

Preface

So you are faced with a human error problem.
What do you do?

How do you make sense of other people's puzzling assessments and actions? How can you get people in your organization to stop making errors? How can you get your operations to become safer?

You basically have two options, and your choice determines the focus, questions, answers and ultimately the success of your efforts, as well as the potential for progress on safety in your organization:

- You can see human error as **the cause of a mishap**. In this case “human error”, under whatever label—loss of situation awareness, procedural violation, regulatory shortcomings, managerial deficiencies—is the conclusion of your efforts to understand error.
- You can see human error as **the symptom of deeper trouble**. In this case, human error is the starting point for your efforts. Finding “errors” is only the beginning. You will probe how human error is systematically connected to features of people's tools, tasks and operational/organizational environment.

The first is called the Old View of human error, while the second—itsself already 50 years in the making—is the New View of human error. This Field Guide is the successor to the *Field Guide to Human Error Investigations*. It helps you understand human error according to the New View. Whether you are an investigator, a manager, a regulator, a practitioner, the New View can give you new and innovative leverage over your “human error problem”. Leverage you may not have known existed.

Embracing the New View is not easy. It will take work. And maybe a change in your own worldview. But embracing the New View is necessary if you really want to create progress on safety.

We have long searched for ways to limit human variability in—what we think are—otherwise safe systems. Performance monitoring, error counting and

Table 0.1 Two views on human error

The Old View of human error on what goes wrong	The New View of human error on what goes wrong
Human error is a cause of trouble	Human error is a symptom of trouble deeper inside a system
To explain failure, you must seek failures (errors, violations, incompetence, mistakes)	To explain failure, do not try to find where people went wrong
You must find people's inaccurate assessments, wrong decisions, bad judgments	Instead, find how people's assessments and actions made sense at the time, given the circumstances that surrounded them
The Old View of human error on how to make it right	The New View of human error on how to make it right
Complex systems are basically safe	Complex systems are not basically safe
Unreliable, erratic humans undermine defenses, rules and regulations	Complex systems are trade-offs between multiple irreconcilable goals (e.g. safety and efficiency)
To make systems safer, restrict the human contribution by tighter procedures, automation, supervision	People have to create safety through practice at all levels of an organization

categorizing—these activities all assume that we can maintain our safety by keeping human performance within prespecified boundaries. Our investigations into human error often reveal how people create havoc in otherwise safe systems when they go outside those boundaries. When people don't do what they are supposed to do. When they violate rules or lose situation awareness.

In fact, while we can make our systems safer and safer, the human contribution to trouble remains stubbornly high (70 per cent!). We have long put our hopes

for improving safety on tightening the bandwidth of human performance even further. We introduce more automation to try to get rid of unreliable people. We write additional procedures. We reprimand errant operators and tell them that their performance is “unacceptable”. We train them some more. We supervise them better, we tighten regulations.

Those hopes and ideas are now bankrupt. People do not come to work to do a bad job. Safety in complex systems is not a result of getting rid of people, of reducing their degrees of freedom. Safety in complex systems is *created by people through practice*—at all levels of an organization. It’s only people who can hold together the patchwork of technologies and tools and do real work in environments where multiple irreconcilable goals compete for their attention (efficiency, safety, throughput, comfort, financial bottom line).

The New View embodies this realization and lays out a new strategy for understanding safety and risk on its basis. Only by understanding the New View can you and your organization really begin to make progress on safety. And the Field Guide is here to help you do just that.

Here is how.

Chapter 1. The Bad Apple Theory

Presents the Old View of human error: unreliable people undermine basically safe systems. In investigations, we must find people’s shortcomings and failings. And in efforts to improve safety, we must make sure people do not contribute to trouble again (so, more rules, more automation, more reprimands).

Chapter 2. The New View of Human Error

Explains how human error is a symptom of trouble (engineered, organized, social, etc.) deeper inside the system, and that efforts to understand error begin with seeing how people try to create safety through their practice of reconciling multiple goals in complex, dynamic settings.

