Safety Culture and Leadership

Looking For A 21st Century Solution for Safety Performance: Integrating Personal and Process Safety

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The safety challenges of the 21st century require a bold, new approach that integrates best practices from across industries and among areas of safety specialization. Over the last 20 years, for example, lessons from personal and process safety approaches have revealed the strengths and weaknesses of each, but little has been done to bring them together. This paper paves the way to a balanced, integrated approach—an integral solution. It also includes a synthesis of key literature that suggests the emergence of a groundbreaking new model of safety culture and leadership that produces high-performance safety.

Leaders who wish to create a new level of protection for their people, their assets and the environment in which they work need a new model to guide their actions—a model that will create a 21st century standard.

Here is a glimpse at the path forward.

Beyond Personal and Process Safety

The Deepwater Horizon drilling rig disaster in the U.S. Gulf of Mexico has riveted public attention to the risks inherent in the petroleum industry. Like many events of this kind, it will dominate public attention for a period of time and then likely fade into the background until the next catastrophic failure. The Gulf of Mexico tragedy was preceded by other noted disasters around the world, such as the 1984 Bhopal gas tragedy in India, the 1988 Piper Alpha North Sea platform explosion and collapse, the 1998 Longford Gas Plant explosion in Australia, the 2005 BP Texas City Refinery explosion, and the April 2010 Upper Big Branch mine disaster in West Virginia. These examples, mainly from the oil and gas industry, have parallels in many other industries. The accumulated effects of these failures may now have created a tipping point in the public's willingness to accept the level of risk to human life, assets, and the environment that these endeavors entail.

The discontent in the public is fueled by a growing recognition of the complexity of these technologies and how difficult it is to find a single cause or to hold any individual to account for the failure. For example, the Texas City event and the resulting investigatory report initiated a cross-industry focus on *process safety,* a term that refers to the systemic, cultural and far-reaching implications of the failure. Company after company has since identified risks and blind spots that if not addressed could lead to similar disasters in their own operations. Companies from diverse industries such as petrochemical, mining and construction, as well as the design and engineering groups responsible for building major capital projects of all types, are wondering what else they should be doing to protect their people, their assets, and the communities and environments in which they do business.

The focus of attention is merited, of course, because of the significant loss of life associated with the catastrophic disasters noted here. There also are the millions and even billions of dollars in lost assets—assets both of the companies directly involved as well as those who suffer from the fallout of such accidents—legal settlements, shareholder value and livelihoods to consider.

The current emphasis by many on *process safety* also springs from an assertion made by researchers and analysts in the aftermath of the Texas City Refinery disaster. Managers and employees at the refinery may have been misled by the positive *personal safety* results (a lagging safety measure) that the refinery was experiencing, and thus wrongly believed that there was improvement in all areas of safety at the site. This one-dimensional focus on *personal safety* indicators may have led management to overlook issues that eventually contributed to the 2005 disaster. As a result, BP and many other companies, as well, have shifted their focus to rebuilding *process safety* capability.

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The recent focus on major failures and *process safety* has the potential to draw attention away from *personal safety*, a mistake in our view. This paper focuses on what is unique and what is similar about these two important safety domains. We assert that an integral (whole) approach to safety incorporates aspects of both. The purpose of the paper is to integrate best practices from the domains of personal and process safety, while establishing common ground for both in a new model of safety culture and leadership.

A Process Safety Approach

The expression *process safety* has been used widely since the Texas City disaster, but originated primarily in the U.S. chemical, refining and process-intensive industries over 20 years ago. The term originally referred to an approach for preventing the unexpected release of gases and chemicals, and preventing fires and explosions, mainly in process-intensive industries. In recent years, however, the meaning of *process safety* has expanded and often includes subjects ranging from asset integrity, technical integrity or reliability in plants, and major accidents in industries such as mining, rail, air transport or construction. What all of these terms have in common is a reference to unexpected, potentially catastrophic failures resulting in loss of life and property.[1]

1 It would go too far to suggest that the term process safety is used universally by all industries in the broadest meaning as we use it here. In this paper we use process safety to cover a broad area of safety concern while recognizing that there is considerable divergence of language use across industries.

