Admitting Human Error in the Workplace - The Mindset Shift to Attaining Operational Resilience

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Abstract

A principal mindset among organizational leaders and managers is the belief that the end goal of attaining human reliability is to achieve flawless performance of job tasking. Despite persistent efforts to enforce compliance, nearly 90% of incidents are still being attributed to human influences at their source.

A contemporary perspective sees error as product of the operational system. Human error is accepted as ubiquitous and cannot be categorically eliminated through engineering, automation or process controls. Error is embraced as a system product rather than an obstacle; sources of error are minimized and programs focus on recognition of error in order to disturb its pathway to becoming failure.

Achieving safe, reliable and resilient operations begins with a mindset shift in the way leaders view their operation, particularly the human agent within a dynamic, multi-dimensional concurrence where choices are made and actions are taken that lead to outcomes both desired and undesired.

Introduction

Drawing on broad lessons from US military and commercial aviation, special operations, nuclear propulsion, oil & natural gas exploration and chemical processing, this paper examines a set of consistent key principles which suggest that error is a natural and inescapable characteristic of tasking and that reliability, while not synonymous with safety, is found in operational resiliency.

Historically, individuals and groups of people with clear vision and good intention to achieve success have overlooked a keystone truth. Their belief is that error is failure when in fact it is

not. In truth, human error can be an organizational resource for creating reliability, improving operations and attaining resilience. Wrongly, we presume that if we can eliminate error we will eliminate failure. This mindset permeates the very fabric of an organization and creates friction between leadership and delivery.

After decades of studying organizational behavior, professionals a have observed the profound struggle between management trying to get operators to perform reliably and skilled workers attempting to get leadership to understand the operational realities they face.

Resilience and reliability emerge when we understand error cannot be completely eliminated; to the contrary, efforts aimed at eradicating error are not only ineffective, they often degrade performance. Error produces resiliency when it is spotted, studied and learned from. An environment that embraces error in order to learn from it and minimize its effect will foster problem solving, collaboration and a deep desire for excellence.

Practical and measurable progress towards achieving operational resilience and human reliability can be achieved through a systematic and quantifiable institutional method that acknowledges the influence of human factors. Rather than focusing on individuals, we must consider the concurrence or juncture created by the organization where people are simply a component. Success is realized when competent people are given clear tasking to operate proper equipment in a controlled environment while being provided with accurate information and directed by effective leadership and supervision. Consistent success at this Operational Juncture™ will optimize the system for profitability, safety and value.

Leading organizations understand this juncture and implement benchmarks both proactively and reactively to measure and improve resilience. Stepping through the lens of the Operational Juncture™, organizations evaluate and design reliability into its operational components and measure and improve culture to gauge resilience.

The solution begins with leadership's commitment and peaks when everyone in the organization, especially supervisors and front-line operators, understand the influence of human factors in their operations.

Background

Recent studies indicate as much as 90% of incidents and accidents involve human factors. By exposing and analyzing human factors in their operations, organizations can take corrective action to prevent reoccurrence and improve operational efficiency and safety.

On March 23rd of 2005, a crew at BP's Texas City refinery worked to restart the plant unaware that 15 people would never see their families again and more than 200 lives would be deeply changed recovering from injuries in what would become the deadliest industrial accident in US history. An early investigation assigned the cause to negligence of the front-line operators and supervisors in their failure to follow the procedure. What came to light later was shocking and hard to grasp. The lessons from this accident offer remarkable insight into understanding human influences in operation systems.

Early in the 20th century, in response to similar events both catastrophic and minor in terms of outcome, a community of interest formed with the objective to understand the human influence on systems in order to achieve consistent and reliable outcomes. In fact, an academic discipline, Human Factors and Ergonomics, emerged applying scientific methods, statistical analysis and psychology to study the human performance and the man-machine interface. After decades of published research, the solution still eludes us. More recently, the concept of a High Reliability Organization (HRO) aims at the reliability of human performance in context with the operational and economic risks to an organization where failures can have a devastating and unacceptable impact on the people, the equipment and the environment.

The term human reliability provokes diverse reactions depending on perspective. In some views, they are almost a contradiction in terms. The basic pursuit of human reliability is to form a system involving human influence and interaction with equipment and an environment that responds predictably and reliably in order to achieve its designed function or objective.

With all of the research, operational experience and lessons, the challenge remains translating key principles of human factors into the operational setting. Today, organizations are seeing a plateau in safety progress from conventional safety and risk management programs.

Effective management of human factors begins with a philosophical change in the way we approach the human element of operations. Slight exception notwithstanding, we must understand people do not set out to cause failure, their desire is to succeed. In fact, humans have an ability no other system does to adapt to changing conditions, system design variance and unanticipated circumstances.

