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Insight from hindsight: A practitioner's perspective on a causal approach to performance improvement

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ABSTRACT

The petrochemical industry works relentlessly on many fronts to improve performance and to create desired performance outcomes. Companies' approaches vary widely; yet despite best efforts, the industry continues to experience periods of undesirable performance outcomes in product quality, reliability, process safety, environmental, and personal injury. The industry continues to search for better methods, techniques, and technology that are assumed to be missing, but the causes of incidents illustrate that what is in the way of improving performance may not be what is missing but rather what already exists.

This paper provides an alternative perspective of performance problems viewed from underlying causes and patterns of causes of incidents in these so-called "high hazard industries" (Carroll, 2004) across several years and geographic regions. The perspective includes two distinct insights.

First, although problems can have a wide range of outcomes and impact, the underlying causal patterns are relatively few in number. These few represent essential elements that are repeatedly discovered in various forms under many unrelated problems.

Second, several common obstacles within organizations often inhibit the ability to find the causes, learn from the causes and to effectively address the causes of performance problems.

The conclusion is that when these repeating patterns are combined with a limited ability to effectively find, learn, and eliminate the causes, organizations are left with repeating periods of performance problems despite well-intended efforts to improve.

1. Introduction

Conducting investigations over many years provides one an opportunity to observe the many ways that things can go wrong, and why. In the first decade of my investigative experience I formed many theories about the causes of performance problems and often had them dashed by conflicting evidence and new causal theories I could not have imagined earlier. As hard as plausible theories were to develop, they were even harder to let go of, as explanations provided an easy way to describe what was happening (i.e. the way one believes things work) and provided comfort in knowing. Having to let go of one's "favorite" theories leaves little but uncertainty, some mystery, and the work of "finding out" again. Only after considerable time was it possible to embrace the idea that each investigation is a new and specific discovery of causes that are discoverable only if we do not hold too tightly onto what we have believed and trusted.

But 30 years of investigations also provides insight across performance problems and across time. This view clearly reveals that organizations suffer recurring problems over longer time frames and struggle to resolve the causes of complex performance incidents in real time. These two issues, of course, are related and this paper is intended to describe the underlying patterns that cause the recurring problems and to describe the nature of the difficulty that organizations have in addressing causes. In Section 2 I discuss the insights achieved through hindsight in identifying the underlying patterns that drive recurring problems, observed across many investigations. In the next three sections I discuss what keeps organizations from addressing the underlying causes of problems and thereby missing the opportunities to improve performance. The stories are organized by specific limitations in discovering cause (Section 3), learning (Section 4), and taking action (Section 5). In the final section I offers some ways to address these limitations.

2. Insight from hindsight

Looking back over 30 years of investigative work, several distinct patterns emerge that provide insight into how, despite

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well-intended efforts to improve performance, problems may continue to reoccur and can even get worse. These patterns represent essential elements, or building blocks for creating performance problems. One or more of these patterns has existed in nearly every in-depth investigation of which I am aware.

2.1. We trust the "system" will protect us

Incidents causing significant losses, damage, or injury are usually considered nearly impossible by the organization that suffers these outcomes. It is not uncommon to hear employees at all levels state that they "Could not believe that something like that could happen at a place like this that runs so well". Even individuals in organizations that have struggled with performance problems cannot usually fathom that an incident that yields significant damage and risk to life could happen in their part of the organization and certainly not to them.

We are fundamentally surprised by incidents of significant magnitude (Weick and Sutcliffe, 2001). We seem to hold an inherent and often unjustified trust in the system around us to produce the outcomes we want and to protect us from the outcomes and harm we want to avoid. This trust hides the underlying defects in the system from our view, and as long as the trust remains, the existing underlying defects will remain and more will come, undetected as well.