Although it would be tempting to use the more generic term *major hazard* to describe these types of events, Andrew Hopkins, Professor of Sociology at the Australian National University, warns against it because *major hazard* suggests that other kinds of hazards are *not major*. For example, a serious burn or fall may result in death, which in comparison could hardly be considered minor. For this reason, ***process safety*** **is used herein to refer to systemic hazards in all kinds of industries.**

In the aftermath of Texas City, the U.S. Chemical Safety Board, and then later The Baker Panel[2], found that the refinery failure was best understood as a *process safety* failure rather than a *personal safety* failure. Within months after the release of these groups' reports, the term and the idea of *process safety* spread globally and leapt from the highly process-oriented refining and chemicals industries to mining, construction and beyond. A quote from the Baker Panel report clarifies the Panel's intended meaning of the term:

> Process safety hazards give rise to major accidents involving the release of potentially dangerous materials, the release of energy (such as fires and explosions), or both. Process safety incidents can have catastrophic effects and can result in multiple injuries and fatalities, as well as substantial economic, property, and environmental damage.

While the Baker Report specifically describes how process safety plays out in a plant, a broader application reveals that a process safety failure in a mine might result in a collapse or explosion; in construction it could result in an explosion, structural collapse or, as seen recently in New York City, a series of crane incidents. In hydrocarbon/chemical plant construction it is well known that during the start-up and commissioning phases there is an increased risk of incidents, but as we saw recently in a start-up explosion at the Kleen Power Plant in Middletown, Connecticut, those lessons have not been learned across all situations.

The Personal Safety World

In spite of the recent focus on high-profile *process safety* failures, the vast majority of workplace injuries continue to result from *personal safety* incidents; thus no one can afford a lapse in attention on *personal safety*.[3] The Baker Panel has given a definition of *personal safety* that has become a de facto industry standard:

> Personal…safety hazards give rise to incidents—such as slips, falls, and vehicle accidents—that primarily affect one individual worker for each occurrence.

Many *personal safety* approaches focus on individual behavior, with the goal of either reducing or eliminating behaviors that result in incidents or injuries. Inside the realm of *personal safety* both behavior-based and commitment-based approaches are distinguished here, although many safety programs include a mix of both. Both approaches focus on raising awareness and influencing the choices individuals make (*personal safety*) as core to eliminating worker injury.

In JMJ's approach, for example, there is an emphasis on shifting an individual's mindset from "injuries are inevitable" to "I am committed to eliminating all injuries." We have observed again and again that when people act from this commitment they produce radically improved safety performance. The assumption is that if I choose to work safely and watch out for my work mates, and you do the same, we create a partnership of safe work practice. The approach is deeply rooted in the value for human life and the practice of treating others with dignity and respect.

The commitment-based approach begins with having senior managers personally take on a commitment to no injuries at any time. This is then followed by a special emphasis on reaching the front-line supervisors, both because it is critical that they embrace an injury-free commitment and to ensure that they interact with their direct reports in a way that causes everyone to work safely.

A commitment-based approach is only successful, however, when there is adequate attention given to cultivating a safety culture that will reinforce the emerging new mindset—work can be done free of incidents and injuries—and root new actions in shared safe practices. Said another way, without a positive safety culture, the new mindset will not take root and workers will revert to the resigned view that "nobody cares and injuries are likely to happen here."

With the behavior-based method, workers use a systematic approach to study safe and unsafe behavior, applying a research-based intervention strategy to reinforce safe behavior. The emphasis is on employee empowerment, data collection, and systematic analysis. As with the commitment-based approach, BBS (behavior-based safety) practitioners in recent

2 The Report of the BP U.S. Refineries Independent Safety Review Panel (The Baker Panel), self-published, Jan. 2007.

3 According to the International Labor Organization, 2.2 million people per year die of workplace related incidents and diseases, a number the organization claims may be vastly underrepresented.

years have emphasized the need for a positive safety culture to reinforce new behaviors.[4]

This begs the question: what is meant by safety culture? But first, consider what advantages can be gained by integrating personal and process safety perspectives.

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The Best From Both Worlds—Differences and Similarities

The *process safety* approach views hazards from a broad perspective, and seeks to eliminate them through systematic analysis, process mapping and organizational learning, while de-emphasizing the role of personal responsibility. On the other hand, *personal safety* approaches focus on influencing individuals' actions so that people work safely and influence others to do so, as well.

Note that both approaches emphasize the need for a highly developed safety culture that reinforces safe work practices. Both also emphasize the need for strong safety leadership, a key factor in creating a strong safety culture. **To purposefully shape a culture, skilled, purposeful leadership is required. Otherwise, the status quo will reign.**

From the perspective of a commitment to the elimination of all injuries and incidents in the workplace, it seems obvious that companies should include both personal and process safety approaches in their HES (health, environmental, safety) program. There really is not much of a question there. Rather, the tough questions are: how do we accomplish this blended approach and how do leaders purposefully craft a safety culture that can sustain such an approach? Before exploring answers to these questions, the differences in personal and process safety approaches will be examined, placing special emphasis on the skill sets required in each area. As Andrew Hopkins points out, *process safety* hazards are very different from *personal safety* hazards, and thus require different skills to identify and address them.[5]

In the domain of personal safety, for example, technical aspects include specialized personal protection equipment (PPE), ergonomics, observation techniques, engineering, safety management systems, hazard identification, and so on. Beyond the technical requirements of *personal safety* is the underlying focus on people. Therefore, the *personal safety* skill set includes at least a basic understanding of human factors such as communication, psychology and influence theory.

