

From the Book; *Apollo Root Cause Analysis – A New Way of Thinking*, Third Edition by Dean L. Gano Copyright 2007

# Preface

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## A New Edition Driven by Continuous Learning

In the first edition of *Apollo Root Cause Analysis – A New Way of Thinking*, published in 1999, I expressed the hope that “this book would stimulate more learning for me and others who are interested in this fascinating subject.” I am happy to report my hopes are being realized because Apollo Root Cause Analysis (ARCA) is steadily becoming the world standard for event-based problem solving. Since the late 1980s, more than 75,000 people have been trained world-wide, and more than 50,000 books have been sold. The training material has been translated into 9 languages and is used by businesses of all sizes, from the largest to the smallest. It is used by professionals, crafts, managers, and workers of all kinds in a large variety of industries from Aerospace and Information Technology to Healthcare and Agriculture. Indeed, it can be used on any problem where we interact with our environment. With this increased exposure and more minds contemplating the use of the methodology, we have all learned

even more; and this new edition reflects what we have learned in the last 8 years.

Perhaps the most important thing we have learned is the powerful effect RealityCharting® software has on problem solving. By providing an intuitive communications tool based on the proven ARCA methodology, RealityCharting® facilitates a much more robust cause and effect chart—called a Realitychart (The name “Realitychart” was chosen because the software creates a common reality based on the input of all stakeholders). This updated edition of *Apollo Root Cause Analysis – A New Way of Thinking* includes helpful information on how to use the software to maximize your problem-solving effectiveness.

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# Introduction

The purpose of this book is to share what I have learned about effective problem solving by exposing the ineffectiveness of conventional wisdom and presenting a principle-based alternative called Apollo Root Cause Analysis that is robust yet familiar and easy to understand. I hope this book will improve your understanding of human problem solving and thus make your journey in life more successful.

This book will change the way you understand the world without changing your mind. One of the most common responses I get from students of ARCA is that they have always thought this way, but did not know how to express it. Other students have reported a phenomenon where this material fundamentally “re-wires” their thinking, leading to a deeply profound understanding of our world. Many ARCA practitioners have become the best problem-solvers in the company. One such person received a \$50,000 bonus and recognition as the employee of the year. It is not unusual to see a return on investment of 10 times more than the cost of the event being investigated. An executive from one very large global company credits ARCA with saving it from bankruptcy by not only solving a multimillion dollar regulatory problem but by adding millions of dollars to the bottom line.

At the heart of this book is a new way of communicating that is revolutionizing the way people all around the world think, communicate, and make decisions together. Imagine your next decision-making meeting where everyone is in agreement with the

causes of the problem and the effectiveness of the proposed corrective actions—no conflicts, arguments, or power politics! This is the promise of ARCA.

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## **A New Way of Thinking**

This book presents a unique and new way of thinking about the way we solve problems in our daily life. It is not about math problems or design problems. It is not about creative problem-solving or brainstorming. It is not another categorization scheme to lump causes and solve them by popular vote. It is not another compilation of conventional wisdom. Rather, it is about finding effective solutions to event-based problems—problems encountered when we interact with our environment.

The ARCA method is based on fundamental principles, which provide a standard or law that is applicable to every event-type problem. As such, it does not require that you have great subject-matter expertise. Simply by applying the fundamental principles discussed herein and having access to the subject-matter experts or the people who know the most about the actual causes of the event (usually the workers), anyone can solve any event-based problem every time. Furthermore, by understanding the cause and effect principle (Chapter 2), you will be more prepared to prevent problems in the first place—not only because you will begin to think causally and see problems before they occur, but with the help of RealityCharting® software you can create basic fault-tree diagrams that depict possible failure scenarios in your more complex systems.

# Effective Problem Solving

In everything we do, the ability to solve problems effectively is fundamental to our success. The better we understand the underlying causes of an event, the better we can control it. The more causal relationships we understand, the better we can predict the future and the more successful we will become.

While we inherently understand the notion of cause and effect, no culture has ever devised a principium of cause, and hence we have never taught causal strategies in our schools. The paradigms and mental models on which conventional wisdom are based tend to regard cause and effect as obvious. But in actuality, once you understand the complexities of the cause and effect principle (Chapter 2), “reality” becomes so complicated it boggles the mind.

The cause and effect diagramming process discussed herein has historically been called Apollo Root Cause Analysis, and the software application developed for it is called RealityCharting®. This simple and easy to use problem-solving method is based on the four elements of the cause and effect principle:

1. Cause and effect are the same thing.
2. Causes and effects are part of an infinite continuum.
3. Every effect has at least two causes in the form of actions and conditions.
4. An effect exists only if its causes exist at the same point in time and space.

Don't try to digest these elements right now, just make note that there are four laws that help define your reality. Applying these principles means that every time we ask “why” we must find at least two causes (third principle) and because cause and effect

are the same thing (first principle), we must then ask “why” again. Because each effect reveals at least two causes (usually many more), each of those two causes must reveal two more for a minimum of four more, and those four become a minimum of eight and eight becomes 16, 32, 64, etc., on to infinity (second principle). The fourth element will be discussed in more detail later in the book, but we can see at this point that asking “why?” leads to an ever-expanding set of causes, something like the branches of a tree, limited only by our knowledge of the subject or event.

By understanding this complexity of causation we can now see why the human brain cannot deal with “reality.” How could we possibly be able to comprehend, let alone communicate to others, an infinite set of causes for a single event? At every turn, our biological and cultural development has failed to devise a strategy to deal with this enormous complexity. Instead of dealing with this complexity, we have invented many simple-minded strategies to accommodate our simple minds and sadly to protect our fragile egos.

By understanding the cause and effect principle and creating a Realitychart, your understanding of what constitutes reality will be changed forever, and that change will allow you to become a more effective problem-solver. ARCA provides the methodology and RealityCharting® provides the tool to allow you to see a reality that was previously beyond your comprehension.

## **Beyond Conventional Wisdom of Problem Solving**

This book exposes the fallacies of our most common problem-solving strategies and, more importantly, provides an alternative that works on every event-based problem every time. The most common problem-solving strategy in use today is to

categorize causes or identify causal factors, look for root causes within these categories, and then vote on which ones we think are the root causes. There are many categorical schemes being used, like MORT, Ishikawa's Fishbone, and various "Cause Tree's" that come in an infinite variety. While these categorical methodologies claim to represent a causal analysis, there is no causal relationship whatsoever—simply groupings of cause categories based on the creators' own experiences within the system or world in which their events occur.

These categorical methodologies do help generate impressive Pareto charts, which can be used to prioritize which problems to work on, but they do not reliably lead to finding effective solutions. This is because cause categorization schemes do not reveal the cause and effect relationships crucial in finding effective solutions. Grouping or categorizing causes makes us feel good because we have taken what looks like a complex problem and simplified it into neat little piles of similar causes. True cause and effect analysis does the opposite. It takes what appears to be a few simple causes and humiliates us by revealing the complexity of what happened. The humility is worth it because of the richness and diversity of solutions that are revealed.

