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Managing the Unexpected

**Resilient Performance in
an Age of Uncertainty**

Second Edition



John Wiley & Sons, Inc.

More Praise for the Second Edition of *Managing the Unexpected*

“If you are concerned about how your organization will respond to an unexpected event that can easily destroy the reputation and financial health of your organization as well as you as a leader, this is the book for you. You will learn from two world-renowned experts what makes organizations susceptible to unexpected catastrophic events and what you can do to make your organization alert and responsive to unexpected and potentially destructive events.”

—**Michael Beer**, professor emeritus, Harvard Business School
and chairman, TruePoint Partners

“Improving patient safety has, at long last, risen high on the priority list—where it belongs—for health care leaders. But, as those leaders soon realize, protecting and improving safety and reliability in complex systems is not easy. Simple formulae won’t work. Luckily, the technical and social sciences that underlie safe practice have been developing for many decades in sectors other than health care, with the scholarship and teaching of experts like Weick and Sutcliffe. *Managing the Unexpected* is a *tour de force*, as it explains and illustrates much of what is now known about organizational and social systems that can achieve high reliability. I know of no better introduction to safety at the state-of-the-art, and it is the first book I now recommend to health care leaders who ask me how they can best deepen their knowledge of this fascinating and crucially important field. Adapting its lessons to the world of patient care is not just possible; if we are to achieve our mission in health care, it is essential.”

—**Donald M. Berwick**, MD, MPP, president and CEO,
Institute for Healthcare Improvement

“What can a manager in a global firm learn from local forest firefighters in California? Plenty. As businesses fragment their value chains and depend on a wide variety of global suppliers, their systems become fragile. There are more moving parts, few of which they directly own or control. The interlinkages are also continuously changing. In *Managing the Unexpected*, Weick and Sutcliffe provide an extraordinary blueprint for creating high reliability organizations in which the unexpected is the norm. Capacity to create new knowledge rapidly, substituting collaborative and integrative capacity for investment capacity, and seeing new patterns in weak signals are critical to building a culture that the authors call ‘mindfulness’ in managing. The insights in this book are a must for those who want to remain at the cutting edge.”

—**C. K. Prahalad**, The Paul and Ruth McCracken
Distinguished University Professor of Corporate Strategy,
The Ross School of Business, University of Michigan

“For me, Karl Weick and Kathleen Sutcliffe are the giants of the risk and resilience business. Their writings have consistently excited, inspired, and informed me over many years now. They are always beautifully written, always innovative, and marvelously rich in stories and wise paradoxes. They are a joy to read.

“I am not surprised that the first edition of *Managing the Unexpected* has proved to be such a big hit. It reaches out equally to managers and to fellow social scientists. The book translates the five defining characteristics of high reliability organizations (HROs) into a comprehensive program for dealing mindfully with unforeseen, unanticipated, and often unwanted happenings in a variety of risky domains.

“The second edition goes still further. Prominent among its new features is a brilliant chapter that describes a change program built around small shifts and alterations that produce visible and tangible results. This ‘small wins strategy’ is again organized around the five defining principles of HROs: preoccupation with failure, resistance to simplification, sensitivity to the details of operations, commitment to resilience, and deference to expertise. Firefighting, both in its organized form and in its day-to-day reality, is a central theme of this chapter. I found it enriching and full of surprises. This book about dealing with the unexpected is rightly full of unexpected challenges to conventional managerial wisdom. It is perhaps the best thing they have written. I can give it no higher praise. Buy it and live by it.”

—**James Reason**, author, *Managing the Risks of Organizational Accidents*

“The quality of responses by organizational leaders at every level to unexpected events and developments either strengthen or weaken the system. The unexpected can, therefore, be a turning point in the fortunes of organizations and their leaders. Do the right things—like J&J’s leaders in the Tylenol crisis—and your stock (metaphorically and literally) will rise. Do the wrong things—like the leaders of FEMA post-Katrina—and you will lose respect and more. But leaders can’t wait until the crisis hits—they have to prepare their organizations and keep them tuned. Weick and Sutcliffe offer valuable insights and practical advice to improve the odds that you will be leading a high reliability organization when the chips are down.”

—**B. Joseph White**, president, University of Illinois

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Karl E. Weick
Kathleen M. Sutcliffe

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Preface

With the unexpected becoming a larger chunk of everyday life, it isn't surprising that we find ourselves interested in resilience and coping. Since the publication of the first edition of *Managing the Unexpected*, the unexpected has surfaced time and time again. Hurricane Katrina, the Asian tsunami, the Enron scandal, the *Columbia* space shuttle disaster, terrorist attacks such as 9/11, the London bombings, and the Madrid train disaster, all on a large scale, have tested the stability of our organizations. Most organizations experience unexpected events on a much smaller scale all the time. These dynamic and uncertain times raise the questions of how and why some organizations are much more capable than others of maintaining function and structure in the face of drastic change and of bouncing back in a stronger position to tackle future challenges.

