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The Failure Analyzer

Mindset, Requirements, and the Discipline of Extracting Value from Mistakes

Key Points

- Failure is not a setback but a strategic data source—when examined with discipline, it becomes one of the most powerful engines of innovation.
- The most effective failure analyzers combine technical literacy with cognitive range, enabling them to recognize patterns and anomalies others overlook.
- A distinctive mindset—curiosity, resilience, and reflective rigor—matters more than credentials in transforming mistakes into meaningful insights.
- Organizations that treat failure as information rather than blame create the conditions where breakthrough discoveries can emerge.
- High-value insights rarely come from routine errors; they come from the rare anomalies that contradict expectations and reveal new possibilities.
- A structured approach to sorting through mistakes allows failure analyzers to identify the few deviations that can unlock disproportionate value.

Introduction

In most organizational settings, failure is treated as something to be minimized, hidden, or quickly corrected. Yet innovators like Patsy Sherman at 3M demonstrated that failure—when examined with curiosity and discipline—can be one of the most powerful engines of discovery. Sherman famously encouraged colleagues to become "failure analyzers," people who do not simply tolerate mistakes but actively mine them for insight, patterns, and unexpected value. This Executive Insight explores what it means to be a failure analyzer, the educational and attitudinal foundations that support the role, the organizational context that enables it, and the disciplined method by which failure analyzers sort through countless errors to identify the few that hold transformative potential.

It reflects an admonishment I gave to young staff earlier in my career, namely, "that if they didn't screw up at least once a day, they weren't doing their job." Of course, the corollary was to "tell, tell, tell." Only then could we help manage the mistake, help them learn from the mistake, and in turn we can learn that the thought was right but the context wasn't. In this last instance the organization learned.

Defining the Failure Analyzer

A failure analyzer is not merely someone who investigates defects or errors. The role is defined by a deeper orientation: the belief that anomalies, deviations, and unexpected outcomes are signals rather than noise. Where most people see a setback, the failure analyzer sees a data point. Where others rush to fix, the failure analyzer pauses to understand. **This mindset transforms failure from a liability into an asset.**

Patsy Sherman's own breakthrough—*Scotchgard*—emerged from a laboratory spill that most researchers would have cleaned up and forgotten. Instead, she asked: *Why didn't this substance behave the way we expected?* That question, grounded in curiosity rather than frustration, is the essence of failure analysis.

Educational Foundations

While failure analysis is fundamentally a mindset, certain educational backgrounds strengthen the ability to perform it effectively:

- **Scientific and Technical Training -** Disciplines such as chemistry, engineering, materials science, and physics cultivate:
    - Hypothesis-driven thinking
    - Comfort with experimentation
    - Familiarity with controlled failure
    - Statistical reasoning

  These fields normalize the idea that unexpected results are not personal shortcomings but part of the investigative process.
- **Systems Thinking -** Training in systems engineering, operations research, or complex systems helps failure analyzers:
    - Understand interactions rather than isolated events
    - Identify root causes rather than surface symptoms
    - Recognize emergent behavior
- **Cognitive and Behavioral Sciences -** Exposure to psychology, behavioral economics, or cognitive science supports:
    - Awareness of bias (e.g., confirmation bias, sunk cost fallacy)
    - Understanding how humans interpret anomalies
    - Techniques for structured reflection
- **Cross-Disciplinary Breadth -** Failure analyzers benefit from intellectual range. Many breakthroughs occur at the intersection of fields, where anomalies are more visible and less constrained by disciplinary assumptions.

Attitudinal and Behavioral Requirements

Education provides tools, but attitude determines whether those tools are used effectively. The failure analyzer embodies several core traits:

- **Curiosity -** Not superficial interest, but a deep, persistent desire to understand *why* something happened. Curiosity turns a mistake into a puzzle rather than a problem.

- **Psychological Safety and Resilience -** Failure analyzers must be comfortable confronting uncertainty, ambiguity, and the possibility of being wrong. They do not personalize failure; they depersonalize it.
- **Patience and Reflective Discipline -** Most mistakes are mundane. The failure analyzer must be willing to sift through large volumes of unremarkable data to find the rare anomaly that matters.
- **Openness to Serendipity -** Sherman's discovery was not planned. Failure analyzers cultivate the ability to recognize value in the unexpected, even when it contradicts their assumptions.
- **Skepticism Without Cynicism -** They question results without dismissing possibilities. This balance allows them to remain rigorous without becoming rigid.

