Starting Strong: The ABCs of Process Safety Culture

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Abstract

Building a strong process safety culture is about more than just rules and regulations; it is about nurturing a shared commitment to responsibility and accountability within every team member.

This paper explores what process safety culture means for new professionals seeking to understand its core principles and how they can personally contribute. It will break down the essentials, or "ABCs," of process safety culture, covering topics About Process Safety Culture, Benefits of a Strong Process Safety Culture, and Characteristics of a Strong versus Weak Culture.

1 Introduction

Establishing an effective process safety culture is critical to your organization's success. With it, you can prevent catastrophic incidents, fatalities, major property damage, and loss of public trust. Without it, you could face injuries or fatalities, years of litigation, a total shutdown of operations, and millions of dollars in losses.

Achieving an effective process safety culture requires management commitment, regular employee participation, routine safety dialogues, and access to training and information.

2 About Process Safety Culture

Process safety culture has many definitions, and they continue to evolve. In 2007, The Center for Chemical Process Safety (CCPS, 2007) defined it as "the combination of group values and behaviors that determines the manner in which process safety is managed. A sound process safety culture refers to attitudes and behaviors that support the goal of safer

process operations." Then in 2018, an Essential Practices book on process safety culture was written by CCPS with a new, expanded definition. The book's team determined that the first definition did not make it clear that the goal of a strong process safety culture was to prevent incidents. The new definition states, "The pattern of shared written and unwritten attitudes and behavioral norms that positively influence how a facility or company collectively supports the successful execution and improvement of its Process Safety Management System, resulting in preventing safety incidents."

In the October 2024 edition of the Professional Safety Journal, the case was made by Gendi et al. (2024, Oct.) that the group values within a process safety culture must be periodically assessed using employee surveys, interviews, or focus groups to determine if they agree that a strong process safety culture exists, trust management to protect employees, and feel comfortable reporting safety issues or stopping an unsafe operation without fear of retribution. The CCPS book (2018) agrees that this must done to develop an improvement strategy for a process safety culture.

In his book *Organizational Culture and Leadership* (1985), Dr. Edgar Schein ties the ideas of group values and behavior from CCPS and safety perceptions and safety perception surveys from the Gendi article into three primary layers of culture within an organization that "profoundly shape behavior on a day-to-day basis." He makes the case that, in practice, a misalignment is often seen between the values and real behaviors. His three tiers, which are depicted in the form of an iceberg, with the first tier being clearly seen and the others becoming less obvious, include:

- **Artifacts** — These are visible and physical (i.e., safety awareness posters, procedures, and employee handbooks that state the safety rules).

- **Beliefs and Values** — These are the organization's communicated and written norms and ideals (i.e., mission statement or corporate safety values) intended to guide behavior and decisions.

- **Underlying Assumptions** — These can take the form of perceptions (i.e., everyone plays a role in safety). These perceptions form over time, most often influenced by leadership.

According to Schein, the underlying assumptions are also the most difficult to influence, but when successful, they lead to cultural change. In other words, to impact safety culture, we need to influence our core underlying assumptions. These assumptions have a profound impact on behavior. A joint paper by Stephanie Payne and Yimin He (June 2021) described a 2016 survey of 41 unique operating companies to determine if they had conducted process safety culture surveys to understand and improve on these underlying assumptions. Seventy-three percent of the respondents said that they had conducted a survey. The companies stated that the surveys resulted in increased and improved communication with employees, including lessons learned, an increased management presence in the process, and specific action items and timelines to address identified safety concerns.

The CCPS book *Guidelines on the Conduct of Operations and Operational Discipline* (2011) states that the effectiveness of a PSM system is based on the daily ability of an organization to continuously and thoroughly implement all system requirements. Just one person, one time, not appropriately executing their task could seriously jeopardize the operation, which could result in a major accident. Therefore, the success of a safety program is believed to be largely dependent on the overall process safety culture within the organization, which must include a highly committed and involved management team, an organization with an ongoing sense of vulnerability where it is understood that constant diligence and vigilance are required to prevent accidents. Operational discipline is also required, where all tasks are performed correctly every time (CCPS, 2018).

