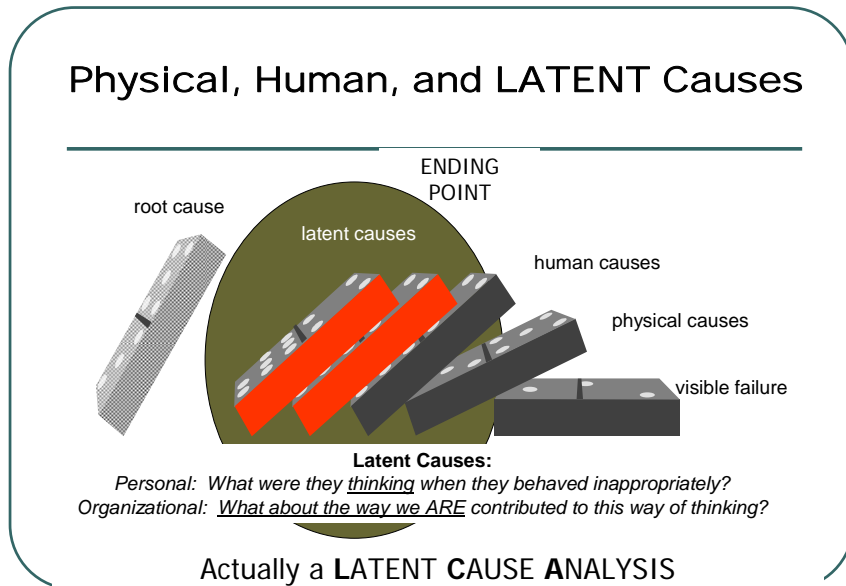
First, instead of avoiding people (for fear of blaming them), Failsafe is now confronting them when they have contributed to things that go wrong. Failsafe has learned how to do this in an effective, caring, and constructive manner.

Secondly, instead of relying on a handful of people to do LCA's at a particular site, Failsafe recognizes the need to involve everyone at that site. This is necessary because **unresolved small problems cause big problems**. There are so many unresolved small problems, it is impossible for a small handful of people to address all of them. Also, it is important for everyone to discover his or her own role in things that go wrong. We are ALL part of the problem.

In summary, Failsafe's approach to LCA is becoming more and more of an introspective exercise performed by everyone.

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4. Objective of Latent Cause Analysis



Events that happen in our lives are sensed in one form or another. If it were not for our senses, we would not know that things occur. The subject of this document (and of LCA) is the problematic events that people sense in their lives. Another word for these problematical events is "failure."

"Failure," therefore, is anything tangible, visible, or physical that ought not to have occurred. The human "feeling" that accompanies this kind of phenomena is "pain." The level or intensity of the pain is intuitively indicative of the seriousness of the event. Although many organizations attempt to formalize the seriousness of an unacceptable event, our humanness seems to do this automatically.

Nevertheless, when such an event occurs it will be visible (or sensible) to the observer at various levels of pain, depending on the nature of the event. If it is an unacceptable event, we call it a "**visible** (or sensed) **failure**." For example, "the shaft broke."

When such an event does occur, its causes are always numerous and deep, no matter whether the event is large or small.

Visible failures that are physical in nature (i.e., a shaft that breaks) always have "**physical causes**." For example, the shaft failed in fatigue due to rotating bending stresses.

But people do things that enable (or trigger) the physical causes. We call the things that people do "**human causes**." Human causes are acts of omission or commission and answer the question "who did what wrong." For example, the

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mechanic misaligned the motor and the pump (which caused rotating bending stresses in the example above).

Failsafe's methodology requires the identification of Human Causes. In other words, there must be a Human Cause for all unacceptable events. The naysayer might object to this, saying that some things "just happen." Their arguments include acts of nature such as lightning strikes, tornadoes, and floods. However, the **ONLY REASON** for doing an LCA is to understand what we (as humans) did or did not do that contributed to the consequences of the event. If we find nothing, then the same consequences **WILL** occur in the future. Again, **the ONLY reason for doing an LCA is to understand our HUMAN role in the event.**

However, stopping at the Human Cause will result in finger-pointing and witch-hunts. This is certainly **NOT** the intent of an LCA. True Latent Cause Analysis starts at the human, and then attempts to understand why the people did what they did. It's not as difficult as it might seem.

Failsafe's LCA process tries to understand human behavior in three steps:

- **What thoughts were going through the hands-on person's mind when they behaved inappropriately?** This is the most important step for revealing latent causes – after all, our thoughts control our actions (or inactions). If we want to know why people do what they do, we must understand what they were thinking when they did it. Most of the time, the people involved will reveal this information freely.
- **What is it about the way we (as a business) are that contributed to these thoughts?** All involved parties must hear and understand the thoughts that were going through the hands-on person's mind. After hearing these thoughts, these people are required to answer the above question. We call these organizational latent causes.
- **What is it about the way I am that contributed to these thoughts?** Although it is useful to answer the "we" question, it is usually too vague and impersonal. Therefore, the ultimate objective of Failsafe's LCA process is to help everyone see their own role in things that go wrong. We call these personal latent causes.

In summary, the basic objective of LCA is to identify not only the **Physical Causes** of a failure, but also the **Human Causes** and the **Latent Causes**. Unless all three levels of causes are found and corrected, the failure will likely repeat itself because the same cause will trigger similar failures in other equipment, systems, or people.

The ultimate objective of LCA, however, is to change people. Therefore, LCA is becoming an intense, **introspective endeavor**. Failure is, perhaps, the only phenomena in our existence capable of fundamentally changing us – for the better – if we slow down and ask the question:

"What is it about myself that contributed to this event?"

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5. Organizing for Success

Few organizations have realized the need to embrace this introspective endeavor, especially on the scale proposed by Failsafe. This is natural. Refineries, chemical plants, manufacturers and other businesses are focused on generating wealth for themselves and their demanding stockholders.

On the other hand, the public is becoming increasingly intolerant of work-related injuries, damage to the environment, fraud, and other public abuses.

The only way to walk the tightrope between the need to increase profits and the need to decrease injuries (and other negative consequences) is to control our businesses to a much greater degree than ever before. In the limit, however, our ability to control our businesses is proportional to the extent we understand OURSELVES. After all, we are in CONTROL of our businesses.

Any successful attempt to increase our understanding about our businesses (and ourselves) must focus on things that go wrong within that business. This is because the only way to increase our understanding of our universe and ourselves is to learn from things that go wrong. Although most people intuitively know this, the vast majorities of people wait for disaster, and then investigate its causes using one of the Latent Cause Analysis methods that have become available.

Unfortunately, it is too late to wait for disaster in order to learn about ourselves. By then, the damage has already been done! If we have learned anything from our past quests into the causes of our failures, it is that SMALL problems cause big problems. More accurately, UNRESOLVED small problems cause big ones. Therefore, organizations that are sincere about wanting to avoid catastrophic consequences MUST learn from its small problems.