A system design view approaches the operation linearly and plans reliability into components in order to extrapolate system and human reliability. Conversely in the field, operators and teams seek with good intention to balance the rivalry between preservation [safety] and production [productivity]. People operating tools and equipment guided by conflicting objectives within an operational setting that includes physical, technological, regulatory and procedural environments are provided information; within their capability for good judgement, they make choices that lead to outcomes, both positive and negative. It is within this multidimensional concurrence we can influence the reliability of human performance. Understanding this concurrence directs us away from blaming individuals and towards determining why the system responded the way it did in order to modify the organization.

Educated leaders, Trained investigators and effective analyses are the most proactive tools we have in understanding hazards and installing adequate controls to create safe and resilient operational systems.

The Basic Pursuit of Operational Resilience

The basic pursuit of Operational Resilience is to form, measure, sustain and improve a system involving human beings interacting with equipment in an environment that responds predictably

and reliably in order to achieve its designed function or objectives including efficiency, profitability, quality and safety.

The term resilience has various meanings depending on context, but generally refers to the ability of a strained body to return to its design. It can be used to describe elasticity in material to retain its shape, people to recover from misfortune, ecosystems to respond to climate variation and cultures to endure through clashes with other belief systems. In industry, it is most often used to describe an organization's ability to alter operations in the face of changing business conditions in order to remain competitive.

In an operational setting, resilience effectively illustrates a system's ability to respond to anticipated and unanticipated disruptions and operate within its designed parameters. When we add the socio-behavioral component to that functional design, a resilient operational system becomes one that can absorb human error and retain or reshape to its predictable and reliable state. Operational resiliency is the product of managed risk of human error. And as we shall see, resilient operational performance illustrates the ultimate aim of finding the balance between safety and productivity.

High Reliability Operations, Operational Excellence, Quality Management, Lean Six Sigma, Safety Management, Behavioral Based Safety, Process Safety, Systems Safety, Human Factors and Ergonomics are all terms used broadly in industry to describe various aspects of a fundamental quest for Operational Resiliency.

Operational Reliability

In contrast to resilience, reliability describes the ability of a system or component to function under stated conditions for a specified period of time. Reliability is not safety; something can be perfectly reliable but not safe. The primary distinction is made in the category of hazards being addressed. Reliability is primarily concerned with production threats to commercial efficiency and costs where safety targets potential threat of injury, damage to equipment and the environment.

Reliability as it relates to human performance becomes more abstract. Unlike linear systems where reliability can be engineered into components in order to gain systemic consistency, human reliability behaves in a multi-dimensional way and must be planned for very differently.

Operational Excellence

Operational excellence refers to the pursuit of industry-leading performance through consistent and reliable execution, or said differently, operations done right the first time and every time. Operational excellence emphasizes the deployment of philosophies, protocols, systems, and tools towards continuous improvement measured against results or key performance indicators. It involves a philosophy in the workplace where problem-solving, teamwork, and leadership result in ongoing improvement.

Operational Resilience

An emerging and promising study of performance has been the concept of creating resilience and its relationship with reliability. Operational resiliency describes a system's capacity to recognize and respond to unanticipated disturbances outside of its design. While this is not a new concept, the approach to engineering resiliency into operations is innovative. Realistically, organizations need both reliability and resilience. The hurdle remains realistic application of theoretical principles of resilience.

The term Operational Resilience describes cohesion between processes aimed at business performance and improvement. Productivity, profitability and safety are concurrently linked. And because these are lagging measures of output, aside from other variables such as costs and market dynamics, when operations are resilient the system is optimized for profitability and safety. Unfortunately, as many have learned, those indicators can often mislead the organization into failure. The model is to identify and assess leading indicators, which are found in the contributing operation.

The basic pursuit of Operational Resilience is to form, measure, sustain and improve a system involving human beings interacting with equipment in an environment that responds predictably and reliably to disturbances in order to achieve its designed function or objectives including efficiency, profitability, quality and safety.

Interestingly, the basis of these objectives are in direct conflict with each other. Perfect safety and maximum profitability do not coexist; quality and thoroughness offset efficiency. Operationally we have to find the balance, which is elusive and changing, to meet operational priorities and business strategies. Within this operational system an irreconcilable tension exists that impacts the framework for operations. The challenge is to consistently realize the balance and assess the impact of program initiatives and tasking. Attempts to drive down cost will unquestionably upset the balance with quality and safety.