2.1   Benefits of a Strong Process Safety Culture

A strong process safety culture has many benefits, including saving lives, protecting your business, safeguarding the environment, enhancing efficiency and performance, and building employee confidence and morale, which can lead to better retention, productivity, and teamwork.

The CCPS Essential Practices book on safety culture (2018) states that a process safety culture is made up of six themes:

2.1.1.   Maintain a sense of vulnerability

Having a strong sense of vulnerability is recognizing that hazards always exist and that past success, or lack of incidents, does not guarantee future safety. It ensures that workers will not fall into the trap of thinking, "It won't happen here, so we are safe." Instead, they routinely identify risks, continually train on and emphasize safety, and communicate openly, even when the news is bad.

Organizations also understand that compliance with the regulations is not enough; they must identify and manage all risks, even if they are not regulated. A good example of this is combustible dust hazards. The Occupational Health and Safety Administration (OSHA) did not regulate combustible dusts for many years, and even now only regulates it under the general duty clause. To show that a company has violated the general duty clause, OSHA must demonstrate that the business knew that a hazard existed in its workplace and did nothing to prevent or stop it. Combustible dusts can be explosive if the hazards are not adequately identified and managed; therefore, many companies are including them in their risk assessments and following the (state) NFPA standards despite the absence of an OSHA standard.

2.1.2.   Combat Normalization of Deviance

We all seek to improve the environment and conditions around us; it is our nature. Doing so in a PSM-covered process without the proper change management can compromise safety, even when the changes were meant to improve safety. But when unauthorized changes are made and nothing bad happens initially, the organization tends to adopt them. These changes can reduce the safety margins that were assumed by the established design

features, safe operating limits, maintenance schedules, procedures, safe work practices, and timing for safety action item completions.

Many years ago, Ms. Coon worked with multiple facilities and shifts to become ISO 9002 certified. Part of the ISO process was ensuring that procedures were in place and being followed. Various shifts had "improved" the process by reducing cycle times, increasing batch sizes, and taking shortcuts without authorization. The process engineers were unaware of these changes, and when they reviewed them, they found that several processes were very close to conditions that could cause runaway reactions.

2.1.3   Establish an Imperative for Safety

An imperative for safety includes a management team that demonstrates that production depends upon process safety and that this is true even when production demands are high. The organization understands the hazards of the process and can survive process upsets and return to normal conditions despite these challenges. When budget cuts are made, they ensure there is sufficient process safety expertise and coverage to assist in decision-making. Operations personnel are permitted to stop work if they believe a significant safety issue is present.

2.1.4   Perform Valid/Timely Hazard Risk Assessments

To understand the hazards, risks, and required safeguards, organizations must complete appropriate risk assessments. Incidents are often caused by a failure to act on these known hazards and risks by not following up on action items from the assessment, not implementing or maintaining the required safeguards, and not analyzing changes to the process.

2.1.5   Ensure Open and Frank Communication

Open and frank communication allows for honest mistakes, near misses, and improvement ideas to be freely reported without fear of reprisal. The organization attempts to communicate factually and truthfully at all times using written, verbal, formal, and informal safety messages. Communication pertaining to safety indicators should be clear with defined terms to ensure understanding and appropriate responses. A common method of open safety communication is the use of a safety moment to start every meeting, even if the meeting is not safety-related.

2.1.6   Learn to Assess and Advance the Culture

Organizations should embrace the lessons learned from previous incidents and make approved and documented changes to the process and procedures based on the root causes of those incidents. As changes are made, personnel should be trained in the changes and how they impact the hazards and consequences of deviation of the process. New personnel should be trained and assessed to ensure they are competent in their job duties, and all employees should be trained in the previous incidents at the site and similar facilities to maintain their sense of vulnerability.

As the process safety culture is built around these themes, the organization benefits from a committed, flexible, and trained workforce who trusts management to keep them safe, seeks to work safely, communicates openly about issues, and stays current on their job requirements and the known hazards and consequences of deviations. The workforce also understands and manages the known hazards, recognizes that constant vigilance is needed to prevent incidents, avoids unauthorized changes within the process, and shares lessons learned to improve and advance the culture continuously.