The shift in emphasis from investigating catastrophe to investigating small problems will take enormous energy. It will be like reversing the direction of a fully loaded oil tanker. The notion that we need to focus on our SMALL PROBLEMS will be a dramatic paradigm shift because most people have not connected the dots between unresolved small problems and catastrophe. People will have to DISCOVER the connection for themselves.

In other words, everyone within the organization must discover the need to look at their own small problems. Telling them they have to do it will help, but it will not suffice. Once they discover the need to do it on their own, it will become a part of their being.

In addition, people must discover that **ALL** unresolved small problems are unacceptable. Again, sending them to a training class or asking them to read an article will not convince them. They must discover this on their own.

Finally, people must discover their own role in things that go wrong. They must discover the benefit of being introspective, rather than blaming other people or things.

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The process of helping people discover these things will be very difficult. Obviously, it will not occur spontaneously. There will have to be a plan. The plan will have to be driven.

5.1. Organizing for Success: Distinguishing Between Maxi, Midi, and Mini-LCA's.

A critical part of the plan to migrate from the investigation of catastrophes to the unresolved problems that cause these catastrophes requires the universe of problems (undesired events and conditions) to be categorized so they can be "divided and conquered." Failsafe's terminology for this categorization is "Maxi, Midi, and Mini-Events." By making this delineation and then requiring it to be used to set varying levels of inquiry (LCA's), the beginnings of a plan will have been developed.

Maxi-LCA's are to be performed on Maxi-Events. In addition, they:

- Are lead by someone from outside the affected Area
- Involves at least 3 additional outside Evidence-Gatherer's
- Uses a rigorous investigative process (ROOTS)
- Specifically identifies and involves the stakeholders, after evidence has been gathered and summarized
- Requires the stakeholders to identify Physical, Human, and Latent Causes and remedies after having reviewed the evidence
- Performed approximately once per year per Area (100 people)

Midi-LCA's are to be performed on Midi-Events. In addition, they:

- Are lead by someone inside the affected Area
- Involves at least 3 additional Evidence-Gatherer's
- Uses a rigorous investigative process (ROOTS)
- Specifically identifies and involves the stakeholders, after evidence has been gathered and summarized
- Requires the stakeholders to identify Physical, Human, and Latent Causes and remedies after having reviewed the evidence
- Performed approximately four times per year per Area (100 people)

Mini-LCA's are to be performed on Mini-Events. In addition, they:

- Are performed by each individual person within the Area
- The person performing the Mini-LCA is usually the primary "stakeholder."
- When necessary, Mini-LCA's involve more than one person.
- Evidence is gathered either by that one person, or whomever is doing the Mini-LCA (if more than one person).
- Uses the principals of ROOTS, but without the confrontational stakeholder meetings (more later).
- Requires the individual(s) to identify and act on the Physical Causes.
- Requires the individual(s) to identify Human and Latent Causes, then send Mini-LCA to Mother-Source for identification of Common Latent Threads.

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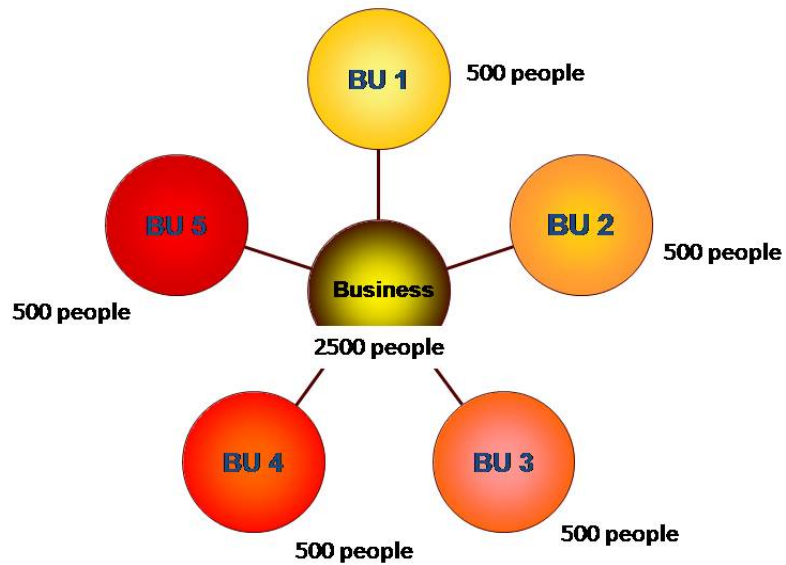
- Performed approximately four times per person per year

5.2. Organizing for Success: Establishing a Mother-Source

Forming a Mother-Source is the single most important activity necessary to make Failsafe's vision a reality. The Mother-Source is a nurturing entity that has the ultimate objective of ingraining a "root cause mentality" throughout an organization (within all its Business Units)

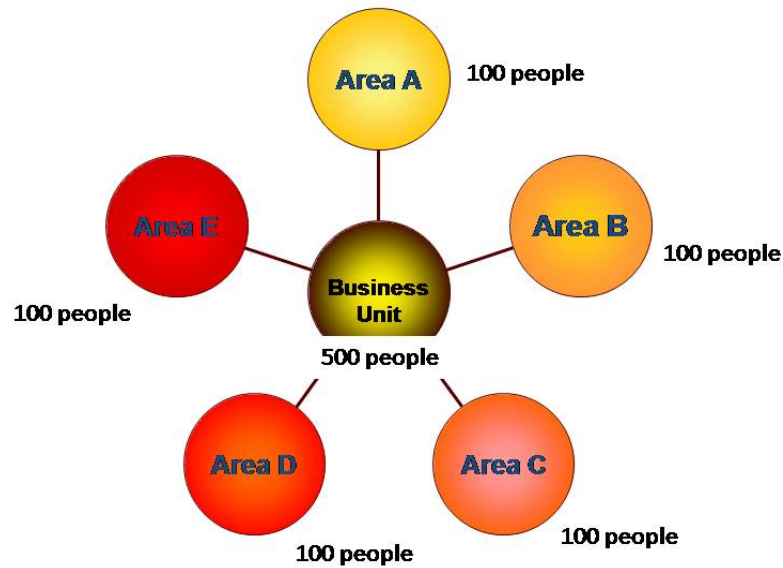
A typical large Business often forms individual "Business Units" to help organize work.

Typical Business



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Typical Business Unit (BU)



It is important to form a Mother-Source within each Business Unit.