A Book About Reliable Organizations

This book is based on examination of the ways people and organizations organize for high performance in settings where the potential for error and disaster is overwhelming: nuclear aircraft carriers, air traffic control systems, aircraft operations systems, hostage negotiation teams, emergency medical treatment teams, nuclear power generation plants, continuous processing firms, and wildland firefighting crews. These diverse organizations share a singular demand: They have no choice but to function reliably. If reliability is compromised, severe harm results. Adopting the terminology first used by researchers at the University of California, Berkeley, we

have lumped these organizations together and called them high reliability organizations (HROs).

Other people who have examined these organizations were struck by their unique structural features. We saw something else. These organizations also think and act differently. Their processes and practices are different, but not in ways that are uniquely different.

Like most other business organizations, HROs experience unexpected problems continually, and most of those problems involve a lapse in reliability. Either somebody counts on something to happen and it doesn't, or someone counts on something not to happen and it does. And most of these lapses do not emerge abruptly as full-blown issues. Instead, small clues accumulate for some time and suggest that unexpected things are happening and aren't going away.

Benchmarking Against the Experts

Given today's dynamic and uncertain business environments, it is important to benchmark on the experts in managing the unexpected. This book is about experts in resilient high performance and how they stay on top of operations, despite repeated interruptions. Part of their success stems from their uncommon skill at finding ways to stay mindful about what is happening. They update their ideas of current situations and are not held captive by old categories or crude renderings of the contexts they face. They use techniques that you can copy—techniques that are worth copying because they ensure faster learning, more alert sensing, and better relationships with customers. Unreliable suppliers and unreliable services make us crazy. But much to our surprise, reliability does not mean a complete lack of variation. It's just the opposite. It takes mindful variety to ensure stable high performance. HROs have learned that the hard way. We hope to make it easier for you to learn the same lessons they learned the hard way.

When we say that these are lessons learned the hard way, we mean that these principles come out of HRO experiences with suc-

cess and failure. And frequently, the principles are more visible in experiences of failure, which is why several examples in this book focus on mismanagement of the unexpected. What we find striking about HROs is that they have dealt with these issues for a long time and know what they understand and what they don't understand. When we ask you to benchmark on these organizations, we do so not because they "have it right" but because they struggle to get it right on a continuing basis. Complacency and hubris are two of their biggest enemies. Once you study their experiences, we hope they will be your enemies as well.

Acknowledgments

Several people figured in this project, and we want to express our appreciation for their help. We are especially grateful to a host of valued colleagues whose work we admire, people such as Bob Bea, Gary Klein, Constance Perin, Charles Perrow, Paul Schulman, Scott Snook, Bill Starbuck, Diane Vaughan, David Woods, and especially "the mother of HROs," Karlene Roberts.

We have learned a great deal about managing the unexpected from members of the wildland firefighting community, including Anne Black, Paul Chamberlin, Dave Christianson, Jim Cooke, Mike DeGrosky, Deirdre Dether, Riva Duncan, Brett Fay, Paul Keller, Mark Linane, Paul Linse, Paula Nasiatka, Ted Putnam, Jim Saveland, and Dave Thomas. Marlys Christianson, Marilyn Rosenthal, Daved van Stralen, and Bob Wears have helped us understand adverse events in medical settings. We also thank Michelle Barton, Dan Gruber, and all our colleagues at the Ross School of Business at the University of Michigan. David Obstfeld played an important role in helping us synthesize early ideas. Kathleen Sutcliffe continues to learn from people who have no choice but to show up and manage it all, including Carolen Hope, Steve Lyford, Gail Marnik, Fiona and Miranda Marnik-Said, John Said, and Frances Sanders.

Finally, we dedicate this book to the two people who always clear space and time for us to be able to do our best work. Karen

Weick is a beloved expert at managing the unexpected, and half of this book is directly traceable to her efforts. The other half of the book is traceable to Tim Wintermute, who for Kathleen makes it all worthwhile. We dedicate this book to both of them with love!

June 2007
Ann Arbor, Michigan

Karl E. Weick
Kathleen M. Sutcliffe

Managing the Unexpected

1

Managing the Unexpected

What Business Can Learn from High Reliability Organizations

Unexpected events often audit our resilience. They affect how much we stretch without breaking and then how well we recover. Some of those audits are mild. But others are brutal. This book is about both kinds of audits, as unrecognized mild audits often turn brutal.

Consider some examples. People did not expect that Pentium computer chips would make incorrect calculations, that a new soft drink formula would unleash protests rather than praise, that bottled water would be tainted with benzene, that fresh spinach would cause serious illness, that pet food would be tainted with poison, that patients supposedly suffering from St. Louis encephalitis were actually victims of the West Nile virus, or that pediatric deaths during cardiac surgery would be excessive. All of these were the mild audits that grew into substantial problems for Intel, Coca-Cola, Perrier, Salinas Valley spinach growers, Menu Foods, the Centers for Disease Control and Prevention, and the Bristol Royal Infirmary, respectively. In each case, small failures went unnoticed, simple diagnoses were accepted, frontline operations were taken for granted, recovery was treated as routine, and experts deferred to authorities. These troubled organizations might have acted differently had they modeled themselves after a family of organizations that operate continuously under trying conditions and have fewer than their fair share of major incidents. These *high reliability organizations* (HROs) practice a form of organizing that reduces the brutality of audits and speeds up the process of recovering. They are the focus of this book.