Unfortunately these "Cause Trees" are welcomed and used by many because they seem familiar and are easy to use. They are only familiar because they utilize biologically evolved processes of categorization inherent in our mental operating system. By design, our mind categorizes everything; it even stores nouns and verbs in different parts of the brain<sup>1</sup>. We will discuss categorization and other failed strategies further in Chapter 1 and in the Appendix.

Regardless of the problem-solving method(s) you currently use or don't use, you will find Apollo Root Cause Analysis and the companion RealityCharting® software a simple, structured, and

more powerful alternative. After you have read this book, I invite you to visit our Web site at [www.realitycharting.com](http://www.realitycharting.com) and begin using RealityCharting® immediately at no cost without having to log in or register. Use it to create a Realitychart of any event you have interest in, or visit RealityCharting > Example Problems; <http://www.realitycharting.com/realitycharting/example-problems/> to see a variety of Realitycharts, including one analyzing ineffective problem solving. RealityCharting® is simple and intuitive—watch the 2-minute tutorial and then get started using a tool that will significantly improve the way you and those around you understand the world.

The ARCA process eliminates the usual arguing and politics associated with most event investigations, and results in effective solutions that all stakeholders can buy into. While our individual realities will always remain unique, we can better understand the realities of others and share ours with them to form a common reality through the application of the cause and effect principle and the use of RealityCharting®.

## **How To Read This Book**

I have designed *Apollo Root Cause Analysis – A New Way of Thinking* to be read at several levels and to allow quick reference to topics or sections. Because this book challenges conventional wisdom, it may not validate your existing belief system, so I suggest you read the book straight through first and then go back and reread the chapters that interest you the most. Highlight, underline, and otherwise dog-ear the book as you go so that it becomes a useful reference for you. Many very important messages are contained in single sentences throughout the book, and you will want to note them and carefully consider their value.

Chapter 1 examines the typical ways most of us approach problem solving, where those strategies came from, and why those strategies rarely keep our problems from recurring. Chapter 2 describes the cause and effect principle, upon which the Apollo method is based. Chapters 3, 4, and 5 describe the ARCA tools that are critical for implementing the cause and effect principle and finding effective solutions. These chapters provide “how-to” information with some guidelines and philosophy interspersed. Chapter 6 provides valuable guidance on facilitating a team using the ARCA method. The ARCA method can be used individually or in a group and is most powerful in a group. Chapter 7 highlights the attributes of the Apollo method.

In the Appendix, I have summarized, for comparison, conventional root cause analysis methods.

Finally, the Glossary provides a single-source reference for the new words you will learn, and the Index helps you get to specific topical discussions.

## **Training**

While the Apollo process is simple and the software intuitive, we have found that most people benefit significantly from a formal training program. Training is available from certified ARCA/RealityCharting® instructors. A 2-day course helps to further reinforce these concepts through insightful and practical exercises, and graduates receive a copy of the RealityCharting® software and certification as an ARCA practitioner and team facilitator. A 1-day course is also available for management and others who may need practical knowledge, but who won't be facilitating any investigations. If you are interested in training, software, or other services, please see the contact information

provided at [www.realitycharting.com](http://www.realitycharting.com).

## **About the Author**

Dean L. Gano is President of Apollonian Publications, LLC, which is dedicated to helping others become the best event-based problem-solvers they can be by providing highly effective problem-solving tools in the form of books and computer software. Mr. Gano brings more than 36 years of experience in process industries, power plants, and computer software development to this endeavor. He started his incident investigation work and subsequent fascination with problem solving while working on solutions to the incident at Three-Mile Island Nuclear Power Station in the late 1970s.

He has participated in hundreds of incident investigations since and studied the problem-solving process through his teaching and consulting work. He has been teaching his unique version of root cause analysis to people around the world for more than 20 years. His message is being taught in nine different languages on five continents and is being used globally by many of the Fortune 500 companies, the National Aeronautics and Space Administration, the Federal Aviation Administration, and other government entities. To ensure an effective problem analysis is done every time, Mr. Gano created RealityCharting® software, which is becoming the world standard problem-solving tool.

Mr. Gano holds Bachelor of Science degrees in Mechanical Engineering and General Science, is a formerly certified nuclear reactor operator, and a Vietnam veteran. He is a senior member of the American Society for Quality and the American Society of Safety Engineers. He is a philosopher and student who finds great

happiness in learning and helping others become more successful in their life pursuits.

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## Reference

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## Set Up To Fail

Ignorance is a most wonderful thing.  
It facilitates magic.  
It allows the masses to be led.  
It provides answers when there are none.  
It allows happiness in the presence of  
danger.

All this, while the pursuit of knowledge can  
only destroy the illusion. Is it any wonder  
mankind chooses ignorance?

*In every human endeavor, a critical component of our success is our ability to solve problems. Unfortunately, we often set ourselves up to fail with our various problem-solving strategies and our inherent prejudices. We've typically relied on what we believe to be common sense, storytelling, and categorizing to resolve our problems. Conventional wisdom has us believe that problem-solving is inherent to the subject at hand—the doctor solves medical problems, the mechanic fixes our car, etc. Using these strategies often leads to conformity, which brings complacency and mediocrity. This chapter will expose the failed strategies that prevent us from being effective problem solvers.*

As we explore the reasons behind ineffective problem solving, we will see how rule-based thinking creates the illusion of one right answer and a misguided belief in common sense. We will also see how our natural prejudices prevent effective problem solving. By dispelling the notion of common sense, we are able to replace it with a common reality that allows extremely effective communication. By appreciating all views and seeking causes, not blame, we will start down a path that leads to effective solutions for everyday problems every time.

Please open your mind and join me on an adventure into a new way of thinking that will improve your problem-solving skills and enable much more effective communications.

Problem solving is generally understood to mean overcoming some kind of difficulty by implementing a solution. The best solutions are often the most difficult to find, not because they are hiding but because we don't know how to find them. We call these untapped solutions creative solutions because they are seemingly created from inside our minds. Like the sculptor's notion that the statue lies within the stone, many effective solutions are waiting to be revealed by the method provided herein.

Depending on the various abilities we start out with, combined with the experiences we encounter in life, we each develop our own strategies for coping with life's problems. We each define our own world by creating our own reality. We observe how different things interact and establish our own understanding of the world through these relationships. We learn to control various causes (for example, people and things) to obtain certain goals. We do all this without even knowing it. It is simply part of our nature to explore and understand the world around us. Problem-solving skills vary significantly from person to person, and unfortunately most are ineffective.

The notion of a single right answer, the belief in something we call “common sense,” and the natural tendency to establish biases and prejudices are all strategies that block effective solutions. This chapter will explore some of these strategies and where they come from.

## **Problem Solving**

One of the most difficult questions I am asked as I travel around the world is, “What do you do for a living?” The answer to this question is difficult because most people are not familiar with what I do. My usual response, “I teach people how to be better problem solvers,” is understood in many ways, but rarely as I intended. “Oh, are you a psychologist?” “Oh, are you a college professor?” “What kind of problems?” “Are you a management consultant?” I am frustrated because I can’t think of any other way to summarize what I do that will be understood. Every response reminds me how each person perceives the world differently and how the notion of problem solving has no common meaning.