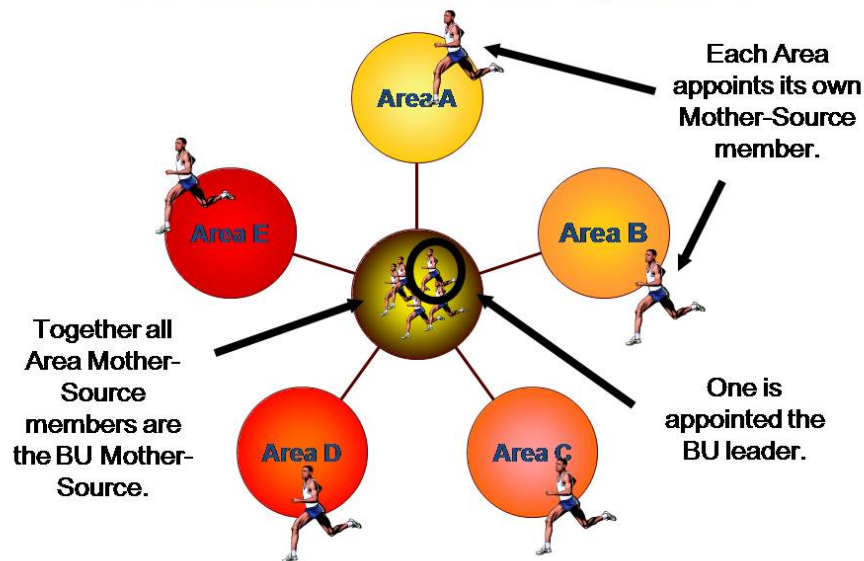
These Business Unit Mother-Sources are to be networked with each other to help provide momentum and consistency, and to help spread learning's.

Business Unit Mother-Sources can be structured in a number of ways. The following are two options currently being practiced.

- **Option #1:** If a Business Unit is sufficiently large and geographically diverse, a Business Unit can split itself into approximately 5 geographical Areas (Area A, B, C, D, and E). In this scenario, a Mother-Source person is appointed for each of these Areas. Together, the 5 Mother-Source members act as the Business-Unit's Mother-Source.

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BU Mother-Source: Option 1



In this scenario, each of the Area Mother-Source members should be able to devote a significant portion of their time to:

- leading Maxi-LCA's in other areas within their Business Unit.
- leading Midi-LCA's in his/her own area within the Business Unit.
- assuring that Mini-LCA's are being performed within their own area
- making sure that LCA learning's are acted-upon in their area.

Each of the Area Mother-Sources members should communicate with one another on a continuing and formal basis to help assure that:

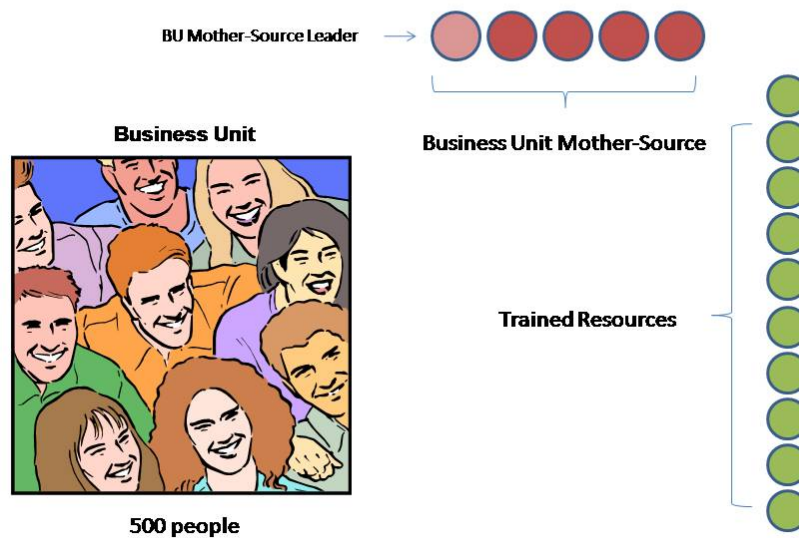
- Maxi-LCA's are being performed correctly and consistently
 - Mini-LCA's are being performed correctly and consistently
 - LCA findings are being communicated and acted upon correctly and consistently
- **Option #2:** If a Business Unit is not sufficiently large or geographically diverse, or if other obstacles prevent pursuing Option #1, a Business Unit can designate approximately 5 people to be its Mother-Source without dividing itself into 5 geographical segments.

In this case, the 5 person Mother-Source is not assigned to given areas. Instead, they act as mentors to those who will be performing Maxi, Midi, and Mini-LCA's in the Business Unit. In this scenario:

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- the Business Unit Mother-Source assures the training of a significant number of “Principal Investigators (PI’s)” and Evidence Gatherers. (approximately 20 for a 100 person organization)
- these PI’s and Evidence Gatherers are placed on a rotating call-list.
- when a Maxi or Midi event occurs, the person on top of the call-list leads the Maxi or Midi-LCA.
- This designated PI taps into the next 3 people on the call list to help with evidence gathering
- a Mother-Source member also responds to the event, to coach and mentor the PI.
- the Mother-Source member can disqualify the PI if the person is too close to the problem

BU Mother-Source: Option 2



The Mother-Source, with Option #2, devotes a significantly lesser amount of time (than Option #1) to:

- mentoring Maxi-and Midi-LCA's in their Business Units.
- assuring that Mini-LCA's are being performed in their Business Unit
- making sure that LCA learning's are acted-upon in their Business Unit

Each of the area Mother-Sources members are to communicate with one another on a continuing and formal basis to help assure that:

- Maxi-LCA's are being performed correctly and consistently
- Mini-LCA's are being performed correctly and consistently
- LCA findings are being communicated and acted upon correctly and consistently

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Selection of an Area Mother-Source

Mother-Source personnel should be selected after they have been exposed to the potential of Latent Cause Analysis (after they have attended *The Latent Cause Experience*) because they must be passionately interested in this subject in order to be successful. In addition to having been already trained, and passionately interested, the candidate should also:

- Be trained-in and agree with the basic premises of Failsafe approach to LCA.
- Desire to serve as a Mother-Source Member for at least 1 year.
- **Agree that their ultimate objective is to help INCULCATE (ingrain) the root cause mentality throughout the organization - and not just to "solve" a select few problems.**
- Agree to provide support and guidance to ANYONE in search of "root cause."
- Agree to ALWAYS define the underlying causes of a problem, especially when someone is about to be BLAMED.
- Agree to collaborate with other Mother-Source Members to help assure consistent progress.
- **When confronted with any "failure." agree to try to understand "why" to such an extent that they'd feel likely to do the same thing in a similar situation (the GOLDEN RULE OF AN LCA).**
- Agree to point out areas of their business unit where what they OUGHT to do is unclear.
- Agree to point out areas of their business which DISTRACTS them from doing what they OUGHT to do.

5.3. Organizing for Success: Establish Thresholds for Triggering Maxi, Midi, and Mini-LCA's

It is suggested that each 100 person Area within each Business Unit perform approximately 1 Maxi-LCA and 4 Midi-LCA's in their organizations per year.

Without specifically-defined thresholds for triggering Maxi, Mini, and Mini-LCA's an organization is likely to enter into LCA-induced chaos. Whether or not to do an LCA should not be subject to the whim of a manager because as a fellow human being the manager is subject to prejudices which might thwart some needed investigations and encourage unnecessary ones. Organizations should perform enough Maxi and Midi-LCA's to make sure significant Latent Causes are surfaced, but not so many that the organization is overburdened. To achieve the right balance it is very desirable to set thresholds up-front, adjust them on a yearly basis, and adhere to them religiously.