A good HES approach to *personal safety* blends technical with human-oriented skills. Clearly, a worker should be required to wear the most up-to-date safety equipment, but this will do little good if a lapse of attention or exhaustion causes him to fall from a building. It is important to blend both human and technical experience in creating a complete approach to personal safety.

Turning to *process safety*, it is interesting to note that *process safety* approaches do not eliminate human factors entirely, but put them in the background. The common view is that individual workers should not be held accountable for incidents that result from systemic or process-oriented issues. Although various researchers emphasize different aspects of *process safety*, there are a few common themes.

James Reason's process-oriented "Swiss Cheese" model, for example, emphasizes latent conditions such as poor design, gaps in supervision, undetected manufacturing defects, maintenance failures, unworkable processes and procedures, and less than adequate tools and equipment. Latent conditions "may be present for many years before they combine with local circumstances and active failures to penetrate the system's defenses." Identifying *process safety* hazards, therefore, requires special technical, operational and engineering skills, and a capacity for making the invisible visible in ways that would not be easily available to the naïve or untrained observer.

Hopkins adds that *process safety* measurement is quite different from typical *personal safety* measures. He argues that personal and process safety measurements need to address both lagging and leading indicators, revealing that identifying leading indicators for each requires very different measurement approaches.[6]

4 Krause, T.R.; Leading With Safety, John Wiley & Sons, Inc., 2005.

5 Personal communication.

6 Hopkins, Andrew; Safety Culture, Mindfulness and Safe Behavior: Converging Ideas? Working Paper 7: Dec 2002

Another area of focus in *process safety*, especially since Texas City, is safety culture. The Baker Panel attributed the primary cause of the disaster to BP's faulty safety culture, and made a host of recommendations specific to changes in BP's process safety culture leadership.

In fact, since the Texas City explosion, there has been renewed interest in developing a more rigorous definition of safety culture, presumably because companies that want to have one must have a shared understanding of what constitutes a safety culture. Currently, there is a great deal of confusion about this.

The Baker Panel, and then later Hopkins in Failure to Learn, pointed to BP's focus on *personal safety* measures (Days Away From Work, DAFW, and Lost Time Injuries, LTI) as problematic and a diversion from perceiving the latent hazards at the plant. BP believed that its safety performance was improving, and in one sense, BP management was right. However, while BP was focused on improvements in personal injuries at the plant, it was blinded to the underlying weaknesses—latent conditions—unable to detect and learn from them, thus failing to eliminate conditions that led to the explosion.

From a quick read of available literature, one might think that *process safety* means simply following safety processes and procedures, but this is far too superficial. At Texas City, employees had no confidence in the safety processes because there was a cultural tendency to create workarounds. The norms around these processes had been systematically degraded to the point that people had accepted conditions of increasing risk. Employees had no confidence that if they reported the risks that anyone in management would do anything about them. Further, the plant's processes were out of date. In this case, the notion of latent conditions extended to the culture. In other words, latent conditions can be found either in faulty equipment, ineffective processes, or in cultural tendencies to cover over or minimize problems/issues.

In summary, one could say that when a company overuses its "*personal safety* eyes", the organization is blinded to *process safety* hazards. On the other hand, the opposite can be true. When overusing "*process safety* eyes" one can be blinded to *personal safety* concerns. In particular, the *process safety* perspective can undervalue the interior life of the worker, and those subjective states that can lead to errors and violations. **For this reason, we believe that the current challenge is to create a safety approach that engages both eyes—process and personal.** (The word "eyes" here refers to all types of noticing—eyes, ears, thought processes, etc.)

Going one step further, perhaps it does not stretch the metaphor too far to say that a whole approach to safety would suggest (Fig. 1) one eye trained on the tiger (up close and personal, the imminent danger) and another eye trained on the jungle (background and latent conditions that might lead to future dangers).

