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Blowing Up Safety Culture
The Lure and Trap of Accident Investigation and Continuous Improvement

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Abstract

Safety culture is clearly recognized as an important element of any organization. This is of particular importance for high-risk industries where complex sociotechnical systems exist. In many industries a great deal of energy, time and money continues to be expended in trying to get the culture right. Active safety programs such as the Voluntary Protection Program, peer observation programs such as behavior-based safety, planned audits and inspections from a variety of bodies both internal and external to the organization, as well as audits by regulatory bodies are regularly employed. And when something bad happens there are standard protocols for investigating accidents leading to corrective actions that seek to prevent another occurrence. This coupled with the fact that for decades there have been countless programs directed at quality and continuous improvement has led to situations where we can become captured by quality and we are led away from understanding the greater situational context. In addition, a specific intervention and step-by-step approach is described that was applied to "blow up" and then reset the safety culture of an operational facility.

Introduction

Safety culture is clearly recognized as an important element of any organization that is involved in activities that can result in personal injury or environmental degradation. This is of particular importance for high-risk industries where complex sociotechnical systems exist. In many industries a great deal of energy, time and money continues to be expended in trying to get the culture right. Active safety programs such as the Voluntary Protection Program, peer observation programs such as behavior-based safety, planned audits and inspections from a variety of bodies both internal and external to the organization, as well as audits by regulatory bodies are regularly employed. And of course when something bad happens there are standard protocols for investigating accidents leading to the identification of root causes and hopefully corrective actions that seek to prevent another occurrence. This coupled with the fact that for decades there have been countless programs directed at quality and continuous improvement has led to situations where we can become captured by quality and we are led away from understanding the greater situational context. And without this larger context we do not possess the guidebook for behavior and action that allows us to really understand and improve. This, of course, is not to say that the focus on quality has not resulted in numerous improvements in terms of processes, and individual product quality but rather that our tools and techniques through evolution have potentially blinded us to real problems.

Case study serves to describe how these approaches and techniques fail to identify truly systemic issues because of their focus on individual actions, and incidents. It details how blind, procedural-like application of accident investigation and root cause techniques can actually set up situations where razor like corrective actions treat symptoms but not necessarily the underlying culture that is the systemic cause. Our culture of quality has contributed to this problem by causing individuals to look for smaller changes that will '"fix" the problem while perhaps ignoring the deeper issues.

Rationale

A focus on continuous improvement, six sigma, and other quality programs may inadvertently cause organizations to miss the need to make substantial, systemic culture change by focusing on incremental changes to plant, people, and procedures. One place this focus manifests itself is in the process of accident/incident investigations routinely conducted in many industries. In some cases they are driven by regulatory requirements and or best practices. They differ based upon the relevant regulatory drivers and also the type of event for example, an abnormal event, an injury, common cause, or a major event. There are many different approaches to these investigations and are often customized by the host institution or agency (Dekker,; Gertman and Blackman, 1994 p230-299)

The intent of these investigations is to ultimately determine why an event occurred so that the same or similar events may be prevented in the future. These investigations generally form the basis for process as well as organizational improvement. Accident investigation techniques have borrowed techniques, taxonomies and language from other continuous improvement processes. These techniques tend to drive toward the identification of corrective specific actions that may be taken in light of the incident.

Generally investigations consist of several elements including:

- Investigation itself where those involved and an investigation team are brought together to review the sequence of events
- Complete a causes analysis
- Determine corrective actions including:
    - Hardware changes
    - Procedural changes
    - Organizational changes
    - Training
    - Disciplinary actions

Generally speaking these types of actions can be very effective in correcting specific items including errors in a procedures, unclear reporting lines, or equipment in need of repair. What they may miss are higher-level deficiencies that permeate the entire organization or work ecosystem.

The Fukushima accident lends significant evidence towards this. Continuous improvements (quality) activities had built a nuclear power industry with very low scrams, low fail to start for emergency diesel generators, and even low defects in fuel elements. These techniques consistently demonstrated their ability to help improve the overall reliability of these systems. In fact, prior to the tsunami, there was no real consideration given to long term AC power loss because of the outstanding ability to repair transmission lines that was produced by the application of these techniques (Kondo, 2014). The actual guideline required compensatory actions for AC power loss of 30 minutes. Subsequent to this guideline long-term power losses did occur due to significant weather event, but the guideline was not changed. Again only continuous improvement actions were taken in this case to strengthen the construction of the pylons supporting the transmission towers. The significant changes in weather and the reoccurrence of major storms were not addressed. In essence the culture depended upon the quality first approach, which successfully produced a highly reliable power supply, but failed to recognize the need to alter the bases for the drivers of the design basis; the industry had been “captured by quality” (Kondo, 2014).

The evidence of the overall performance of the power plants gave credibility to the quality techniques, and may have blinded some to the reality of the changing frequency of significant weather events that was changing the potential accident scenarios for the basis of design. This may be a problem common to all industries where we have focused too strenuously on the application of quality type tools.