Pondering why this is so, I wonder if it may be because our education systems do not recognize problem solving as an entity unto itself. Since problem solving has never been established as a separate subject or curriculum, our skills are not well developed. Aside from the sometimes boring and difficult dictums found in college courses on logic and critical thinking, no fundamental principles have been laid down on which to build a problem-solving curriculum. Problem solving is understood to be inherent in each subject, so problem-solving for the computer engineer or the mechanic is thought to be unique to their occupations. Based on this belief, we have failed to teach effective problem solving.

I have discovered that while specific knowledge lies within

the job, profession, or subject matter, effective problem solving can be universal to all subjects. Certainly most mechanics can't solve highly technical computer problems nor can the typical computer engineer be expected to rebuild an engine, but they both can use the same problem-solving strategies in their work and their lives.

While problem solving can be categorized in many ways, we usually treat problems as if they are rule based. That is, we seem to believe all problems have "one right answer." A colloquial saying even expresses this notion: "It's the right thing to do." Many people are so intent on solving all problems with rules that they limit themselves to the same old favorite solutions that failed to prevent them from recurring in the first place.

Rule-based problems follow rules created by people to help us understand repeatable events, such as a company procedure or established laws. In rule-based problems we agree to a convention, and thus a single answer or pre-defined solution is usually available, for example,  $2 + 2 = 4$ , or if we run a red light we may be fined, or score the most points in a game and you win. In each case, the answer is predefined by a set of rules that all players agree to. The rule-based approach is often more concerned with conformity and consistency than with accomplishing our goals. The rule-based approach to problem solving is often ineffective because our daily lives are filled with the immense variability of the human condition. As such, most problems do not have one right answer—only good, better, and best. These daily problems are called event-based problems; they are problems we encounter when interacting with our environment.

The concept of the "right answer" was brought home to me a few years back when I was teaching a class at a national laboratory. As we will discuss later, asking "why" is an important

part of my approach in identifying causes and effects in problem solving. A Ph.D. physicist, who was also a tenured professor at a prestigious college, informed me during class that to ask “why” was foolish. He talked about Einstein and Niels Bohr and stated that “why” should never be asked. Since this was a total affront to the theme of my class, we had many discussions over the next two days and I finally came to understand his perspective. In his world of experimental physics, he always establishes a box around the experiment so there are no unknown variables. In scientific experiments, everything is known, a condition is changed, and the result is documented and used to provide evidence of a theory or premise.

When I discovered his perspective, I pointed out to him that the world outside his boxes did not have the luxury of complete knowledge. Variables exist in the infinitum, I explained. He understood what I had said, but it destroyed his illusion of the perfect world where everything is known and right answers always exist.

When we cling to a rule-based mindset, we set ourselves up to fail when trying to solve event-based problems in daily life. We so often look for one right answer because that is what we have been taught to do. The next section takes a look at the practices we have so carefully cultivated and refined but unfortunately allow us to repeat our problems rather than prevent them from happening.

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## **Typical Problem-Solving Practices**

When I first began teaching root cause analysis, I taught some of the conventional wisdom of the day. I taught people how to categorize causes and how to find the “real” root causes. In each class, a few students would seriously challenge what I was

teaching. With an aversion to contradictions, I reflected on each class and was constantly learning and changing what I taught. In the process, I identified several problem-solving strategies that are detrimental to effective problem solving. The most common detrimental problem-solving practices used by individuals and organizations the world over include stopping too soon, the need to place blame, the root cause myth, the false belief in common sense and a single reality, groovenation, storytelling, and categorical thinking. We are going to examine each one of these failed strategies and as you will see many of them are interrelated.

## **Stopping Too Soon**

For the most part, we have been set up to fail by a culture that has never adopted a principium of cause. Perhaps this is because we operate on the general assumption that everyone has basic problem-solving skills, and all they need bring to the table is their specific knowledge. Consider the following real example of an empowered work group at one of North America's larger manufacturers.

“Hey, Frank, our building needs more lights! Is it OK for us to order new lights? I mean management said they would support us, so we should be able to just do it, right?” Seeking to better understand the situation, Frank asked, “What do you mean you need more lights?”

“Well, in our quality circle the other day, the guys decided the lighting in here is no good. When we asked management for money to buy more lights, they wouldn't give us any.

Again, Frank persisted, “So tell me more about your lighting problem. I hear a problem and a solution in the same sentence. Why do you think the lighting is so bad?”

“Like I told you, there ain’t enough lights in here.”

“Well, can you show me what you mean?” Frank continued.

As Frank looked around the building for possible causes, he found light fixtures covered with several layers of white paint. New cable trays had been installed and blocked the light. Several light bulbs were burned out, and one lighting circuit was not working. Frank had the fixtures cleaned or replaced and cable trays moved. No additional lights were needed.

Fortunately for this company they had Frank, who understood effective problem solving. The people in the quality circle had a solution without fully understanding the problem. As a result, their solution was inappropriate. If we are going to empower people, we need to make sure they have good problem-solving skills, or we are setting them up to fail.

A recent survey<sup>1</sup> documented just how bad our problem-solving skills are. The survey, which was a limited nonscientific study, revealed that only 20% of the general populace understand the concept of basic problem solving. Five simple events were presented to each participant. Each event had an unacceptable consequence, and the participants were asked to place themselves into the situation and find out what happened so they could prevent the problem from happening again. The entire conversation was recorded and documented.

While evaluating the responses is subjective, clear trends emerge. In about 10% of the responses, participants immediately sought to place blame. Another 26% immediately expressed an opinion of the causes and offered a solution without investigating the problem. It was encouraging to find 50% of the participants immediately asked “why,” yet most stopped this line of questioning after only two or three “whys.” When they stopped asking “why,” their solutions either sought to place blame or was a

favorite solution that seemed to fit.

Only two out of every ten responses continued to pursue causes until they found enough cause and effect relationships to allow an effective solution to be implemented. This is a significant indictment of the general populace's problem-solving skills. My own study of industry in the United States and abroad indicates that we only find effective solutions about 30% of the time. It doesn't matter whether it is a safety incident, equipment failure, or customer service issue. Regardless of the industry, the company, or the country, I have found that companies' incident reports reflect the same symptoms and the same poor problem-solving skills as the study discussed above. Furthermore, this failure goes beyond the incident reports to the techniques people use and the way people think about problem solving.

Stopping too soon seems to be caused by the need to get on with a solution, which we will discuss later, but I also suspect that most people know they are not good at analysis so they rely on their past experience and just wing it. The fact that we seek to place blame about 20% of the time is also very disturbing because it is rarely an effective solution.

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## **The Need to Place Blame**

A contractor employee was driving his backhoe through the construction site when his boom struck an overhead power line. The subsequent line break caused a power outage and disruption of work over a large area. Safety investigators were promptly dispatched, and root causes identified. The first root cause was personnel error, and the veteran backhoe driver was fired. Other minor causes were identified, but the emphasis was on personnel error.

This is only one of thousands of examples that happen daily in American businesses, where punishment is perceived as an effective corrective action. Consider the example. Since this was a veteran backhoe driver (who by the way had never had an accident before), how will firing him prevent recurrence? Moreover, who learned the most from this event? The backhoe driver, of course. Firing this driver is like sending an employee to an expensive training course and then firing him when he returns. In effect, this company probably replaced the most experienced person with someone who has no experience with overhead wires. They may have reestablished the same conditions they had before the event. They have done nothing to prevent recurrence, and they have set someone else up to fail in the future.