Organizational Context That Supports Failure Analysis

Even the most capable failure analyzer cannot thrive in an environment that punishes mistakes or prioritizes speed over understanding. Several contextual factors are essential:

- **A Culture That Treats Failure as Data -** Organizations must shift from blame to learning. This includes:
    - Transparent reporting of anomalies
    - Psychological safety in teams
    - Leadership modeling curiosity
- **Time and Space for Reflection -** Failure analysis requires cognitive bandwidth. Environments that demand constant output leave no room for insight.
- **Access to Information -** Failure analyzers need:
    - Historical data
    - Experimental records
    - Cross-functional visibility
- **Incentives for Insight, Not Just Efficiency -**If employees are rewarded only for speed or error-free performance, they will hide or ignore anomalies. Incentives must value learning and exploration.
- **Diversity of Thought -** Breakthroughs often emerge when different perspectives collide. Multidisciplinary teams increase the likelihood that someone will notice the significance of an anomaly.

How Failure Analyzers Sort Through Mistakes to Identify High-Value Opportunities

The central challenge is not encountering failure—organizations generate thousands of small failures every day. The challenge is distinguishing between trivial noise and meaningful signals. Failure analyzers use a structured approach:

Step 1: Capture Everything - They begin with comprehensive logging:

- Deviations
- Unexpected behaviors
- Outliers
- Near-misses

This creates a rich dataset from which patterns can emerge.

Step 2: Categorize by Type and Impact - Failures are sorted into categories such as:

- Process deviations
- Material anomalies
- Human errors
- Environmental factors

Most categories will contain routine, low-value mistakes. The goal is not to fix them immediately but to understand their nature.

Step 3: Look for Outliers and Non-Linear Behavior - High-value failures often exhibit:

- Properties that contradict expectations
- Behaviors that cannot be explained by known variables
- Effects that scale disproportionately

Sherman's spill was interesting precisely because the substance behaved *too well*—it resisted removal.

Step 4: Ask "What Does This Make Possible?" - This is the creative leap. Instead of asking how to prevent the failure, the analyzer asks:

- Could this behavior be useful?
- Does this reveal a new property?
- Does this suggest a new application?

This reframing, transforms failure into innovation.

Step 5: Rapid, Low-Cost Exploration - Promising anomalies are tested quickly:

- Small experiments
- Controlled replication
- Boundary testing

The goal is to determine whether the anomaly is reproducible and valuable.

Step 6: Integrate or Escalate - If the anomaly has potential, it is escalated into:

- Product development
- Process redesign
- Research programs

If not, the learning is documented and reintegrated into the system.

Conclusion

Being a failure analyzer is not a job title; it is a disciplined way of seeing the world. It requires curiosity, resilience, and a willingness to treat mistakes as signals rather than setbacks. It thrives in organizations that value learning over blame and insight over speed. Most importantly, it requires the ability to sift through countless mundane errors to identify the rare anomaly that holds transformative potential. Patsy Sherman's legacy at 3M demonstrates that innovation often begins not with success, but with the courage to examine failure deeply and imaginatively. In a world that increasingly values adaptability and discovery, the failure analyzer is not just useful—they are indispensable.

Failure is part of life and learning. Failure is not dirty and embarrassing, it is educative. Companies need to investigate the lessons from failure and create a culture that allows learning from errors.

The Failure Analyzer – *An Example*

Large consumer product beverage manufacturer typically has hundreds of small capital projects at facilities across the country every year. Multiple projects were failing to meet desired completion schedules to satisfy annual execution plans. Schedule failures were not a common occurrence.

Rather than reviewing the schedule failures on a project-by-project approach, 'The Failure Analyzer' looked at the projects collectively as a program wide review. The common delay across the projects was driven by the procurement and delivery of high-quality stainless-steel valves and fittings. There is a limited supply chain that supports the Food & Beverage industry with stainless steel materials.

The F&B company took a new perspective with their procurement practices for stainless steel materials, taking a holistic vision of the capital plan on an annual basis rather than a single project basis. The result was bulk procurement, warehousing and distribution of these specialty materials with preferred supply chain partners on an annual basis. This allowed supply chain partners to produce materials on a more cost-effective basis throughout the year, materials on hand and ready for delivery when needed. The result was small capital projects being completed on time to meet business needs, with the additional benefit of bulk material cost savings to offset the cost of the owner-procured material program.

About the Author

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