2.2. We do not see the pre-cursors

After an incident has been causally analyzed, it is common to discover that parts of the incident have happened before; in some cases nearly the same physical event has happened before but at a lower level of impact. And once causes are uncovered, it is also common for individuals near the events to recognize some of these causes. Sometimes individuals were concerned about these issues and sometimes they had seen them so often that they were considered normal.

Prior events and the causes of prior events are often known at some level in parts of the organization before similar more significant incidents occur. The causes of these prior events can exist for long periods of time under the threshold we would deem to be concerning or even noticeable. In hindsight, we can see more clearly how these causes developed over time and the weak warning signals they provided, and we accepted as normal. The inherent assumption that "weak signal" (Weick and Sutcliffe. 2001) equals "insignificant", precludes us from seeing the problems coming and finding them when they are small. We are then left with the problems getting larger and finding us.

2.3. Multiple concurrent causal paths exist all the time

Investigations often show a number of concurrent causal paths that needed to exist in the same time and space to create the event the way it happened. The individual paths, by themselves, often appear insignificant but when aligned with other causal actions and conditions, they can yield some very significant outcomes (fires, explosions, large economic losses, fatalities). In my experience, it is rare to see large impacts occur with less than six concurrent causal paths and incidents may contain more than twice that many (and these are just the paths we know about).

It is actually fortunate that significant incidents usually require a significant number of concurrent causal paths to exist and to align. However, the fact that these significant incidents do occasionally occur suggests that we have many defects (causal paths) in our organizations at any time.

2.4. We introduce new causes with solutions

The causes of current performance originate from many sources including our own solutions. For a number of years I tabulated that about 30% of the causes discovered in significant incidents were the direct result of solutions put in place to either solve the same or other problems. Specific investigations illustrate higher and lower percentages, but the frequency illustrates the risk of unintended consequences from well-intended action.

There is an inherent risk in taking well-intended action, especially if the action is broad and generalized (i.e. not precise). The less we understand the system into which we introduce new solutions, the greater risk we accept that the action will lead to unforeseen outcomes.

2.5. Actions can create an illusion of progress and miss cause

Problems present themselves to us through symptoms we observe. For example, when a pump fails, we know we have a pump problem, and we make repairs. But if the pump failure was not expected, then pump failure is likely just the symptom of underlying causes. The causes of the pump failure could reside in the way we lubricate the equipment, or in the operational conditions surrounding the pump, or in a mismatch between the design and actual operation, etc. In other words, the pump hardware may be just fine; the pump may just be the vehicle through which the problem manifests. The causes that need to be addressed may reside outside of the pump flanges and are not addressed through fixing the hardware.

Addressing the visible symptoms provides us the immediate benefit of restoring functionality but also potentially creates the illusion of longer-term performance improvement. Addressing only the symptoms leaves the underlying causes intact to create future problems.

2.6. We have a part

As humans, we intuitively accept that we have a part in our organization's performance outcomes when the outcomes are really good and exceed expectations. But it is harder for us to accept that we also have a part in performance when it fails to meet expectations or when it leads to significantly bad outcomes. It is more common for us to shift the burden of poor performance to others, especially to those closer in time and space to the event, by concluding that what they did was wrong or that they should have done something different. This "hindsight bias" is seductive. It allows us to view an incident (after it occurs) and to then judge others based upon this new understanding that neither they nor we had before the incident. The result is that others get judged as wrong, while we stay right, and no one learns from what happened or why it happened.

Individuals at many levels of an organization can participate in inadvertently leaving incident causes in place, unknowingly introducing new causal paths, or blocking learning from current performance. In combination, these "normal" human behaviors can create a significant performance challenge for any organization striving to create predictably reliable outcomes. Given that one or more of these underlying patterns exist, the causes of current performance can be very difficult for organizations to discover and address.

The following sections illustrate several key obstacles that prevent well-intended organizations from finding and addressing the causes of poor performance, thereby sustaining recurring problems. The obstacles are presented with summaries of actual investigative efforts to help highlight how problems in the discovery,