2.2   Characteristics of a Strong vs. Weak Culture

The section above stated the themes that an organization with a strong safety culture would exhibit. A weak safety culture would show very little effort or emphasis in these critical areas. Management would not visibly support the culture, employee participation would be sparse and unenthusiastic, and the normalization of deviation would be accepted. The process hazards and risks would not be adequately understood or managed, communication would be poor and possibly retaliatory when bad news was delivered, and continuous improvement would not be a focus. Finally, a weak process safety culture would allow the attitude of "We have not had an incident lately, so we will not have one in the future," which encourages a false sense of security and promotes inherent bias.

Ms. Coon experienced a poor safety culture when implementing a global mechanical integrity program. One plant manager of a large facility did not believe his facility needed the program. They had never had a significant incident under his leadership, and he thought the program was a waste of time, money, and resources. After many failed attempts to gain his support and conversations with committed plant managers, Ms. Coon created a presentation that depicted the company's past major incidents. She presented this to all plant managers to create a sense of vulnerability and a higher level of buy-in from all of them. The resistant plant manager became much more supportive and cooperative.

This story illustrates that one person can make a difference in the process safety culture of a facility or organization. As you consider what a strong process safety culture looks like, here are a few actions that you can personally take to contribute to your company's culture:

- Attend all required training for your job duty competencies and truly engage in the training to ensure you can understand and apply the required procedures and work practices, conduct the required activities flawlessly, and execute the essential problem-solving activities.

- Understand why the personal protective equipment (PPE) is required, maintain your PPE, and wear it every single time it is required.

- Raise safety concerns to your supervisor or designee and be specific about what you think needs to be addressed and why.

- Remember the incidents that have occurred at your facility and similar historical ones, and commit to preventing future incidents at your facility.

- Refuse to modify, bypass, ignore, or shortcut procedures, safe operating limits, work practices, equipment design, safeguards, or anything else associated with the covered process unless an appropriate change management process has been conducted and approved for the intended action.

- Stop work if you believe there is a significant safety issue that must be addressed.

- Participate in your facility's risk assessments or, at a minimum, review the findings and action times to increase your knowledge about the hazards, risks, and safeguards in the process.

- Champion learning and get involved with professional communities like AIChE or local safety chapters.

- Be a positive influence for the people in your workplace by promoting safety verbally, by setting an example of always following safety procedures and rules, and by encouraging those around you to do the same.

One global chemical company had a safety practice of giving out safety coins with the company's philosophy on it. They were beautiful and heavy. Managers were encouraged to give them to employees who were exemplifying the desired safety culture. When the coin was given out, the person got two. One for themselves and one to give to someone else. Once a person received a certain number of these coins, they would receive a small gift to thank them for helping to support the process safety culture of the company. Think about how you and your company might encourage people to support safety and your culture continually.

2.3 Conclusion

A strong process safety culture is not just about following rules—it is a shared commitment to vigilance, responsibility, and continuous improvement. By maintaining a sense of vulnerability, combating the normalization of deviance, identifying and managing risks, training the organization on the required competencies, and fostering open communication, organizations can build an environment where safety is ingrained in daily operations. Leadership plays a critical role in setting expectations, but every employee contributes by following procedures, raising concerns, and refusing to compromise on safety.

The contrast between strong and weak safety cultures is stark. A strong culture results in engaged employees, effective risk management, and a safer workplace, while a weak culture increases the likelihood of catastrophic incidents. Implementing process safety culture assessments, learning from past incidents, and reinforcing safety behaviors are essential to sustaining a proactive culture.

Ultimately, process safety is not a one-time achievement—it is an ongoing journey. Every decision, action, and conversation matters in creating a workplace where safety is prioritized, incidents are prevented, and employees trust that their well-being is valued.

Organizations that embrace and advance their safety culture will protect lives, strengthen business operations, and contribute to a safer industry as a whole.

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