Failsafe embraces the concept of allowing the hourly workforce the responsibility and authority to enforce the call on whether an incident requires a Maxi, Midi, or Mini-LCA.

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Whereas the popular pre-defined risk-ranking matrices offer a good way to rank incidents, they seem to trigger either too many or too few LCA's. Until an accommodation can be found to make these matrices more practical, at least 2 other alternatives are available, remembering that "the simpler the better."

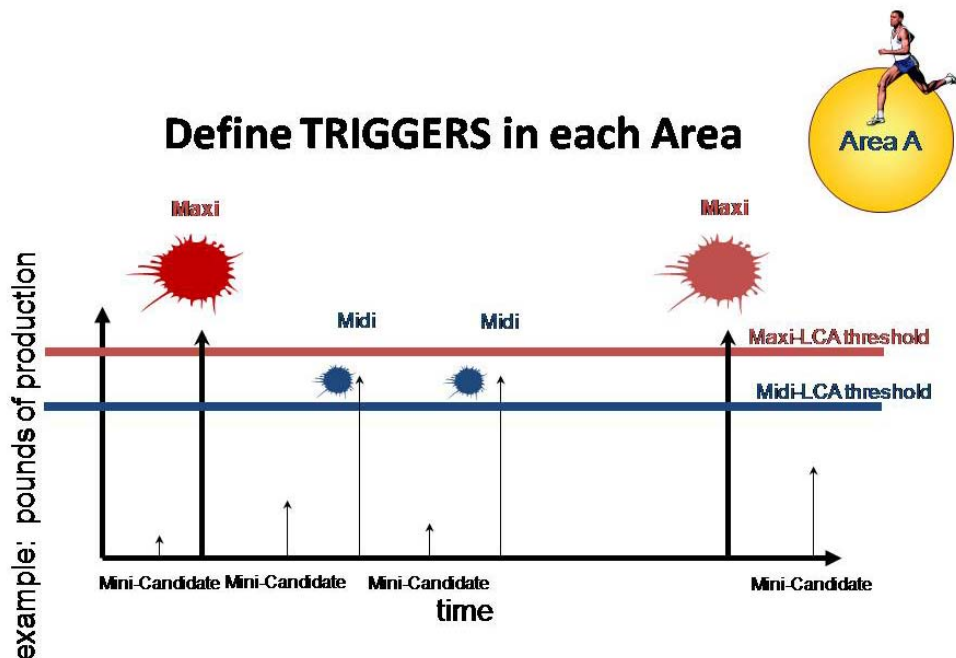
Lines in the Sand Method

It should be the responsibility of the manager of each Area Manager to set thresholds in his/her Area. This is because each manager will know their Area, and know which of the following factors is in most need of attention:

- Health, safety & environmental impact
- Production loss
- Repair costs

Most organizations already have metrics for measuring historical performance in each of the above areas. It is suggested that these historical metrics be used – looking back to see where the thresholds should be set to trigger about 1 Maxi and 4 Midi-LCA's per year in their area. Note: thresholds can be set for one or all the above factors.

Each Area Mother-Source should promote the setting of these thresholds, but representatives from the hourly workforce should be held accountable for alerting appropriate people when a Maxi or Midi event is triggered.



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Time-Outs-Remaining

For organizations that have difficulty setting thresholds, it is suggested to either “allow” 1 Maxi and 4 Midi-LCA’s per Area per year, just as football teams are allowed a given number of time-outs. If this option for triggering is chosen, either the Area Management or representatives from the hourly workforce would have to reach consensus when calling for a Maxi or Midi-LCA – knowing that only 1 Maxi and 4 Midi’s would be allowed for the year. Of course, each time a Maxi or Midi-LCA is requested, one less would be available for the remainder of the year.

Mini-LCA Thresholds

Each person in each Area should be required to do 1 Mini-LCA per quarter, on any problem they encounter in their work-life. It is the responsibility of the Mother-Source to assure that people are trained, to assure that the Mini-LCA’s are being performed correctly, to look for common latent threads and finally to act on the common threads.

6. An Overview of the Phases and Rolls involved in a Maxi-and Midi-LCA.

Now that you have organized for Latent Cause Analysis, you are ready to start doing them. The Maxi-and Midi-LCA should take place in three phases.

First, **evidence should be gathered by three independent teams of non-biased people**. The three teams are not to talk to one another during the initial evidence gathering and summarization phase. This helps to assure objectivity by isolating bias.

Secondly, **“stakeholders” are identified** (based on the accumulated evidence). Stakeholders are any people who need to act or think differently as a result of the incident.

Thirdly, the **evidence is presented to the stakeholders**, who define the causes and recommended actions.

The Principal Investigator should not present conclusions to the stakeholders; instead, the stakeholders should come to their own conclusions after having reviewed the summarized evidence.

6.1. Role of the Principal Investigator *(in the approximate order in which they occur):*

- Must respond promptly to the scene of the failure
- Takes immediate control of the scene to preserve evidence
- Determines the evidence-freezing resources needed to conduct the investigation
- Reviews the information collected by those working the area
- **Immediately forms 3 evidence-gathering sub-teams**, one for each of the 3 Ps (People, Physical, and Paper) by appointing a leader for each sub-team.

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Often, these are only 1-person sub-teams unless the evidence-gathering effort is substantial. The Principal Investigator oversees these 3 sub-teams.

- People evidence sub-team leader is to do all the interviewing, then summarize the findings.
 - The Physical evidence sub-team leader is to gather all positional and parts evidence, and summarize the findings.
 - The Paper evidence sub-team leader is to gather all paper evidence and summarize the findings.
 - These 3 evidence-gathering sub-teams are to be kept **intentionally isolated** from one another to help avoid bias. The only thing that they all share is “**the 5 items.**” This is called the **Vector Approach to Evidence Gathering.**
- Sits on each of the evidence-gathering sub-teams – not as the leader but as the only person who knows all the information that is being gathered. The PI is to “seed” other evidence teams by requested that they get additional evidence as missing pieces become obvious.
 - Coordinates all communication regarding the investigation details to parties external to the team
 - Ensures commitment from all team members that the details of the investigation will be held within the team while the investigation is in progress.
 - Must understand everything, regardless of the complexity.
 - Finds technical experts for evidence teams as required.
 - Leads two major meetings; the Evidence Review Meeting and Stakeholder Meeting (explained in more detail later)

6.2. Role of Additional Team Members

The size and membership of the team grows with time.

In the beginning, the team is comprised of the Principal Investigator and 3 Evidence-gathering sub-team leaders. Although the sub-teams are to be given access to experts, these experts are only to be tapped as necessary. It is important to try not to involve the stakeholders at this time, even if you need their expertise. Ask someone aside from a stakeholder if you need expert input.