The belief that punishment will improve behavior in adults is not supported by any facts or studies. In fact, most of the time, punishment causes the exact opposite behavior. If we are unduly punished, we do not strive to do better. We are more likely to seek revenge or to give up. Since we perceive ourselves as mature adults, we do not appreciate being treated as children. This often causes childlike behavior, which is not a question of maturity or self discipline, but a human reaction. You cause me pain, I react. The rational, reasoning “self” may not come into play when dealing with hurt feelings and emotional pain.

More important than the ignorance of our actions is the causes behind them. In the work place, we place blame because we don’t know what else to do. Like parents, most supervisors and managers are not prepared for their job. If we have not developed a philosophy for certain situations, we are forced to draw on other life experiences. In the case of personnel error and punishment, we look to similar past experiences. We may find them in a parent-child relationship, a military experience, a teacher-student experience, a theological teaching, or the criminal justice system

that we read about every day. Since the workplace is not a family, the military, school, church, or prison, none of these experiences provide an effective reference for dealing with personnel performance problems in the workplace. We have been set up to fail by our environment.

Using punishment to prevent problems is rarely effective. Unless you believe, based on some evidence, that punishment will prevent recurrence of your problem, don't do it!

I was recently informed that one of our clients wanted to modify the Apollo method to allow disciplinary action as a solution. To my great surprise, he thought the Apollo method does not allow discipline. It seems they wanted to punish their employees and couldn't do it with the Apollo method, so they asked us if they could change our method a little. Contrary to this perception, the Apollo method absolutely supports discipline, but only under circumstances where this is appropriate.

Discipline can be two different things. It can mean the punishment or the praise of an individual to effect a change in behavior. With punishment, the purpose is to stop undesired behavior. A person being praised understands they should continue their behavior. In this sense, discipline is an act of reinforcement and comes in one of two forms, positive or negative. It can be self-generated or come from outside.

When discipline comes from within, be it positive or negative, we accept it as having some value. When discipline comes from outside ourselves, it will seem appropriate and cause change only if we agree with it. To agree we must see the value in the discipline. While the value is obvious if it is positive reinforcement and allows us to meet our goals, it is something altogether different for punishment.

Value in punishment may be harder to accept, but is not

unusual. Most people learn at a young age that if they violate established rules, punishment will surely follow. If taught and learned, we accept this causal relationship as a fact of life. Speeding on the freeway is a good example of this relationship. Not only do I know the speed limit as well as how fast I am going relative to it, I use a radar detector to reduce the likelihood of being caught. If caught, however, I accept the consequences and may modify my behavior. In the long run, I may even value this discipline as helping me grow to be a more responsible adult.

In the workplace we may violate established rules using the same logic. The thinking may go like this: “I know it’s wrong, but as long as I can get away with it, I am more productive. I will accept the consequences if I get caught.”

In general, we accept the consequences of our actions if the error is one of commission, not omission. That is, when we commit an error with purpose, knowing full well it violates established rules, we expect to be punished if caught and we usually accept it. When this occurs, we often accept the value of such discipline and change our behavior.

If the cause of our behavior is ignorance (i.e., omission) and we are punished, we rarely see the value of punishment and will not change our behavior. Indeed, we often seek revenge or take other actions to show our disagreement with the punishment. Whatever the reaction, punishment for errors of omission will likely not cause a change in behavior because behavior is not the cause; the cause is lack of knowledge.

If we disagree with the rules, the cause may be that the rule is inappropriate and needs review or the individual has deviated from accepted thinking for various reasons. It is imperative that we know the causes of what may appear to be inappropriate behavior. If we find that the behavior included a conditional cause of

ignorance and an action cause that precipitated the event, then punishment will not afford effective discipline, because ignorance is part of being human. If the cause was to purposely bypass or violate established rules, then punishment may be an effective solution. Even here, make sure you know why the rules were bypassed or ignored.

For example, if bypassing the rules is caused by the long-term failure to enforce or reinforce desired performance, then the responsibility also lies in the leadership and not necessarily in the individual worker. We call this “Common Law,” which is not only found in the history of our legal system, it is fundamental to the human condition. If everyone is violating the rules and it is accepted practice, then it is reasonably considered acceptable. In this case, punishment will not be accepted as having value, and behavior will not be modified.

In Common Law situations like this, the performers have been set up to fail by those who are responsible for leading them. A drunk who encourages his child to drink carries a greater burden of responsibility for the consequences of alcoholism than does the child. A leader in any organization must assume the responsibility of setting an example by consistency of purpose or they cannot be called leaders.

Another common cause of inappropriate behavior is the failure to learn. A few people (about 5% of the population) are simply incapable of learning, but a larger number choose not to learn. This cause is evidenced by repeat offenders. If we find an individual does not learn, then reassignment or termination may be the best solution. In this case, however, the solution is not discipline, because it does not seek to change behavior. It seeks to remove the cause of the problem by removing the person who fails to learn. Anyone who thinks they are doing these people a favor by

not removing them fails to understand they are actually reinforcing the choice not to learn. Take them out of the cause path.

So yes, punishment is sometimes a viable solution, but it should be applied only when we can be sure that it will prevent recurrence. And that will only occur if we understand the causes. My studies show that we use punishment as a solution about 20% of the time, and it is effective at preventing recurrence less than 1% of the time.

If punishment is used to prevent recurrence, the offending person must know the causes for prevention's sake and must understand the causes in order to accept responsibility. Sometimes we don't see our own willful act to violate established rules. Never rule out the delusionary ability of the human being. It is by far the most powerful attribute we possess. Confront all delusions head on and remember to "fix the cause not the blame."

Responsibility for your own actions requires an understanding of cause and effect relationships. For those who do not understand the cause and effect principle as discussed in this book, accepting responsibility may be a difficult task. I have found one of the greatest secondary effects of training people in these methods is that they come to believe that stuff does not just happen; everything has a cause. With this understanding comes responsibility, accountability, and pride in effective problem solving.

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## **The Root Cause Myth**

Common buzz words for problem solving are "root cause analysis," and the term has been around for at least 50 years and in a less formal sense much longer than that. Root causes are the causes that solutions act upon by removing, changing, or

controlling them such that the problem does not recur.

With these buzz words, a great myth has been created. When I first became involved in problem solving, I was introduced to all the various methods. I took several training classes, read the few books available, talked to industry experts, and tried to implement the various schemes and tools. When I tried to apply these methods, they didn't help me solve my event-based problems any better than my natural instincts. I looked more closely at the methods and tried to separate the parts that worked from the parts that didn't. Over the years I began to find some things worked much better than others. What I eventually discovered is that the *Root Cause Myth* was causing all the confusion and failed strategies.

The overriding theme of all these methods is the pursuit of a root cause, hence the buzz words: root cause analysis. Funny thing though, there is no accepted definition of a root cause; everyone just makes up their own definition. It took me about seven years of study and teaching root cause analysis to figure out why the definition was so difficult: by focusing on finding the root cause, we presume there is one.