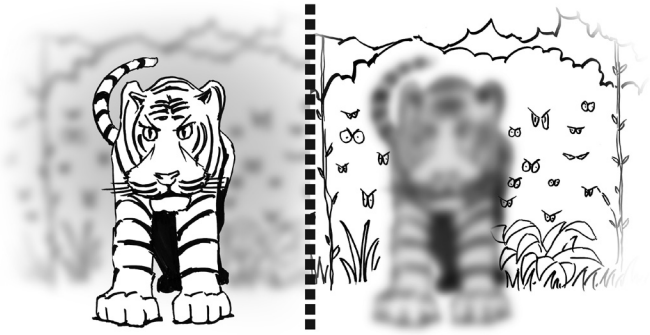

Fig. 1: Training ourselves to split focus—one eye attuned to the tiger (personal safety) and the other eye to the jungle (process safety)—is required to effectively implement a whole approach to safety.

What is Safety Culture?

From the *personal safety* perspective, a safety culture is needed to sustain the personal commitments to working in an injury-free way. From the *process safety* perspective, safety culture is seen as a primary mechanism for uncovering and then resolving latent process hazards.

Edgar Schein[7] provides a useful summary of what various writers have meant by culture: observed behavioral regularities, group norms, espoused values, formal philosophy, rules of the game, climate, embedded skills, habits of thinking, shared meanings, and root metaphors. From Schein's perspective, behavioral patterns arise out of culture and are an expression of it. Adapting Schein's general definition of safety culture, we offer the following as a starting point:

> Safety Culture: A pattern of shared basic assumptions that the group learned as it solved its (safety) problems, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those (safety) problems. (Schein, pp. 373-374)

Other authors have developed more specific definitions, taking Schein's ideas about organizational culture and adapting them to safety culture in particular. In a review of the literature on safety culture, Douglas A. Wiegmann and Terry L. von Thaden found that although there is much convergence among authors

7 Schein, E., Organisational Culture and Leadership, 2nd edition, Jossey-Bass, 1992, pp 8-9.

writing about safety culture, there is a significant split between those who view culture as what an organization "is" versus those who view it as something an organization "has." Authors who take the "is" view emphasize the intersubjective[8] aspects of culture and, therefore, use descriptors such as shared values, beliefs, assumptions, and underlying patterns that influence behavior. Those who emphasize culture as something an organization "has" describe culture as actions, shared behavior and practices. In an attempt at synthesizing the various perspectives, Wiegmann and von Thaden, who support the "is" perspective, define safety culture as:

> …the enduring value and priority placed on worker and public safety by everyone in every group at every level of an organization. It refers to the extent to which individuals and groups will commit to personal responsibility for safety, act to preserve, enhance and communicate safety concerns, strive to actively learn, adapt and modify (both individual and organizational) behavior based on lessons learned from mistakes, and be rewarded in a manner consistent with these values (Wiegmann et al., 2002).

Although Wiegmann and von Thaden support the idea that companies "are" their culture rather than "have" a culture, this definition still seems to collapse those distinctions, offering a definition that includes subjective traits (commitment, learning, personal responsibility) as well as objective traits (behavior, reward systems, actions). We suggest an amendment to this definition so that it preserves the distinction between safety culture as what a company "is" and those safe practices that are an expression of it. Our reformulation of safety culture, therefore, is as follows. Note the shift in emphasis toward culture as what we "are", and behavior as an expression of it.

> Safety culture is the enduring shared value for worker and public safety embraced by each person and group at every level of an organization. It refers to the extent to which group norms reinforce personal responsibility for safety and a commitment to the elimination of all incidents and injuries. This commitment is expressed through: active caring among workers, communication and correction of safety risks, applied learning, and adapted behavior (both individual and organizational), including use of reward and recognition systems that are consistent with these values. (JMJ Associates, 2010)

All writers on safety culture seem to agree that culture determines "how we do things around here" and is important to safety performance. All writers emphasize the shared aspect of culture, and this is significant; it reveals that safety culture is more than an individual's beliefs and behaviors.

In our definition, there is a recognition that culture is not equal to a heap of individuals who think, feel and act in similar ways; as a collective entity, culture is more than the sum of its parts. **Culture influences individual actions as much or more than individual actions influence culture.** Although researchers on safety culture do not view it as the only cause of safety performance, more and more, it is being viewed as a significant causal factor. In fact, the Baker Panel determined that BP's faulty process safety culture was the main cause of the 2005 Texas City disaster.

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Reason and Hopkins have had a major influence on recent developments in *process safety*, and belong to the school of safety researchers that defines culture as what companies "have," thus focusing their work on culture as a set of practices. These authors assert that practices are easier to influence than values and assumptions. In other words, managers can more effectively work to change organizational practices, and if they do so, values, beliefs and assumptions will follow.