The size of the evidence gathering teams are dependent on the amount of evidence to be gathered. Minimum size is 4 (PI, plus 3 evidence gatherers). It is rare to have more than 8 on an evidence gathering team, even when large amounts of evidence are available.

The Role of Each Evidence-Gathering Sub-Team Leader

The role of the lead evidence-gatherer in each sub-team is:

- to gather the required evidence
- and then summarize the gathered evidence (more about this later)

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- must know the evidence inside-out
- must be ready to represent it fully to the other evidence gathering sub-teams as well as to the stakeholders (as explained later).

The Role of Evidence-Gathering Helpers (not the sub-team leader)

If it has been determined that more than one person is needed to gather and summarize any of the 3 Ps, helpers might be assigned. These people operate under the sub-team leader and are not necessarily to be involved after they have performed their duty (under the discretion of the Principal Investigator).

The Role of the Expert

As evidence is gathered, the evidence-gatherers might need help interpreting its meaning (especially Physical and Paper evidence). When this occurs, the evidence gatherer should contact appropriate expertise, either by phone, in person, or via email. When possible, do not involve any of the stakeholders in this process (because of their possible bias). When this is not possible, do your best to get additional opinions.

In all cases, the expert is not to be considered part of the evidence-gathering process – but merely someone to be tapped for interpretation. Some (but not all) of the experts will eventually be considered “stakeholders” (below).

The Role of the Stakeholder

After the evidence teams review their evidence, they define the “stakeholders” (more later). Therefore, the “team” grows when the stakeholders are identified. Never expect to have only one stakeholder. It is normal to have many stakeholders, but do not go overboard. It is normal to identify 5 to 10 stakeholders.

Stakeholders are specific people:

- including all inferred in the Human Causes
- whose behavior must change
- who will have to recommend technical changes
- who will have to authorize the expenditure of money
- who are either accusing someone, or
- who are being accused
- including ANYONE who will be the recipient of a recommendation or action item

Stakeholders are brought into the “team” so that the summarized evidence can be presented to them. **Never tell the stakeholders your conclusions.**

Stakeholders will:

- be expected to attend a brief Stakeholder preparation meeting (more later)

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- be expected to **state their own conclusions**, based on the evidence that will be provided.
- be expected to **agree on corrective actions**, after having agreed upon the causes.
- be expected to “try to understand why a person did what they did to such an extent they are convinced they would have done the same thing under similar circumstances.
- be expected to “try to see their own role in the event.”

7. Gathering Evidence

Immediately after a triggered failure occurs, effort should be focused on freezing evidence. Evidence is volatile – people lose their memory of what happened, things get moved, materials get lost, records are destroyed, etc. There are three primary forms of evidence which need to be gathered (the **3 Ps**), listed in 7.2 thru 7.5, in order of their “volatility.”

To prepare for the gathering of this evidence, the investigative “starting point” should always be the same. Immediately on being informed that an LCA has been requested, the Principal Investigator should insist on obtaining “The 5 Items.” Insisting on this will help establish consistency, as well as help the Principal Investigator establish control. In addition, since the PI is coming from a location external to the BU that experienced the event (Maxi-LCA), these items are essential in helping the PI get up-to-speed promptly. Even when coming from inside the BU, the PI ought to request “The 5 Items.” Even when doing a Mini-LCA, the “5 Items” are the investigative starting point.

7.1. Request “The 5 Items”

The information shown below is to be prepared for the Principal Investigator by whoever initiated the Maxi or Midi-LCA for review when he arrives on location so that he can grasp the situation quickly. (note: when doing a Mini-LCA, prepare “The 5 Items” by yourself):

- Statement: A brief statement of what happened, in one or two paragraphs including who, what, where and when. It is to be written by one person to summarize the essentials and should include comments regarding the significance of the failure.
- Schematic: A hand-drawn schematic of the system that failed – this is the actual item that failed and the machines or components that the item is a part of – a technical drawing or photograph is not an acceptable substitute, but they provide good supplemental evidence.
- Relationship: A hand-drawn sketch showing the relationship between the system that failed and other systems – a technical drawing or photograph is not an acceptable substitute, but they provide good supplemental evidence.
- Sequence: A summary of the sequence of events, written by one person (approximately 5 bullet points). A more exhaustive sequence of events will be established later.

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- Oddities: A list of oddities – aside from the failure itself, was anything out of the ordinary taking place during or before the time of the failure?

7.2. List the Evidence to be Gathered

Upon receipt of “The 5 items,” and after having reviewed them with whoever provided them, the Principal Investigator should go into the field near where the event occurred. Gather whoever is available into a room to brainstorm 3 lists of evidence to gather (the **3 Ps**):

- a list of People to interview (focus initially on eyewitnesses)
- a list of Physical evidence (position and parts) to gather
- a list of Paper evidence (recorded information) to gather

Use any available people to help brainstorm these lists. The Principal Investigator and his/her evidence gatherers should not attempt to create these lists him/herself.

7.3. People Evidence

Eyewitnesses are critical sources of information. “People evidence” is very fragile and evaporative, and must be obtained as soon as possible following the incident. In most cases, it will take the People Evidence Sub-team time to travel to the site, gather and plan for the interviews. While this is happening, critical parts of people’s memory might be lost. To compensate for this reality, it is useful for Area Management (supervision, etc.) to ask each eyewitness to write an account of what happened as soon as possible after the incident.

Upon arrival at the scene, the People Evidence gatherers should acquire these statements and use them as part of their evidence. The statements, however, are usually not enough. Interviews usually yield the most significant information in the Latent Cause Analysis.

Below are some guidelines for making the interviews effective:

- Interview as soon as possible after the failure
- Interview near the scene of the failure so that physical things can be observed during the interview, as appropriate
- Interviews should be one-on-one, and individuals should not compare stories until after they have been interviewed.
- Interviews should not be tape recorded. Re-read interview notes aloud in front of the interviewee at the conclusion of your interview to assure you heard them correctly.
- Plan on 1 hour per eyewitness interview
- The following general interview process should be followed for all eyewitnesses:

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- Perspective: Find out who you are talking to and a little about their background. Finally make sure you know where they were and what they were doing when the incident occurred.
- Step-by-Step: Find out what the individual did during, and prior to, the failure by taking the person **step-by-step** through their involvement asking “what happened first” (or “what did you do first.”). And then what. And then? And then? Make sure you use this non-leading type of questioning. Let them lead you. Don’t lead them!
- Sensory Information: As you record their answers, listen for their sensory memories about sight, sound, feel, and smell. Dig into the details of their sensory memories.
- Why: Ask the individual why he/she thinks the failure occurred. Continue asking why until the person can no longer answer. Be curious. Understand why they think what they think. Intentionally probe for warning signs. There is always a warning sign.
- Miscellaneous Questions: As you go through the above steps, circle things you’d like to pursue. After finishing with the “Why,” above, go back and pursue the things you circled.
- Latency: During the interview process, the most important attitude of the interviewer is to wonder “what is it like being the person I am interviewing.” With this in mind, toward the end of the interview, ask the individual what prevents him/her from doing their job to the best of their ability and list the issues that he/she raises. Questions like the following yield good answers:
 - What is it like being an operator here at this site?
 - What would you do if you were king for a day?After the list is completed, review each issue with the individual and ask if the individual thinks that the issue could have anything to do with the failure. Rank the issues on a scale of 0 to 5, 5 high.
- Summarize: Read the interview back to the individual so that they can correct any misunderstandings.