Chapter 3. The Hindsight Bias

Presents research on the hindsight bias, one of the best documented biases in psychology and an unwitting foundation of the Old View. Shows how pervasive the effects of hindsight are, and how they interfere profoundly with your ability to understand human behavior that preceded a bad outcome.

Chapter 4. Put Data in Context

Tells you how to avoid the hindsight bias by not mixing your reality with the one that surrounded other people. You have to disconnect your understanding

of the true nature of the situation (including its outcome) from the unfolding, incomplete understanding of people at the time.

Chapter 5. “They Should Have ...”

Lays out what counterfactual reasoning is and how it muddles your ability to understand why people did what they did. Sensitizes you to the language of counterfactuals and how it easily slips into investigations of, and countermeasures against, human error.

Chapter 6. Trade Indignation for Explanation

Explains how you can avoid the traps of counterfactual reasoning and judgmental language, and how to move instead to explanations of why behavior made sense to people at the time.

Chapter 7. Sharp or Blunt End?

Shows you how easy it is to revert to proximal explanations of failure by relying on the (in)actions of those closest in time and place to the mishap or to potentially preventing it.

Chapter 8. You Can’t Count Errors

Explains how getting a grip on your human error problem does not mean quantifying it. Error categorization tools look unsuccessfully for simple answers to the sources of trouble and sustain the myth of a stubborn 70% human error. This also makes artificial distinctions between human error and mechanical failure.

Chapter 9. Cause is Something You Construct

Talks about the difficulty of pinpointing *the* cause (proximal or root or probable cause) of an accident. Asking what is *the* cause, is just as bizarre as asking what is *the* cause of not having an accident. Accidents have their basis in the real complexity of the system, not their apparent simplicity.

Chapter 10. What is Your Accident Model?

What can count as “cause” depends on the accident model you apply (e.g. sequential, epidemiological, systemic). Some are better for some purposes than others, both when it comes to understanding error and making progress on safety.

Chapter 11. Human Factors Data

Describes some sources of, and some processes for getting at, data relevant to understanding human error and other human factors issues.

Chapter 12. Build a Timeline

Shows how the starting point of understanding error is often the construction of a detailed timeline. Talks about the traps inherent in building a timeline for human performance and how to correct them.

Chapter 13. Leave a Trace

Talks about why labeling human error (under whatever guise) as cause is easily done. Discusses “folk models” that often enter into explanations. Encourages you to not make “leaps of faith” and leave an analytic trace for your conclusions.

Chapter 14. So What Went Wrong?

Offers alternatives to “human error”, explaining human performance issues such as breakdowns in coordination, cognitive lock-up, automation surprises, plan continuation, distortion of time perception under stress, and buggy or inert knowledge.

Chapter 15. Look into the Organization

Presents ways to analyze organizational issues behind the creation of human error, such as production pressures, drifting into failure, different images of work, politics and safety culture.

Chapter 16. Writing Recommendations

Offers directions for the writing of good, useful human factors recommendations that convert diagnosis of what went wrong into change (i.e. continuous improvement of your organization).

Chapter 17. Abandon the Fallacy of a Quick Fix

Discusses how failures and investigations are opportunities for learning—if indeed seen that way. Also covers obstacles to learning from failure and tells you not to get deluded by the fallacy of a quick fix. “Human error” problems are organizational problems, and so at least as complex as your organization.

Chapter 18. What About People’s own Responsibility?

Presents how you have a choice to seek explanations for failure in individual actors or in the system that helps determine their performance. Covers some

of the factors that fuel debate around this choice. Introduces “no responsibility without proof of authority”.

Chapter 19. Making Your Safety Department Work

Talks about the prerequisites of a meaningful safety department (involved, independent, informative and informed) and how safety work is not just bottom-up provision of information but also guidance of top-down countermeasures.

Chapter 20. How to Adopt the New View

Offers much-needed guidance on how you can help your own organization adopt the NewView, and gauge where your organization is in its growth towards better learning from failure.

Chapter 21. Reminders for in the Rubble

Wraps together the most important lessons of the Field Guide in a number of ideas and steps for you to follow when trying to understand human error.