Since JMJ takes the view that culture is what a group "is," we thus emphasize the intersubjective cultural traits or collective patterns of beliefs and shared assumptions. The significance of this approach is that it better dignifies the human experience and avoids the pitfalls of the explicit engineering approach to culture change offered by Reason. It has been our experience that people resist or resent being objectified and eventually suspect the motives of managers who fail to appreciate an individual's unique contribution and personal need for self expression. The engineering approach, although appealing in some respects, fails to address a person's need to author her own destiny within the overall change process.

For this reason we distinguish safety culture from safe practices—a safety culture is expressed in its practices. Thus, when the intent is to develop a highly effective safety culture, the work necessarily includes shaping shared values and assumptions about safety. At the same time, we appreciate the value of and need for identifying and implementing best

8 By intersubjective, we mean shared meanings.

practices in safety. The model of culture we propose then is this: practices are an expression of safety culture and safety culture can be developed to an advanced level by focusing on best practices (Fig.2). This allows development of safety culture to come from two directions; practices are best shaped by management's choices and shared values are shaped through mutual appreciation, shared understanding, and respect—qualities of leadership that can be generated by anyone.

Fig. 2: Safety culture arises from two directions—development of Best Practices (shaped by formal managers' choices) and cultivation of Shared Values (shaped by the leadership of all employees)—both are required for an effective Safety Culture.

In the following section, the research of two notable authors, James Reason and Karl Weick, is reviewed. Reason and Weick have proposed sets of critical practices for producing safe and reliable performance. This review is followed by a new synthesis of practices that support JMJ's definition of safety culture.

Safety Practices and Safety Culture

For Reason,[9] an advanced safety culture is an informed culture, which is defined by four interacting subcomponents: a reporting culture, a just culture, a flexible culture, and a learning culture. Paraphrasing:

- **Reporting Culture:** One of the key elements of an informed culture is that its people actually report their errors and near-misses rather than hide them. The issue is not whether the organization has a reporting system; it is whether, as a matter of practice, errors and near-misses are reported.
- **Just Culture:** People only will report errors based on how the organization handles blame and punishment. If blame is the normal response to error, then people will not report. If, on the other hand, blame is reserved for truly egregious behavior, involving recklessness or malice, reporting in general will occur normally. A balance between no blame in general, and blame in certain circumstances, is a just culture.
- **Learning Culture:** Reports of errors and near misses are only effective if an organization learns from them. This means, among other things, that the right decisions are made following investigations and that the organization possesses the will and discipline to make changes. This is the meaning of a learning culture.
- **Flexible Culture:** Decision-making processes vary, depending on the urgency of the decision, the immediate circumstances, and the expertise of the people involved.

Another influential writer in this domain is Karl Weick who, with his collaborator Kathleen Sutcliffe, has studied the attributes of High Reliability Organizations.[10] His formulation of "mindfulness" builds on Reason's notion of safety culture, but adds new distinctions. Weick and Sutcliffe define a mindful organization as a preoccupation with failure, a reluctance to simplify, sensitivity to operations, commitment to resilience, and deference to expertise. The meaning of these distinctions is as follows:

- **Preoccupation with Failure:** Mindful organizations understand that long periods of success breed complacency, so they are wary of success. They understand that norms can become degraded toward a higher tolerance for risk over time, because of the long time lapse between failures. The longer a company maintains success in a risky environment, the greater the tendency to minimize the risk. To counteract this tendency, mindful organizations actively search for lapses, errors and incongruencies, recognizing that these may be the precursors to larger failures. They have well-developed systems for reporting near-misses, process hazards and small and localized failures. This idea is related to Reason's reporting cultures.
- **Reluctance to Simplify:** Mindful organizations are reluctant to discard information, even though it may seem expedient to do so. "They position themselves to see as much as possible." They socialize their workforces to notice more and they employ more people whose job is to explore complexity and to double-check on claims

9 Reason, James; Managing the Risks of Organizational Accidents, Ashgate Publishing Company, 1998.
10 Weick, Karl; Managing the Unexpected: What Business Can Learn from High Reliability Organizations, Jossey-Bass, 2001.

of competency and success. All too often, organizations regard such people as redundant and eliminate them. Mindful organizations treat redundancy as vital for the collection and interpretation of information that is necessary to avert disaster. Reluctance to simplify does not directly relate to one of Reason's distinctions.