Remember, a list of eyewitnesses has already been established.

7.4. Physical Evidence

Physical Evidence can be divided into two categories: Position and Parts. The Physical Evidence sub-team will freeze this information.

Position: Where are the parts?

There will be pressure to return to normal operating conditions quickly, so it is essential that this take place as soon as possible. In addition to gathering everything on the list generated above:

- Do a quick sketch of the scene (or review the sketches provided to you) – this forces a careful review of the scene.
- Photograph and take video of the failure scene. Err on the side of taking too many photographs. Narrate what you see on the video and in your

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notebook for still photographs. Photograph from varying perspectives. Point out abnormalities.

- Record the positions of everything at the scene including buttons, switches, valves, indicators, people, equipment, marks, cracks, etc.
- Take measurements, tag things, record environmental conditions such as sound levels, lighting, weather conditions, wind direction and velocity, etc.

Parts: What is the condition of each part?

In addition to photographing all parts, sketch each significant part. Sketching helps to assure that the details register within the brain. Every mark, crack, etc. on the failed part(s) must be recorded and explained.

Leave the parts in the as-found condition – for instance, they should not be cleaned and they should be stored in a container which will properly preserve them, such as a Zip-loc bag or other appropriate storage device.

7.5. Paper Evidence (Previously-recorded information)

The Paper Evidence sub-team will gather all the Paper information. This sub-team is frequently abused by asking them to gather inappropriate items. Remember that everything that is gathered must be read, digested, summarized, and finally presented. Do not abuse this team.

The following types of information should be amongst the items on the list mentioned above:

- Logbooks, strip charts, operating procedures, training records
- Electronic data recorded in computers, programmable logic controllers, etc., including first out indications. [Electronic data is sometimes averaged or overwritten within 24 hours of recording, so it is critical to obtain this information shortly after the event. Data prior to the event time is also important.]
- Alarm logs
- Startup and shutdown procedures
- Operating parameter data such as temperatures, pressures, flow rates, valve position, etc.
- Operating limits and set points
- Sequence of events reports
- SAP notifications and work orders
- Permit to work, Job Safety Analysis (JSA), work pack
- Equipment operating logs
- Equipment assembly drawings, parts lists
- Maintenance procedures
- Maintenance records
- Spare parts specifications
- Inspection records
- Condition monitoring reports
- Previous RCFA reports
- Competency requirements to operate/maintain the equipment

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- Personnel training, development records
- A list of oddities – anything out of the ordinary that was taking place during or before the time of the failure

The initial focus should be on the types of information that are deemed to be the most volatile:

8. After the evidence has been gathered:

8.1. Evidence Summarization

Each evidence-gathering sub-team defines what they think are the causes

Sub-team leaders should gather the evidence on their lists – independently. Each of them should “pretend” that their evidence is the ONLY evidence, summarizing their findings IN WRITING (and sketches) by stating “If our evidence were the ONLY available evidence, we’d have to conclude the following:”

- Physical Causes (a paragraph stating how the incident occurred – the physics of the incident – past tense and as specific as possible)
- Human Causes (a bulleted list stated who did what wrong in enabling the physics – past tense and specific)
- Latent Causes (a bulleted list of sentences answering the question “what is it about the way we are (or do business) that contributed to or influenced the Human Causes)

All sub-teams, together identify the stakeholders, after combining and reviewing all the evidence

When all the sub-teams are ready, the Principal Investigator should arrange an Evidence Review Meeting, where each of the evidence sub-teams presents its findings to one-another. This is the first time the evidence teams see what one another has collected.

After reviewing and discussing evidence, the combined evidence team summarizes the evidence just as they did when they were separate, by defining Physical, Human, and Latent Causes.

These conclusions of the evidence gathering teams are never shared with the stakeholders. The two reasons for defining these causes at this point is 1) to assure that sufficient evidence has been gathered before going to the stakeholders and 2) to enable the identification of stakeholders.

Stakeholders are defined based on the presumed Human and Latent Causes. They are inferred in the “who” when defining Human Causes, and are readily apparent in the Latent Causes.

9. Confront the Stakeholders with the Evidence

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9.1. **Stakeholder Preparation Meeting** (plan for approximately 30 minutes)

The Principal Investigator should gather the stakeholders together to prepare them for the Stakeholder Review Meeting. Show the "Stakeholder Preparation Slides" (available at www.failsafe-network.com). They will generate discussion. ANY discussion would be good. This meeting should be considered a "gate-keeper meeting." If the Stakeholders agree to the "Golden Rule of an LCA" and the other slides then the Stakeholder Meetings should be conducted. If they do NOT agree, do NOT conduct the meeting. Put the onus on them.

9.2. **Stakeholder Discovery Meeting #1:** Identification of Physical and Human Causes (2-4 hours, depending on the quality of summarized evidence)

- Principal Investigator should assemble the stakeholders and evidence-gathering leaders.
- Each of the lead evidence gatherer's should be given 20 minutes to show the ESSENCE of their evidence. Try to focus on evidence that suggests Physical and Human Causes. Evidence that suggests Latent Causes should be presented during Stakeholder Meeting #2 (Latent Cause Meeting).
- Principal Investigator, after each form of evidence, should ask the stakeholders what they heard or saw. This will generate dialogue. Dialogue is good.
- **Insist on an OVERNIGHT BREAK to allow the stakeholders to absorb the evidence.**
- After all forms of evidence have been presented, and after the overnight break, the Principal Investigator should divide the stakeholders into at least 2 groups. Make sure to divide strong personalities.
- The Principal Investigator should explain the definition of a Physical Cause. Then ask each group to define Physical Causes based on the evidence.
- The Principal Investigator should explain the definition of a Human Cause. Ask each group to define Human Causes based on evidence. It is IMPERATIVE for them to define WHO did WHAT WRONG (no names). This is what will make or break the process.

9.3. **Stakeholder Discovery Meeting #2** – to LATENT CAUSES (1 day, depending on the number of Human Causes)

- The Principal Investigator should plan on at least 2 hours per Human Cause. Note, however, that Human Causes often have similar Latent Causes. It is typical to dwell on 2 or 3 Human Causes as a result of a Maxi-LCA.
- The Principal Investigator should "seed" this meeting by having each of the evidence-gathering leaders present Latency Evidence. Limit the presentation of this evidence to 20 minutes. Allow for discussion.
- Use the Situation-Filter-Outcome Aid (the discussion generator) for each of the Human Causes. Concentrate on ONE Human Cause at a time.