Traditional Assumptions & Methods - Individual Centered Approach

The fundamental assumptions are that people are erratic and unpredictable, that highly trained and experienced operators do not make mistakes

To begin, we must draw the distinction between error and failure. Error describes something that is not correct or a mistake; operationally this would be a wrong decision or action. Failure is the lack of success; operationally this is a measurable output where objectives were not met. Failures audit operational performance, unfortunately quite often with catastrophic consequences; irredeemable financial impact, loss of equipment, irreversible environmental impact or loss of life. Failure occurs when an unrecognized and uninterrupted error becomes an incident that disrupts operations.

The traditional approach to achieving reliable human performance centers on individuals and the elimination of error and waste. Human error is the basis of study with the belief that in order to prevent failures we must eliminate human error or the potential for it. Systems are designed to

create predictability and reliability through skills training, equipment design, automation, supervision and process controls.

The fundamental assumptions are that people are erratic and unpredictable, that highly trained and experienced operators do not make mistakes and that tightly coupled complex systems with prescribed operations will keep performance within acceptable tolerances to eliminate error and create safety and viability.

This approach can only produce a limited return on investment. Many organizations have experienced a plateau in performance and seek enhanced methods to improve and close gaps in performance.

A New Philosophy

Error is embraced rather than evaded; sources of error are minimized and programs focus on recognition of error in order to disturb the pathway of error to becoming failure.

A new philosophy, formed through decades of leading large-scale operations, coaching leaders and organizations, and investigating failure, is that the source of resilience is counterintuitive. This idea draws on transferrable experience and best practices from military and commercial aviation, special operations, US Navy nuclear power and propulsion, NASA and oil & natural gas exploration.

Slight exception notwithstanding, we must understand people do not set out to cause failure, rather their desire is to succeed. People are a component of an integrated, multi-dimensional operating framework. In fact, human beings are the spring of resiliency in operations. Operators have an irreplaceable capacity to recognize and correct for error and adapt to changes in operating conditions, design variances and unanticipated circumstances.

In this approach, human error is accepted as ubiquitous and cannot be categorically eliminated through engineering, automation or process controls. Error is embraced as a system product rather than an obstacle; sources of error are minimized and programs focus on recognition of error in order to disturb its pathway to becoming failure. System complexity does not assure safety. While system safety components mitigate risk, as systems become more complex, error becomes obscure and difficult to recognize and manage.

Concentrating on individuals creates a culture of protectionism and blame, which worsens the obscurity of error. Our philosophy distributes accountability for variance and promotes a culture of transparency, problem solving and improvement. Leading this shift can only begin at the organizational level through leadership and example.

A Contemporary Approach

Effective management of human factors begins with a philosophical change in the way we approach the human element of our operations.

A systems design view approaches the operation linearly and plans reliability into components in order to extrapolate system and human reliability. Conversely in the field, operators and teams seek, with good intention, to balance the rivalry between preservation [safety] and production [productivity].

In contrast to the individual-centered view, our approach to creating Operational Resilience is formed around the smallest unit of Human Factors Analysis we call the Operational Juncture®. The Operational Juncture describes the concurrence of people given a task to operate tools and equipment guided by conflicting objectives within an operational setting including physical, technological, and regulatory pressures provided with information where choices are made that lead to outcomes, both desirable and undesirable.

Figure 1 Operational Juncture

It is within this multidimensional concurrence we can influence the reliability of human performance. Understanding this concurrence directs us away from blaming individuals and towards determining why the system responded the way it did in order to modify the structure. Starting at this juncture, we can preemptively design operational systems and reactively probe causes of failure. We view a holistic assignment of accountability fixing away from merely the actions of individuals towards all of the components that make up the Operational Juncture. This is not a wholesale change in the way safety systems function, but an enhanced viewpoint that captures deeper, more meaningful and more effective ways to generate profitable and safe operations.

Conclusion

A practical approach to understanding human factors in designing and evaluating performance creates both reliability and resilience. Reliability is achieved by exposing system weaknesses and vulnerabilities that can be corrected to enhance reliability in future and adjacent operations. Resilience emerges when we expose and correct deep organizational philosophy and behaviors.

Resilience is born in the organizational culture where individuals feel supported and regarded. Teams operate with deep ownership of organizational values, recognize and respect the tension between productivity and protection, and seek to make right choices. Communication occurs with trust and transparency. Leadership respects and gives careful attention to insight and observation from all levels of the organization. In this culture, people will self-assess, teams will synergize and cooperate to develop new and creative solutions when unanticipated circumstances arise. Individuals will hold each other accountable.

Safety within operational resilience is something an organization does, not something that is created or attained. Our programs deliver a top-down institutionalization of culture that produces a bottom-up emergence of resilience, reliability and safe operations.