- **Sensitivity to Operations:** A key feature of mindful organizations is that their front-line operators (supervisors) strive to remain as aware as possible of the current state of operations. This means that front-line operators are highly informed about operations as a whole, about how operations can fail, and about strategies for recovery. In order for workers to feel free to report and discuss issues, they must believe that this will not result in blame, but in learning. Therefore, this notion is related to Reason's idea of a just culture.
- **Commitment to Resilience:** According to Weick and Sutcliffe, mindful organizations show a commitment to resilience, which means that they are not disabled by errors or crises but mobilize themselves effectively when these events occur. For example, "knowledgeable people self-organize into ad hoc networks to provide expert problem solving. These networks, which have no formal status, dissolve as soon as normalcy returns." For example, air traffic controllers at times of peak activity group themselves around a single screen to give advice and back-up to the controller in the hot seat. This concept is related to Reason's notion of a flexible culture.
- **Deference to Expertise:** When operations are being carried out at very high tempo, decisions "migrate" to the people with the greatest expertise or knowledge about the events in question. These people may be anywhere in the hierarchy, but at such times, senior managers will defer to their expertise. Researchers have identified this as a consistent pattern in flight operations on aircraft carriers, for example. When the tempo returns to normal, authority moves back up the hierarchy. As with the previous concept, this is also related to Reason's flexible culture and also is akin to Weick's Commitment to Resilience.

With this review in hand, Reason's and Weick's proposals for safety practices can be reformulated as expressions of an advanced level of safety culture. We prefer Weick's idea of mindfulness (which he borrowed from Ellen Langer) as a better overarching concept, so we will use that term going forward rather than Reason's word informed.

About mindfulness, Weick writes: "the common thread in cultures that strive to be mindful is…to anticipate the worst and equip themselves to deal with it at all levels of the organization. It is hard, even unnatural, for individuals to remain chronically uneasy, so their organizational culture takes on a profound significance. Individuals may forget to be afraid, but the culture… provides them with both the reminders and the tools to help them remember." This description parallels the inward aspect of culture that we have been emphasizing.

Our reformulated practices,[11] which take both writers' ideas into account, now number seven. According to our reformulation, a highly developed safety culture is a mindful culture, and includes the following practices:

- **Listening to People** closest to and most aware of risks and acting to eliminate hazards: Incorporates Sensitivity to Operations and Deference to Expertise and the general notion of an informed culture. Formal leaders have developed a way to systematically listen to those who understand the risks, not only when crisis occurs, but as the right way to manage the business. The practice of listening to people, which has its roots in inquiry, has as its primary goal ensuring that people are heard and that what they have to say makes a difference toward the elimination of incidents and injuries in the workplace.
- **Reporting Without Fear of Blame** every possibility of failure: Incorporates Reporting Culture, Just Culture and Preoccupation with Failure. People will report errors and near-misses if they believe they will not be blamed and if they are confident that the company will act on what they report. They not only report on what is obvious, but they also are trained to search for what is not obvious, latent conditions and patterns of cultural disregard for risks (Seeing the Visible and Invisible). In general, people practice reporting all personal and process safety hazards with a focus on learning, not blame, but know that there are consequences for negligent behavior.
- **Mobilizing People** quickly to identify and resolve hazards: Incorporates Commitment to Resilience, Deference to Expertise and Flexible Culture. The practice includes self-organizing into ad hoc networks of those people who are best suited to understand and resolve the hazardous

11 What we mean by practices is related to the definition of culture offered in previous pages. A safety culture is a set of shared assumptions and beliefs, and expresses itself in shared practices. Collective practices, in contrast to individual practices, have been institutionalized as the right actions, producing good results. Thus, advanced practices reflect a highly developed safety culture. This notion is explored more in the next pages.

situation. It includes both reactive problem-solving (after a hazard is identified) and proactive problem-solving (anticipating possible hazards and removing them before they manifest). As stated above, senior managers will defer to others in the organization, despite their placement in the hierarchy, in order to act quickly.

- **Renewing Practices, Processes and Procedures** based on lessons applied: Incorporates Learning Culture and Preoccupation with Failure. The practice of Renewing Practices, Processes and Procedures links to other practices, especially to the Practice of Reporting. Reporting must result in learning that is then used to update best practices and current processes. Processes must be living and useful; otherwise, people will begin anew to work around them, devising their own unofficial (and therefore unknown) practices. The tone of this practice is one of hyper-vigilance, with one eye fixed on the "tiger" of complacency.
- **Building in Overlapping Layers of Protection** wherever there are risks: Relates to Weick's idea of Reluctance to Simplify. The practice, which essentially means providing double-assurance, allows for necessary redundancies in people, processes and equipment to ensure that hazards are anticipated, seen and/or eliminated when possible. For example, a company will include both personal and process safety experts who can look from each perspective. They also may need to double-up on certain shifts during high-risk procedures, such as turnarounds or start-ups. The practice avoids the tendency to treat certain risk situations as "business as usual", and therefore keeping costs dangerously low.
- **Active Caring** shown throughout the workplace. According to E. Scott Gellar, active caring is the product of three interrelated concepts: Self Efficacy (a belief that "I can do it"), Response Efficacy (a belief that "it will work"), and Outcome Efficacy (a belief that "it's worth doing"). The result of these three attributes is self-empowerment, "I want to make a difference" and when applied to safety, the result is a work environment in which people look out for each other as a genuine expression of their regard for one other. This practice includes stopping or correcting work when it is unsafe within the context of active caring.
- **Keeping people continually engaged** and visibly committed to the vision of working safely. This last practice has been distilled from JMJ's 24 years of research while working with companies all over the world to produce *Incident and Injury-Free*® results in safety. The practice is related to active caring and mindfulness. It not only gives people a goal worth pursuing (nobody hurt), but also actively works to enroll others into actively supporting that goal. The practice also is closely related to John Kotter's thesis in the book The Heart of Change, in which he lays out a model of what has been most successful in creating significant changes in organizations. In a nutshell, "people change what they do less because they are given analysis that shifts their thinking than because they are shown a truth that influences their feelings."[12]