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- Remember:
- Understanding the SITUATION is critical to understanding the THOUGHTS. The person that was confronted with the situation should be the one to define it. Make sure you get the group to accept the situation as true. Do this for
- Next, you must understand the THOUGHTS that were in the people's mind that lead to each Human Cause. You cannot assume these thoughts. The people who were thinking the thoughts ought to divulge them.
- Finally you must ask "What about the way we do business lead to these thoughts." A better question would be "What about the way we ARE lead to these thoughts." You can either require the senior manager to answer this question, or you can split into groups again and have each group answer it. In the end, however, the senior manager must agree. Again, you cannot tell them the answer – they have to come to their own answers.
- Always end the Latency Meeting with some kind of forced venting. Ask each person to write down something about "what they got" from the meetings, and then ask them to read it aloud.

10. When to draw the WHY-Tree

WHY Trees are not always drawn during the evidence-review or stakeholder meetings. If a WHY Tree would help in sorting-out the team's logic, then by all means use one. Most of the time, however, the WHY Tree becomes an unnecessary, frustrating, and time-consuming exercise that adds little to the understanding of the stakeholders.

Always remember that the purpose of an LCA is to help the stakeholders see their role in the event so that they become convinced of the need to change. The purpose of an LCA is never is merely draw a WHY Tree.

On the other hand, simplified Explanatory WHY Trees are always to be included in any documentation of the LCA to help other people quickly understand the logic of the failure.

More information about WHY Tree construction can be found at www.failSAFE-network.com.

11. Communicating Findings

A major difference exists between Failsafe's approach to report-writing, and the usual approach. Typically, an investigative team is established who gathers the evidence, determines the causes, and then makes recommendations to management. The final product of these efforts is usually a report.

But if the methods suggested in this document are followed, the people on the investigative team (the evidence-gatherers and all the stakeholders) will have learned as much as there is to know about why the failure occurred and what actions need to be taken. Therefore, it is not necessary to communicate findings

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to the stakeholders again. The point can not be understated: **if the discovery process suggested in this document does not change the stakeholders in a deep, fundamental way, there is nothing a report can do to help.**

However, it is necessary to communicate certain things to the remainder of the organization. These communications ought to be clear and concise. Even more, every form of communication ought to have a purpose in mind, a way to assure the right people get the right information, and even a way to measure intended results.

As you read the following items, remember that Maxi-LCA's are performed about 1 time per year in each BU. Midi-LCA's are performed about 4 times per year in each BU. In other words, the following actions ought to occur about 5 times per year in each BU:

- Transmit detailed information about Physical Causes to the right persons throughout the organization so that the same Physical Causes do not cause a similar problem. The Principal Investigator should make this information available to the Mother-Source lead within the affected BU, who should distribute the information to the right people in his own BU as well as all other Mother-Source leads in other BU's. It should be the responsibility of each Mother-Source lead to make sure the right people in their own organization receives and acts on this information.
- Transmit detailed information about Management System Changes (procedures, policies, checklists, etc.) to the right persons throughout the organization so that the same deficiencies do not cause a similar problem. The Principal Investigator should make this information available to the Mother-Source lead within the affected BU, who should distribute the information to the right people in his own BU as well as all other Mother-Source leads in other BU's. It should be the responsibility of each Mother-Source leads to make sure the right people in their own organization receives and acts on this information.
- Make the Translation of the LCA available to the whole organization. Translations are not the same as reports (see below). Translations are to be created by the Principal Investigator as a final part of the LCA. It should be the responsibility of the Mother-Source lead within the affected BU to make sure the Translation is available within his own organization. In addition, this same Mother-Source lead should transmit the Translation to other BU's, where that Mother-Source makes sure it is available to everyone. Translations should be brief, clear, and even shocking documents (full of color and images – comic books and cartoons make excellent translations). They should be made available at public places through the organization – company cafeterias, security gates, time-clocks, etc. In addition, all Maxi and Midi-LCA Translations should be made available through the company intranet.
- Transmit the Bottom-Line-Learning (moral of the story) to the whole organization. Although the Bottom-Line-Learning is a part of each

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Translation, it should also be a stand-alone item that is intentionally dramatic, perhaps controversial, and even shocking. Bottom-Line-Learning's should create spontaneous discussion amongst employees – and even cause the discussions to be carried to the home. Bottom-Line-Learning's are created by the Principal Investigator, but broadcast to the affected BU by the lead Mother-Source in that BU. The same Mother-Source leader is to make sure the Bottom-Line-Learning is sent to other lead Mother-Source leaders in other BU's, who are to transmit it throughout their organizations.

- Place a copy of the LCA Report on the company intranet. Many companies have electronic folders on their web sites to store LCA's. In addition to event identification parameters, it is also useful to include key words so that others can find useful information in the future. The Principal Investigator should be responsible for doing all this, after the report, event parameters, and key words have been reviewed by the BU Mother-Source.

11.1. A Suggested Maxi and Midi-LCA Report Format

Try to use a consistent report format so that people know what to expect. Consistency will also help inculcate the vocabulary and intent of the LCA effort. The following general headings should be a part of each Maxi or Midi-LCA Report:

- Incident Statistics (for tracking purposes only)
- Incident Description (who, what, where, when)
- Schematic of the Involved System
- Summary Sequence of Events
- Key Physical Evidence
- Key People Evidence
- Key Paper Evidence
- Physical Causes
- Human Causes
- Latent Causes
- Explanatory WHY Tree
- Bottom-Line-Learning (Moral of the Story)
- Agreed-upon Corrective Actions
- Contact information for further details

A useful Maxi and Midi-LCA Report Template is available on the Failsafe web site.

11.2. Translation Format

Translations should be written with the reader in mind. Make it interesting, clear, colorful, and brief. Translations describe the evolution of the event, from the beginning to end.

In an interesting and story-telling manner, discuss the conditions that had been present for year and years (latent causes). Show how they lead people to do things they wouldn't normally have done (Human Causes). Describe

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how these actions or inactions lead to the physics of the problem (Physics Causes), which then led to the event. End with "the moral of the story."

12. Critical Success Factors

The following are considered critical to the success of Failsafe's approach to Latent Cause Analysis:

- **The LCA effort must be driven by a Mother-Source** that is formally identified, with sufficient authority and resources to do its job. The most critical functions of the Mother-Source are as follows:

The Mother-Source behaves as if they are the "keepers of the LCA process." They assure that LCA's are performed "by the book," continually improving the process as required.

The Mother-Source assures that thresholds are developed to trigger Maxi, and Midi-LCA's. In addition, the Mother-Source acts as a barrier to those who call for LCAs that are not formally triggered. Maxi and Midi-LCA's must not be done too often. Maxi-LCA's should be performed about once per year per BU. Midi-LCA's should be performed about 4 times per year per BU.