This false premise stems from the following linear thinking: A caused B, and B caused C, and C caused D, on down the alphabet. At some point we arrive at the root cause G and since G effectively caused A we can eliminate the problem if we eliminate G. This common but misguided approach assumes causal relationships are linear and that problems are born from a single source. Perhaps this is some anthropomorphic tendency based on the pattern of life, which appears to have a beginning and end, but as we will learn later, it is fundamentally wrong. This single source of a problem is generally referred to as the root cause and is the basis for most root cause analysis methodologies (The Appendix

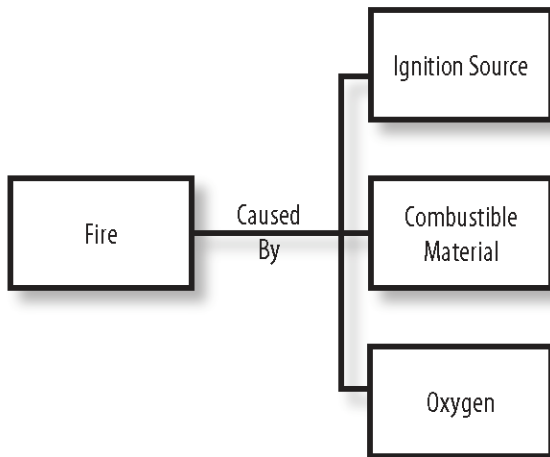
contains further discussion of other methods). Because these other methods are based on this false premise, they only deliver effective solutions by chance, not by design.

Before I discovered the fallacy of root cause, I taught people how to find the real root cause. After many arguments about whose real root cause was the true root cause, I came to understand that there are many possible root causes; and they are a function of who owns them. More importantly, I began to realize that the focus on root causes is wasted effort because the real goal of problem-solving is to find solutions, not root causes, so we should be first focused on solutions.

To illustrate this, let's look at an example problem: Preventing a fire from occurring. The causal relationship for a fire might look something like Figure 1.1.

Using this simple set of causes, what is the root cause of fire? Think about this for a minute.

Based on your understanding of a root cause, what is the root cause for fire?



**Figure 1.1** Solutions and Causal Relationships

If the solution is to remove all ignition sources, then the root

cause of the fire is ignition sources. If we decide to control all combustible material in the area, then the root cause is combustible material. If the fire is in a tank like the fuel tank on an airplane and our solution to prevent fire by inerting the tank with non-combustible nitrogen then the root cause is oxygen.

As you can see, in each one of these scenarios, it is the solution that determines the root cause. We must identify one or more solutions that somehow act upon a specific cause to prevent recurrence of the defined problem. It is the solution that defines the root cause, not the other way around as these failed methods would have you think.

When using the conventional wisdom that seeks to first find a root cause we are putting the cart before the horse. By pursuing a root cause, we end up stopping on a single cause that may or may not produce the best solution. The various methods that use this failed strategy are categorical methods which we will discuss later. The thing to remember at this time is that it is not root causes we seek, it is effective solutions.

This does not mean there is no such thing as a root cause, it simply means that root causes cannot be labeled until we decide on which solutions we are going to implement. The root cause is secondary to and contingent upon the solution.

## **The Illusion of Common Sense and a Single Reality**

When the jury in the Oklahoma City bombing trial could not decide on the death penalty for convicted terrorist Terry Nichols, a jurist lamented, “If I learned anything from this, it is that two people can look at the same situation and see two completely different things.” Indeed, how could this happen? Where is the common sense? The evidence was obvious, the decision clear.

What's wrong with some people anyway? We usually end this line of thinking by concluding that some people just don't have any common sense.

When asked, most of us believe we have our world pretty well figured out and are good problem solvers. We even believe that most of those around us are equally good at problem solving. In fact, we seem to believe that problem solving is the same for everyone. We believe that if we are able to think of it, it must be common to everyone else. Sometimes, when people don't act according to our preconceived ideas, we say they don't have any common sense. We may even question our friendship with them because we certainly don't want to associate with idiots.

Common sense is defined as the common feeling of humanity. With tongue in cheek, it can be defined as that body of knowledge that my friends and I share. In either definition, it is anything but common because we don't have the same friends or the same feelings as the next person. Common sense is often used as an excuse for explaining why others do not "see" things the way we do and then punishing them for it. I once heard a chemical plant manager say, "Since when did our people start checking their common sense at the gate?"

Each one of us is unique, and that uniqueness is caused by our genetic building blocks and the environment in which our perceptions were developed. Exploring why our perception is unique helps us debunk the notion of common sense. Perception exists within each mind and is a four-step process:

1. Receiving data from the senses.
2. Processing the data in the mind to form knowledge.
3. Developing problem-solving strategies.
4. Establishing conclusions and prototypes.

## *Our Unique Senses*

Receiving data from the senses is unique to each one of us. Our sight, hearing, touch, smell, and taste are different than other people—sometimes significantly different. Some people need glasses to see, others don't. Our senses are developed early in life and are a direct function of our environment. Research indicates that children who are visually entertained in the first year of life establish more neural connections and hence have more active minds.<sup>2</sup>

The brain reserves certain areas for each sense. The visual cortex, for example, is located at the rear of the brain, the sensory cortex along the sides, and so forth. As each sense is stimulated, neurological connections are being made in the respective portion of the brain. Patterns are recognized and value assigned to each stimulus in each sensory portion of the brain.

The development of each sensory portion of the brain is a function of the genetic structure of the mind and environmental stimulation. Each sense is on a genetically coded timeline for development. Once that time frame has passed, the sense will all but stop developing.

The acuity of each sense depends on the richness of the environment to which it is exposed during the window of opportunity. For example, if a child is completely blindfolded for the first three to six years of life, the sight portion of the brain will not develop and the child will never see, even though the eyes are completely functional. Physicians have found that covering one eye of an infant for a short period of time (a week or more) will likely cause that eye to be less developed than the other one, resulting in the need for glasses<sup>2</sup> and in a different perspective of the world.

And so, on goes the development of our senses, such that

every person senses the world differently and creates his or her own unique sensory perception.

### ***Our Unique Knowledge***

As data or information is sensed, it is processed into categories for economy of thought. We assign nouns to things and verbs to actions. Everything is sorted, prioritized, and possibly stored.

When we are young, there is little judgment going on; the mind is like a sponge that simply wants to be stimulated. The more time spent learning, the greater our knowledge. A person who is preoccupied with survival, such as our recent ancestors, had little time left for learning beyond what was required to survive. Today, survival is much easier and knowledge is abundantly available to most people. With this abundance comes a greater diversity of thought.

Over time, sensed data is organized and stored as knowledge. This knowledge is structured and valued in various ways but is always shaped by our environment into a unique perception of the world. For example, in some cultures animal sacrifice is a holy event, in others it is cruelty.

We all have our own interests and abilities based partly on the environment and partly on our genetic makeup. Growing up in Africa with Jane Goodall as your mother would provide you with different knowledge than if you grew up in a poor neighborhood in a large city, such as New York. The resulting personalities and perspectives would also be quite different. While we share many common characteristics, we each possess our own unique knowledge base.