The last two practices were not taken from the research of Reason and Weick, but have been found to be at the same level as those in our work over the past two decades. Together, these seven practices generate an environment in which people look out for one another by identifying and eliminating all types of hazards, both personal and organizational. The last two practices create a strong foundation for the others, a goal worth pursuing in an environment where there is genuine care and concern for people and their families. Without this, the remaining practices are without a values-based rudder, which we have found to be irreplaceable when creating a workplace free of incidents and injuries.

To summarize, we have taken the view that safety culture is a pattern of shared assumptions, values and beliefs that shape people's relationship to safety and result in better or worse safety performance. The seven practices outlined reflect a high performing safety culture (Fig. 3).

Fig. 3: These seven practices reflect a high-performing safety culture.

12 Kotter, John; The Heart of Change: Real Life Stories of How People Change Their Organizations, 2002.

Safety Culture Development

What an organization learns about its safety problems may be more or less functional, and thus can be more or less developed. JMJ's research has shown that safety cultures follow the same pattern of evolutionary development that all humans undergo.[13] We use a simple four-level hierarchy to demonstrate how a group can move from one stage to another, each stage bringing more effective responses to safety hazards, both personal and process-based (Fig. 4). In detail, the levels are:

- **Reactive:** We react to safety issues only after they occur; safety is not a high priority unless it has to be. If there is a mistake we find the one to blame. Basically, we expect the people who work here to take care of themselves.
- **Conforming:** We institute and follow safety policies and procedures so that people will not make mistakes that lead to injuries; our emphasis is to make sure everyone follows the rules for their role. We believe in the system we have.
- **Achieving:** We have instituted processes for reducing the number of injuries and incidents that occur, and we hold people individually responsible for their safety. We are constantly looking to improve our safety management systems so that safety performance steadily improves. We are all about driving for quality and results—whatever it takes.
- **Integral:** We are constantly on the lookout for how to have the whole system and each person in it function at their best, safely. We understand that personal and process safety are intimately related and can use reacting, conforming and achieving styles as the situation demands. What motivates us is genuine care and concern for the people with whom we work.

Fig. 4: When a safety culture becomes Intergral, it will mindfully choose the appropriate response to a given situation.

Based on this four-level scale, we can see that both Reason's and Weick's ideas, plus the added two, map closely with the Integral level of development. Thus, the Integral level of safety development is a "mindful" safety culture. In keeping with our general formulation, then, each level has a corresponding set of underlying assumptions, values and an orienting pattern from which behavior and practice are expressed.

In this way, more- or less-safe practices correspond with values and assumptions at each level of safety development. They arise together; when working on practice, one is also working on values and assumptions. Conversely, when working on values, one also is working on corresponding practices (see Fig. 2). **This is important because it recognizes that changes in behavior can come up against people's resistances when those changes are experienced conflicting with personal values. Leaders who hope to influence safety performance must recognize these dynamics if they hope to successfully protect their people, assets and the environment.**

> **Changes in behavior can come up against people's resistances when those changes are experienced conflicting with personal values.**

Safety Leadership and Culture

Lastly, we will focus our attention briefly on a common theme in most contemporary safety literature, the role of safety leadership in developing an advanced safety culture—a culture supportive of *Incident and Injury-Free* performance.

Although Safety Leadership is a topic that merits deeper analysis, our intention here is only to illustrate its connection with and importance for developing an advanced safety culture. In this context, the role of both formal and informal leadership, leadership with and without authority, is addressed.