The Mother-Source assures that all operational (operations, technical, and maintenance) personnel are trained in performing Mini-LCA's, and that each such person does 4 Mini-LCA's per year.

The Mother-Source assures that common latent threads are identified and acted upon at least once per year per Business Unit.

The Mother-Source assures that all action items are tracked and acted-upon.

The Mother-Source assures that all Maxi and Midi-LCA findings are distributed throughout the organization.

Note: without a Mother-Source, none of the above will occur.

- **Management must be supportive of the underlying intent of the LCA process by doing the following:**

Attend the 4-day "Latent Cause Experience." Management thinks they know what they are "buying into," but they do not really know. Their presence is required in the training sessions, therefore, for three reasons. First, they need to know what they are supporting. Secondly, they need to hear the reaction of their people to what is suggested in the training. Thirdly, they need to show their support for this endeavor.

Commit the organization to a continual exposure to LCA training (perhaps yearly) to keep the energized and alive. Make sure a different cross-section

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is trained each year – including management, technical, operational, and maintenance personnel.

Assure that Maxi and Midi-LCA's are given top priority for anyone participating either as a Principal Investigator, Evidence Gatherer, or Stakeholder. Clear the way for this commitment.

Support the notion that the stakeholders (including managers) will not be told the "answers," nor will they receive recommendations. Stakeholders must come to their own conclusions, and must identify their own corrective actions, after having reviewed the evidence.

Embrace an Amnesty Policy when something goes wrong. The LCA process must never result in discipline, unless someone has violated criminal law.

- **The hands-on workforce must be an integral part of this endeavor.**

It is a gross error to merely expose salaried, technically inclined (engineers) to this process. Learning from things that go wrong is something basic to life itself. By merely exposing a "chosen" few to Failsafe's training, expecting them to be "Principal Investigators," an overt signal is being sent to the masses of the organization suggesting that: *"We'll learn from things that go wrong around here. As for you, just do your job."*

The most successful organizations take an approach opposite from the above. They expose a cross section of their organization to the power and potential of Latent Cause Analysis every year. There are a variety of reasons for this. First, everyone needs to learn from things that go wrong! Secondly, everyone needs to understand the vision, intent, direction, and steps being taken to achieve the vision. After all, this is an endeavor that has been grossly misused in the past, so people will need to know what's different this time. Thirdly, the most successful LCA efforts are actually driven from the "bottom-up."

Qualified hands-on personnel usually make the best Mother-Source members. After all, they have the most at stake to make their workplace safer and more efficient. The hands-on workforce is also more likely to be fair and consistent in insisting that LCA triggers be followed.

Do not alienate the hands-on workforce. Include them!

13.Pre-Planning

The following actions should be taken as planning to prepare for LCA work:

13.1. Training

- **A 30-40 person cross-section of each Business Unit should attend Failsafe's Latent Cause Experience, including all key employees.**

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This 4-day encounter will expose everyone to the intent and methods of Latent Cause Analysis. The interaction and response from the cross-section will help insure that everyone understands the intent and requirements of "root cause discovery." Although this is considered a mandatory starting-point, it should also become a yearly-scheduled event to keep the endeavor ever-green.

- **The entire organization should be trained on how to do a Mini-LCA.**

This 4 hour class is currently being offered either via on the Internet by Failsafe 6 times per year, or on-site by one of Failsafe's Licensed Affiliates. Everyone who has not been trained in the 4-day Latent Cause Experience should receive this 4 hour training.

Since it is unreasonable to think that all people will be trained in the Mini-LCA method in a short duration of time, as each group is trained they should be expected to starting performing Mini-LCAs as part of their normal responsibilities. In this respect, it is strongly recommended that each attendee of this training be required to do a Mini-LCA within 2 weeks of taking the class, sending it to their Area Mother-Source for comment and tracking.

- **All field people should be trained on the basics of evidence gathering.**

When a Maxi or Midi-event occurs within a Business Unit, it will take some time for a Principal Investigator to arrive on the scene (along with the required evidence gathering sub-team leaders). Critical evidence will be evaporating while these people are in route. Therefore, all field employees within the BU should be trained by the BU Mother-Source on how to freeze and gather initial evidence, including:

- Getting written statements from everyone involved (which later will be acquired and analyzed by the People-Evidence sub-team leader).
- Taking as many photographs as possible (which will later be acquired and analyzed by the Physical-Evidence sub-team leader).
- Getting logbooks, computer data, and other pertinent written documentation (which will later be acquired and analyzed by the Paper-evidence sub-team leader).

This is typically a half-day class, developed by the Area Mother-Source for his/her people.

- **All Business Unit Managers should be trained on the intent of Latent Cause Analysis, and what they need to do to support it.**

Any Business Unit Manager that does not attend the 4-day Latent Cause Experience should be required to either attend "Latent Cause Analysis for Management," a 3-hour Live, training session delivered over the web 6 times per year, or be present at an on-site Management Review meeting (conducted by Failsafe immediately following a 4-day class).

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14. Other Planning

- **Each Business Unit should develop a Call-List of Lead Evidence-Gatherer's.**

When a Maxi or Midi-event occurs within a Business Unit, the Mother-Source will immediately need 3 people to help gather evidence. There will be no time to look for these people in the heat of the moment. A call-list of people who have been trained in the 4-day Latent Cause experience should be kept. The first 3 people on the list should be called-upon as the evidence-gathering leaders.

This will help inculcate the root cause mentality, by keeping the training fresh in people's minds, as well as facilitate evidence freezing in as timely a means as possible. Enough lead evidence-gatherers should be trained to provide adequate coverage for shifts, vacations, etc.

- **Emergency response procedures could be revised to include a reference to contact the appropriate Mother-Source (if trigger levels are met).**
- **Go-Bags should be made for evidence-freezing resource materials.**

Each Mother-Source person should have their own Go-Bag. They should be packaged and stocked at a strategic location within the Business Unit. Appropriate parties must know where they are. These Go-Bags could include things such as checklists of how to gather evidence, digital camera, video camera, flashlight, magnifying glass, sample bags, tape measure, notebook, and blank interview booklets.

15. Summary

Why do things go wrong? The answer to this question is one of the most important questions of life. Too many cultures, organizations, and individuals do not seem to have time to ask this question, no less answer it.

Latent Cause Analysis emerged as a viable endeavor in the early 1970's. Since then, it has evolved into an absolutely essential part of doing business. Interesting, however, if we heed the lessons learned from the big things that go wrong in our lives, we'll end up looking at our small problems. Small problems are harbingers of big ones.

Failsafe is committed to help organizations and individuals start an ultimately important journey. The journey will start by helping you discover the causes of your big problems. The journey will continue when you realize that it is unresolved small problems that cause your big problems. Most importantly, the

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journey will most likely end at yourself. We all cause problems – all of us. The most important question any of us can ask is:

What is it about the way I am that contributes to our problems?