### ***Our Unique Strategies***

A key aspect of perception is how we order knowledge. The

ordering process is what we call strategies. For example, an infant may learn that crying causes hunger to go away because it causes someone to feed him. From this causal relationship, children may learn the strategy of whining to get their way. Depending on reinforcement from our environment, we will adopt or drop a given strategy.

If we obtain our goals with a given strategy, we will retain it as part of our belief system. Each strategy becomes part of the mind's operating system, and every person uses different strategies for dealing with life's problems. One person may find success in stealing, while another finds failure. Or, in the business world one person may use the strategy of building networks to advance whereas another might use the strategy of working long hours on many projects. Hence, each person will determine the "best" strategy based on their own experiences, where "best" is unique to each person.

### ***Our Unique Conclusions***

The mind is continually sensing, ordering, and developing strategies. It is always open to new possibilities but to varying degrees. As adults, we seek validation of existing beliefs (knowledge and strategies) and do not like change. Inherent in our operating system, however, is the prototype strategy. We know from past experience that sometimes things don't happen exactly as they did the time before so we reserve the right to change our belief system. In effect, we naturally establish prototypical truths that are the best we know now but are subject to change given strong enough reasons to do so. For example, for most of us the earth does not move under our feet and this is the truth. Anyone who has experienced an earthquake, however, knows this is not valid—the earth does move and it can move violently. If you have felt the earth move under your feet or have seen a wave in the earth

move across a field, your first perception may be one of disbelief, but you soon change your belief system to accommodate the evidence.

We hold our belief systems open to change by the use of a prototypical conclusion. Our unique perception of the world, coupled with our unique interaction strategies, combines to form unique people with unique prototypical truths. All these factors are continuously evolving, some more so than others; but there is clearly no way to be anything but unique individuals. No two people will hold the exact same set of prototypical truths, not even conjoined twins who live in the same environment. Once again, our conclusions cause a unique perception of the world.

Understanding this uniqueness calls into question the notion of common sense. What does it mean to have common sense when not a single person has the same view of the world or holds the same belief system? Indeed, what is real? What is reality? Can we know it? When we use the word reality, we assume that there is a single reality and everyone can see it. By understanding the biological impossibility of perceiving the world the same, the notion of a single reality can now be seen as the illusion it is.

The notion of common sense is therefore an illusion created by the false belief in a single reality. Perhaps this need for a single reality is created by our desire to get along with one another. If we all hold the same beliefs, we could always agree. Whatever the cause, the belief in a single reality is one of the greatest barriers to effective problem solving I have found.

So, if perception is reality and everyone's reality is unique, what is reality or truth? This question of the ages continues to haunt us, but the answer is quite simple if you can grasp the notion of relativity. Everything is relative to our own unique perceptions. We each hold our own truths, and the best we can hope for is to

find a way to incorporate others' truths into ours. While we use many tools and strategies for doing this, such as team building, they often fail and understanding is left wanting. Once again, we have been set up to fail.

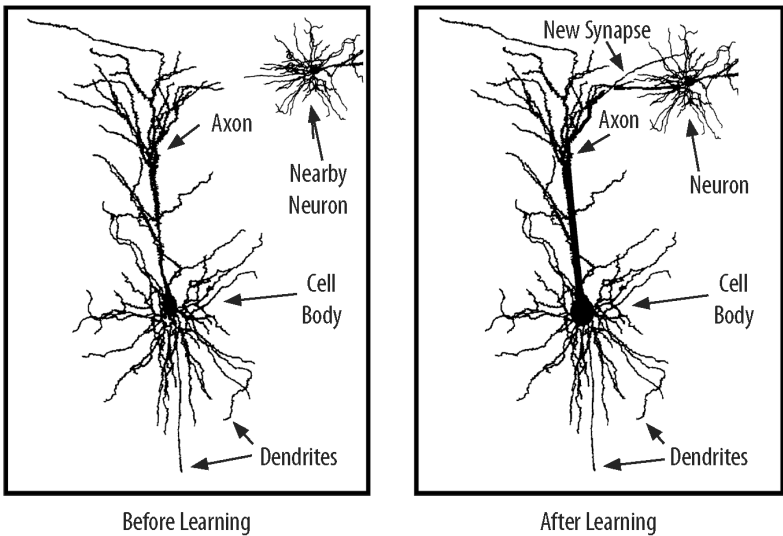
## **Groovenation**

No, this is not a sixties-era song; it is a human condition of the mind that prevents effective problem solving. Groovenation is a term I created to describe the process of justifying our beliefs. To be groovenated is to hold strong biases and prejudices. It is physiological in origin and is found in our search to validate our existing realities. It is the groove we get in by placing a greater value on familiar things than on differences or change. We have a strong desire to be right in our beliefs, and we continuously seek validation over other possibilities.

As we sense the world, we send all data through what I call a "Delta Checker" from the Greek symbol for difference. The Delta Checker, a learned strategy, checks for differences between what we are sensing and our existing prototypes. If something is the same as previously known, we like it. If it is different, we analyze it and make a value judgment. If we place value on the difference, we continue to scrutinize it. Unfortunately, we have a strong tendency to place high value on anything that mirrors our existing reality and low value on everything else. This tendency is caused by the physiology of the mind. For every thought, idea, sense, or motion, many synapses are fired; and with each firing, the connections become physically stronger both in size and chemical response. Just like building muscles, the more we exercise or stimulate the mind, the stronger it gets.

In the thought-provoking book, *Descartes' Error*,<sup>3</sup> Antonio R.

Damasio, M.D., provides great insights into the working of the mind. Dr. Damasio and others have found the causes of groovenation in the physical nature of the mind. The brain is made up of billions of cells known as neurons, which consist of a cell body, a main output fiber called an axon, and input fibers known as dendrites. These neurons are interconnected in circuits and systems within the brain. Brain functions, including our ideas and thoughts, occur when neurons become active through an electrochemical process. Each time we have a new thought or experience something new, axons and dendrites “connect” via a synapse. If the same thought or experience is repeated, the same physical connections enlarge. Figure 1.2 shows a simplified version of this process.



**Figure 1.2** Impact of Repeated Stimulation on Learning

This is not to suggest that one connection constitutes a specific piece of conscious knowledge. It is much more complex than that, but the observation that these neurological connections occur during learning and actually grow in size with repeated

exposure to a given stimulus helps explain part of the physiology behind groovenation. That is, if a larger connection provides a preferential path for a neuron firing, it would explain the physiology of groovenation. Scientists have recently discovered there are other biological processes that also strengthen these connections, which we will not get into in this book. Without going into all the causes, new ideas require new connections and therefore new ideas are at a disadvantage to old ideas. This does not mean we cannot learn, but it does mean we may have to modify existing connections to register contrary thoughts. This happens when new connections become the preferred path from repeated stimulation and connections that don't get stimulated are actually dissolved (physically) by special compounds in the brain.<sup>4</sup>

It seems that no matter how hard we try, sometimes it is nearly impossible to pull ourselves out of a groove or rut. This groove can be an idea, a belief, or a habit. Someone who is highly groovenated will remain intransigent even when the path leads directly to a harmful outcome. The kamikaze pilots in World War II or the suicide bombers of modern day radical groups provide a vivid example of a highly groovenated state.