Case Study

Description

This case study provides a story of one such facility that I believe fell into this quality trap. In this case the quality trap prevented leadership from recognizing the real underlying problem and the path to turn the performance of this facility around. This particular facility is a research facility where one complex, high-risk processes and tasks are routinely carried out. The facility had had multiple events over a two period. Each event was investigated and corrective actions were put into place to correct deficiencies. In some cases where negligence was involved disciplinary actions were also taken.

The types of apparent causes included procedure violations, schedule pressure, and complications due to aging or failing equipment. In some cases groups were re-trained or given new training based upon the nature of the event.

Of particular interest with this facility was the extent and magnitude of significant organizational change that it had undergone over a period of 5 or more years. This facility had been operated by the same entity for decades, until it was subsumed by a new organization. In short, the facility had a long-standing culture over many years and at the same time suffered from persistent declining resources.

During the next few years ensuing the overall organizational change,
Each and every event, occurrence, and near miss was investigated with more and more corrective actions being applied. But events continued to happen- with similar apparent causes. Individual procedures continued to be modified, staff retrained, more management changes, consultants, even more time spent in the field, but events keep happening.

Why?

Small fixes were being made to specific processes, and there was no recognition of more systemic issues. There was a reliance on the processes of accident investigation and continuous improvement. These processes did lead to incremental improvements and fixes but upon reflection ignored the more systemic issues. The actual activities of the investigations and corrective actions took a great deal of time and energy but the return on investment was small. It became clear, over time that more of the same would not fix the problem and it was really time for something different.

What was the underlying problem? The problem began to reveal itself through the actual continuation of events where good people continued to do the wrong thing. What was learned was that over a very long period of time people had been accustomed to not being able to change things due to insufficient resources, a desire to deliver regardless of the situation. Many of the long time staff had learned to be helpless in terms of making improvements and change. This is a chronic condition where failure is expected known as "learned helplessness" (Brown and Inouye, 1978). It became apparent that organization as whole would work around failures, ignore equipment, procedures and even people, simply because they had learned that it was not possible and they were not incentivized to make these changes but rather only to deliver the desired end product. Small changes effected through accident investigations and corrective actions were implemented as required and support but no more. This led to the recognition that a major change in the culture/mindset was needed not an incremental.

The Intervention

A comprehensive intervention was planned to effect this culture change. The elements of the intervention were:

- Work stoppage
- All staff meetings
- Individual group meetings led by management to establish commitment & accountability to the standard of behavior required by the values and expectations
- Signing commitment statements
- Ensuring competency through oral evaluations
- Training to remediate where needed

- Establishing and implementing a team evaluation process to assure commitment and compliance
- A staged resumption of work

Results of the Intervention

In order for the intervention to be successful, the message that things were going to be different needed to be heard by each and every member of the staff. This was accomplished through all staff meetings where the organizational leadership described the problem and the steps that were going to be taken. It was cleat ha each member of the staff had the choice to be a part of the team or leave the organization. The seriously of the issue was demonstrated by the complete stoppage of all work while the entire organization worked through the change process.

Individual group meetings led to the creation lists of commitments and accountabilities that each member of the staff would sign up to in order the meet the new standard of behavior. These were developed by each organization and were the shared across the entire organization. The types of commitments included:

- I will do the job right and not submit to schedule pressure
- I will participate in peer to peer checks
- We will hold ourselves and others accountable
- We will ask questions and engage subject matter experts

After this process each member of the staff was required to sign a statement committing them to working to those new standards.

Each organization also conducted oral boards (examinations) where each staff member was required to demonstrate the knowledge and commitment necessary for their position. Where deficiencies were noted staff were either retrained or reassigned to a position that fit their competencies.

A team approach was also established to observe work, and evaluate performance on the job, effecting any needed changes immediately or stopping work. This step was completed simultaneously with each work area that was restarted.

The results of this effort are still ongoing. Competency issues were identified and remediated, latent issues with equipment and procedures were identified and resolved. Peer to peer checks became normal, expected, and respected. Questioning attitudes were incentivized, and negligence was not tolerated at any level. Incident rates went to zero and work production increased slowly getting back to full production over the course of a year. Learned helplessness was eliminated with management's active commitment to fix things, and to stop work whenever necessary to ensure safety and compliance. Staff recommitted themselves to new standards, they became self aware of what had happened, and what needed to happen, their were competency was assured, and accountability became the new norm.

Lessons Learned for the Future

Of key interest in this paper is the notion that organizations can become over reliant on traditional approaches to quality, continuous improvement, and incident investigations. These techniques, although valuable, might veiled the more important issues needs, whether in terms of changing conditions, and or culture and attitudes that have been ineffective over time. Certainly investigations and quality improvement techniques must continue to be applied but broader systemic investigations of the larger picture must also occur to assure the complete picture. Rearranging deck chairs on a sinking ship is not useful.

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