The Basic Message of This Book

This book is about organizations, expectations, and mindfulness. Our basic message is that expectations can get you into trouble unless you create a mindful infrastructure that continually does all of the following:

- Tracks small failures
- Resists oversimplification
- Remains sensitive to operations
- Maintains capabilities for resilience
- Takes advantage of shifting locations of expertise

Failure to move toward this type of mindful infrastructure magnifies the damage produced by unexpected events and impairs reliable performance. Moving toward a mindful infrastructure is harder than it looks because it means that people have to forgo the “pleasures” of attending to success, simplicities, strategy, planning, and superiors.

This first chapter presents an overview of what it takes to organize for high reliability. We anchor this overview in a devastating incident, the Cerro Grande wildland fire, which caused \$1 billion of damage to Los Alamos, New Mexico, and the adjacent Los Alamos National Laboratories in May 2000. As you will see, events overwhelmed a crew and a system that planned to burn out a hazardous 300-acre area at the Bandelier National Monument. Without much warning, unexpected winds forced the system to deal with a task that was exactly the opposite of the one they were prepared for. Instead of managing an intentional prescribed burn, people in the system suddenly had to suppress an unintentional active fire that had escaped its intended boundaries. Although the Cerro Grande fire is a dramatic event, it involves moments of organizing that are common to organizations of all kinds. The organizing for the Cerro Grande fire started with a plan, vague notions of contin-

gency resources, incomplete knowledge of the system, unexpected changes in staffing, uneven communication, quotas, and shifting command structures. When the unexpected wind swirled into this system, the vagueness, the incompleteness, and the shifting command were the weak points that gave way.

The Cerro Grande Fire: A Brutal Audit

Consider Pat Lagadec's vivid words: "The ability to deal with a crisis situation is largely dependent on the structures that have been developed before chaos arrives. The event can in some ways be considered as an abrupt and brutal audit: at a moment's notice, everything that was left unprepared becomes a complex problem, and every weakness comes rushing to the forefront."¹

Lagadec's description pinpoints potential threats to managing the unexpected. "Structures developed before the crisis arrives" include both routines and special resources for the crisis such as SWAT teams. All of these help people deal with the disruption, except that the crises that are envisioned seldom resemble the crises that actually unfold. This mismatch means that a brutal audit uncovers vulnerability in the form of unforeseen collapses in functioning.

A brutal audit also uncovers unforeseen weakness in resilience—the capability to recover. Resilient action that enables recovery from setbacks is built out of a broad repertoire of action and experience, the ability to recombine fragments of past experience into novel responses, emotional control, skill at respectful interaction,² and knowledge of how the system functions. Structures of resilience reflect lessons that HROs have learned the hard way. The best HROs know that they have not experienced all of the ways that their system can fail. They also know that they have not deduced all possible failure modes. And they have a deep appreciation for the liabilities of overconfidence. This appreciation takes the form of ongoing mindfulness embedded in practices that enact alertness, broaden attention, reduce distractions, and forestall misleading simplifications. How HROs pull this off, and how you can do the same,

are what this book is about. For the moment, the key point is that ongoing mindful practice reduces the severity and frequency of brutal audits, accelerates recovery, and facilitates learning from the audit.

The Events at Cerro Grande

The successes as well as the failures of wildland firefighters can teach us a lot about managing the unexpected.

Normally, wildland firefighting is reactive, as is true for most settings where people describe themselves figuratively as “putting out fires.” Reactive action occurs when firefighters respond to fires that are already burning (such as those started by lightning). Reactive action among nonfirefighters occurs when they respond to “fires” lit by disgruntled customers, shifts in financial markets, or supply chain breakdowns. Wildland firefighting, however, has become more *proactive* and preemptive as forests have become more dangerous due to dead trees and debris on the forest floor. When fires break out in debris-laden forests, they burn faster and hotter, are more difficult to control, and can threaten a larger number of homes and businesses. To prevent such disasters, crews now ignite small preemptive fires, which they try to contain within prescribed areas. A prescribed burn reduces the fuel load that could lead to much larger fires. But prescribed fires are complex events. “Because of the potential for unintended consequences, prescribed fire is one of the highest-risk activities land management agencies undertake. Contingency planning, which includes identifying necessary resources should a planned ignition exceed prescription parameters, is an essential component of a burn plan.”³

The prescribed burn at Cerro Grande was just such a preemptive, prescribed fire. Plans were made to burn 300 acres in the upper portion of the 32,727-acre Bandelier National Monument near Santa Fe, New Mexico (see Figure 1.1). The area of the burn was a south-facing slope between 9,000 and 10,000 feet elevation with a 2 to 20 percent rise.

Figure 1.1 Bandelier National Monument and Vicinity