In your daily life, consider the people who judge everything they see and proclaim it right or “WRONG!” Groovenation is a natural state of being too focused on being right while ignoring a broader perspective. It is present in all humans and varies from inconvenience to the paralyzed mind of a fanatic.

Understanding the cause of groovenation can help us understand that it is part of being human. Understanding the physiology behind the process can help us see how easy it is to be brainwashed or to develop an intellect for music, athletics, or whatever we choose. Just like practice makes perfect in sports, repetition of an idea or thought can create a perfect reality that only

exists in the mind of the one who created it. It becomes real, regardless of contradictory evidence. Denial is one of our most destructive strategies and groovenation is the cause. (More on Denial in Chapter 6) If we spend our lives trying to validate specific relationships, these relationships will indeed become valid. They become valid because of repeated exposure of the mind to the same conditions. Pick any controversial topic—extraterrestrials, evolution, creationism, or who has the best football team—and you will find proponents that know the “truth” of their position. What they don’t understand is that their truth is the result of their own brainwashing.

As our brains are conditioned into a physical state by the repeated firing of the synapses, we convince ourselves of the absolute validity of our beliefs. Groovenation presents a formidable challenge to effective problem solving. Because this barrier is deeply ingrained in the human condition, overcoming it is a primary focus of becoming better problem solvers.

## **Storytelling**

Our primary form of communication is through storytelling. Storytelling describes an event that relates people (“who” elements), places (“where” elements), and things (“what” elements) in a linear time frame (“when” elements).

Incident reports provide prime examples of storytelling and its impact on problem solving. Figure 1.3 is an example incident report taken from the manufacturing industry and is typical of 60% to 70% of the many incident reports I have seen, with many being much worse. As you read this example, ask what the problem is, what the causes of the problem are, and if the solutions will prevent recurrence of the stated problem. Remember, this is a

typical report. The form is filled out, the boxes are checked, and the categories are defined or discussed.

Is the problem an injury, a near-miss with electricity, something called a flashover, or what? Whatever the problem was, are the causes clearly stated? Do the corrective actions support the statement that this will never happen again? What do “position switches” have to do with anything? Also, notice that the report states that the problem is human error, but then says the root cause is a defective or failed part. Aside from this contradiction, these are cause categories—not causes—to which thousands of solutions could be attached. The proposed “Corrective Actions” discuss training, procedures, incomplete drawings, and a position switch. Since these have nothing to do with human error, additional contradictions are presented. Is there a hidden agenda here? Are these vague references listed on purpose, or is this simply another example of poor problem-solving skills? After the company further investigated this problem, it was shown to be painfully ill defined and the solutions woefully inadequate.

Take note of the nice story in the “Description of Incident.” Not only do we write stories in our incident reports, we are told to write stories. Everyone likes a good story. Many companies don’t even write the story down; they get together with the decision makers and tell stories to one another, decide which category the problem fits into, and implement their favorite solution.

While entertaining, stories seldom identify causes because they are busy setting the stage of who was where when some action occurred. The basis for any story is a sequence of events starting at some arbitrary point in the past, leading the reader to a significant consequence disguised in a statement like, “The final investigation discovered the root cause to be human behavior.” Opinions, or the consensus of a group, are then presented as

corrective actions. When corrective actions are disjointed like the ones in this example, the consensus strategy of a committee is probably at work.

Every time I teach a class to a new client, I ask them to send sample event reports. I always find one or more that look like the example discussed here; and when presented to the class, the most common response is that it is typical or not unusual. Supervisors and managers are especially frustrated by such reports but are lost for ways to remedy them. The concern, however, is more than just poor reports; it is poor problem-solving skills that are reinforced by poor report writing and rule-based thinking like filling out a form. Forms subtly tell users to turn off their brains, fill in the blanks, write a good story, check the boxes, and identify the right categories.

Another example of an incident or event report is shown on the next page. As the example shows, the focus is on people, places, and things, occurring as a sequence of events. Few causes are stated. Even the stated root cause discussion is mostly story. We are told that an employee was injured because he fell. He fell because a rubber floor mat slipped, and the root cause was operators leaving the pumps on during breaks, causing oil to leak and leading to a slippery floor and the accident.

An analysis of this report reveals the following:

The root cause, “operators left pumps on,” places blame on the operators; and the corrective actions express a pre-established opinion as to what should be done about a condition that somehow may relate to the injury. That is, by making the operators responsible to check for oil leaks, the assumption is that the operators are irresponsible and may even think nothing of working on oil-slickened floors. Once again, the employee has been set up to fail, failed, and then told to be more careful, or in this case, more

responsible. All this without ever talking to the injured employee.

If you want to observe a storytelling activity, pick up any newspaper or magazine. Talk to your friends; or the next time you are in a meeting, listen carefully. Or, the next time the President of the United States or any other politician speaks, listen carefully. You will hear all the elements of a story listed above—who, what, where, and when—but you will not hear many causes.

It doesn't matter which culture, country, or education level we observe, we have a common human affliction of poor problem solving, and it is directly proportional to storytelling. The stronger the storytelling culture, the less effective we are at problem solving. A storytelling culture can exist within organizations or within different regions of the country or world.

Storytelling sets us up to fail by ignoring causes and the cause and effect principle, which we will discuss in Chapter 2.

## **Categorical Thinking**

Categorical thinking is caused by the mind's need to order what it perceives. While categorization is a natural process of the mind, the problem comes when we fail to understand how categorization can lead to intellectual laziness. The notion of good and bad is categorical thinking at its most base level. Instead of seeking to understand, we categorize something as good or bad and stop there.

Is it good that the lion eats the gazelle, or is it bad?

Neither, it simply is; and to assign a categorical answer, like bad, we misrepresent the situation by oversimplification. We establish a course of action because if it is bad we are compelled to right the injustice and make it good. If it is good, we can ignore the situation and move on to more bad things.

Please note, it is not the category that causes the problem. Categorization can be a very helpful strategy. The problem categorization creates is the belief that once categorized we can establish certain relationships and then act according to our favorite solutions or stop thinking.

Categorization is strongly linked to storytelling. As the two previous incident reports demonstrate, the causes of the events are in categories. That is, the stated causes represent a group of causes, not a specific cause we can act upon. Here are some examples I hear often: “The cause of 95% of all industry accidents is human behavior.” “Corporations have caused most of the environmental disasters in the world.” “The pump failed because it was worn out.” In these three examples, human behavior, corporations, and worn-out equipment are all categorical causes. Stopping at categories like “worn out” usually leads to ineffective solutions such as replacing the equipment. Solutions based on categorical causes fail to correct more fundamental causes like the cause of wear. The end result is recurrence of the event.

The Garbage Solution is my favorite example of categorical thinking. As we go through the day, we have to assess the value of many objects. Some objects have great value; others, like a banana peel, may have none. Our solution: put these no-value things in the garbage and someone will make them disappear. With this strategy we solve many problems with one solution. The Garbage Solution has us put many problems into one category and solve them with one solution. It appears to be effective and is used extensively in all aspects of our lives. In business we seek “the biggest bang for the buck!” We put as many problems as we can into a category and then solve it with one solution.

The danger of this strategy is that it doesn’t address each individual problem and may cause many other problems. Examples

of this categorical thinking are all around us. Lumber mills used to burn all their scrap until they finally realized they were polluting the air and wasting valuable raw materials. The solution to pollution used to be dilution until we looked closer at its effects. Now most pollutants, including our garbage, are evaluated for cause and effect relationships and individually controlled.

The following is another common example of categorical thinking. We seek to know where people come from, their education level, religion, or political alignment, in order to know “who” they are. Is there anyone among us who doesn’t do this? For example, if you are not well educated and I am, then I can draw certain conclusions and act in a certain way. Such an inference precludes me from knowing the real you, yet we use this strategy daily because we don’t have time to do otherwise.

Categorical thinking creates another significant problem for data collection and analysis. When interacting with others, we assume there is a single reality and therefore our categories are identical to theirs. They are not. I have run hundreds of experiments where I ask students to categorize a list of causes. When completed, we compare notes and find the same causes in completely different categories. The magnitude of this discovery is significant. Every database that has ever been created from the input of more than one person, like most accident reports, has questionable data. I am opposed to categorization, as will be discussed later, but if it must be done, I recommend all categorization be performed by one person or a small cadre of like-minded people. In any database, consistently comparing apples with apples and oranges with oranges is essential. We are not doing this now because we believe in the notion of a single reality and that everyone “sees” the same world.

Categorization is part of our natural operating system. In the

process of categorizing, we assign value that establishes our biases and prejudices. By not recognizing the danger these prejudices bring, we set ourselves up to fail with ineffective problem-solving strategies.

## **Causes of Ineffective Problem Solving**

As we review the many examples of ineffective problem solving, we discover a recurring trend—effective solutions are not found because of three things:

1. Incomplete problem definition.
2. Unknown causal relationships.
3. A focus on solutions.

Let's assess each one of these factors.

### ***Incomplete Problem Definition***

Incomplete problem definition is caused by the false belief that the problem is obvious and the subsequent rush to find a solution. The belief that the problem is obvious is caused by the belief in a single reality discussed above and the notion that we all think the same (common sense).

Observing thousands of decision-making meetings, I found that most meetings start with a statement something like, “Thank you for coming. I think everyone pretty much knows what the problem is, so does anyone have any ideas how we can prevent this from happening again?” The leader looks around the room and sees everyone nodding their heads in approval, so continues.

Everyone is nodding in approval but is thinking many different things. The operations manager knows the problem was caused by poor maintenance. The maintenance manager knows it

was those darn operators again, and the facility manager knows somebody screwed up again. A few people will offer their solutions and the arguing commences. The battle for the right answer begins and the person with the best story—usually the boss or whoever is considered an “expert”—wins. Quite often the discussion ends with the boss or expert expressing their reality—everyone agrees, and they move to implement that person’s wishes.

Most people have been in this meeting. As you can see, the problem is not defined, causes are ignored, and the focus is on sharing our favorite solutions to show everyone else how smart we are. Little or no synergy occurs; the problem is never fully understood and it happens again. When it does recur, we reconvene the meeting, implement another favorite solution, and the cycle continues.

We track and trend how many times we have certain types of failures and create beautiful graphs and charts showing the various “root causes,” but the problems keep recurring. We become so engrossed in tracking and trending causes that we do not realize we are failing miserably. Effective problem solving means the problem never happens again.

### ***Unknown Causal Relationships***

Causal relationships often remain unknown because we do not seem to think causally. Instead, we communicate by telling each other stories, and the inferences surrounding the stories pass as causes. We infer that hardware wore out by recommending replacement. We talk in terms of human error, lack of training, and other categorical causes like management being less than adequate. Instead of continuing to ask “why” to our point of ignorance, we stop at causes that align with a favorite solution. Why did the hardware wear out? This, along with several more “whys,” is

required to adequately understand the problem. Our ignorance of the cause and effect principle as discussed in the next chapter is perhaps the largest contribution to incomplete causal analysis.

### ***A Focus on Solutions***

By focusing on solutions without clearly defining the problem and its causes, we often find ourselves solving the wrong problem. Today, most people still believe the Exxon Valdez oil spill was caused by a drunk captain. The federal government focused on this issue as the problem and proceeded to penalize the Exxon Corporation as the main solution. Monetary penalties did nothing that I am aware of to prevent future oil spills. (Note: While this is a sad truth, the purpose of the legal system is to punish, not prevent recurrence.) Industry efforts to utilize double-hulled tankers has done more to prevent recurrence than the fines levied on Exxon.

Focusing on solutions is caused by many things, but chief among them is groovenation. As discussed earlier, our brains are wired such that we search for what we already know and when we find it, we validate the rightness of our search and cease to look any further. My daddy drove a Ford and his daddy drove a Ford; therefore, I will always drive a Ford. This kind of logic is a natural mental process whereby we seek the familiar and call it “right” or “real.” We tell our children “wait until you grow up and have to face the ‘real world.’” The “real” world will be their world, not ours, and it will be much different. This tendency to seek the familiar is called the favorite solution mindset, and it prevents effective problem solving most of the time.

Authoritative and goal-driven personalities contribute to this drive to find a quick solution. The “Ready, Shoot, Aim!” personalities are hard to deal with because they are ensconced in categorical thinking and buoyed by past successes (groovenation).

It is important to remember that groovenation is a strong physiological force and that even the best and the brightest can succumb to it.

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## **Set Up to Fail**

By sharing my observations of the current state of problem solving, I have attempted to show that we are set up to fail by the processes and strategies we use. Groovenation and the unintended pursuit of the ignorance it creates are the driving factors in this setup. When coupled with the misguided belief in a single reality and the illusion of common sense that this creates, these strategies set the formula for ineffective problem solving.

What we need is some way to express every stakeholder's perspective in a way that complements the learning process. The diversity each person brings to the table provides the opportunity to see a bigger and clearer picture of each situation. Unfortunately, we often look on individuality as counterproductive to effective teamwork, when in fact it is our greatest strength. Conformity, not individuality, is the enemy of effective problem solving. When we conform, we align our thoughts into one point of view.

With many diverse thoughts, there is no limit to what we can accomplish. This principle can be illustrated by the bed of nails supporting the East Indian guru. The nails together as individual units support the body. If they were all aligned in a row, they would be a big skewer. The guru is not skewered because his weight is distributed over many individual points, each providing a small support and together supporting all the weight. Together, as individuals, we can create a common view greater than any individual reality.

Up until now, we have never had the tools to allow us to

create a common view or understanding—to form what I call a common reality. Creating this common reality is what Apollo Root Cause Analysis is all about. By creating a common reality made up of all perspectives, we are able to break out of the illusion of common sense and thus prevent the usual arguing that prevails. It also helps us break the bonds of groovenation by presenting legitimate realities heretofore unknown.

Given proper tools that overcome the handicaps of existing strategies like common sense, single reality, storytelling, categorization, and the pursuit of a root cause, we can find effective solutions to everyday problems almost every time. These tools are based on the cause and effect principle discussed in the next chapter, and they will help us break the bonds of ignorance.

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