Schein's writings on organizational culture reveal how a company's founders or current managers, those with positions of authority, are powerful influences on shaping culture and

13 See for example Hudson, Patrick; Implementing a safety culture in a major multi-national. Safety Science, v45, Elsevier, 2007, pp. 697–722.

maintaining it. This view, which emphasizes the role of formal authority, identifies a set of primary embedding mechanisms:

- What leaders pay attention to, measure and control (especially if leaders are totally consistent in their own behavior)
- Leaders' reactions to critical incidents and organizational crises
- How leaders allocate resources
- Deliberate role-modeling, teaching and coaching
- How leaders allocate rewards and status
- How leaders recruit, select, promote and excommunicate

It is easy to see how these embedding mechanisms can be applied to safety culture. It is clear that people watch managers to find out what is important, and to discover what will be rewarded. It also is easy to see how gaps between what leaders say and what they do can create dissonance for employees. A manager who says that "safety is our priority" but then will not invest in the repair of faulty equipment, relays an unspoken, underlying message that overpowers the explicit spoken message. This view emphasizes the role of formal leadership in generating a safety culture.

Ron Hefeitz, author of Leadership Without Easy Answers[14], also highlights the role of formal authorities in significant change efforts, but notes the influential role of people who have either informal or no authority, as well. Heifetz distinguishes two basic types of challenges leaders must confront, defining problems as either "technical" or "adaptive."

Technical challenges are those for which people have solutions and must apply them skillfully in order to resolve issues. Adaptive challenges are those for which there is no known solution, and therefore both leaders and followers must learn together how to resolve them. Our experience has revealed that culture change in general, and safety culture change in particular, are examples of adaptive change because, as Heifetz claims, "adaptive work…consists of the learning required to address conflicts in the values people hold, or to diminish the gap between the values people stand for and the reality they face. Adaptive work requires a change in values, beliefs, or behavior."

When the goal of safety leadership is to produce an injury-free workplace, the work of leadership is adaptive, which means that values, beliefs and behavior change are at play. Leaders must address this through work that is explicitly designed to transform mindsets (by questioning outdated assumptions and beliefs).

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Leaders with formal authority have additional tools they can use because of their access to resources, knowledge and power. They can embed safe practices (the seven practices of a high-performing safety culture previously outlined) as the primary vehicle for developing an extraordinary safety culture. Whereas, other models emphasize one approach over the other, **our experience has shown that leaders must address both transformational and behavioral approaches in tandem to produce a sustainable safety culture.**

The transformational approach emphasizes the necessary changes in values, beliefs and assumptions in order to commit to the elimination of all injuries and incidents. The behavioral approach emphasizes identification of critical best practices as pathways formal leaders can take to produce a sustainable and highly developed safety culture (see Fig. 3).

Heifetz' work applied to safety addresses the need for leadership with and without authority in order to produce a workplace free of incidents and injuries. Too often, references to leadership are dedicated to those with formal authority alone, and not to the kind of influence that can come from anyone. However, the most significant changes throughout history have come when there were contributions from both types of leaders, those with and without formal authority.

Transformations can be generated by either formal or informal leaders, but cultural development must be addressed by formal leaders in order for the work to be sustainable. To illustrate, we know from history that some

14 Heifetz, R.A.; Leadership Without Easy Answers, The Belknap Press, 1994.

of the most transformative events have been led by people who were not in charge, but instead came through people who led without authority. This includes figures such as Martin Luther King, Nelson Mandela, Mohandas Gandhi, Gautama Buddha, and Jesus of Nazareth, just to name a few. Often these figures created changes at significant risk to their own lives. Their leadership seems to resonate with a collective need for freedom, self expression, or basic human rights. They are able to cultivate a wellspring of collective action that rises up against prevailing structures of injustice. Usually, there is a breaking point where those with authority either accept the needed changes or work to suppress them through subjugation or violence.

Transformations can be generated by either formal or informal leaders, but cultural development must be addressed by formal leaders in order for the work to be sustainable.

The history of unionization is a case in point. Often, the reason for unionization was because of poor working conditions, little regard for the safety of workers, or unfair work practices. These complaints often reached a violent climax before managers and owners would change work practices to benefit workers. These changes in workplace practice required a combination of informal leadership (from union organizers) and formal leadership (from those with power over people and resources) before they were resolved.

In most cases, the development of an advanced safety culture requires collaboration, either explicit or implicit, between formal and informal leadership. Often, informal leaders lead the critical shift in mindset that unhooks people from past beliefs and frees them to think in ways unimaginable. These leaders are not invested in the status quo and have little to gain by maintaining it. Instead, they see new possibilities and inspire others to see them, too. Sometimes, a critical mass begins to operate from a new reality, creating tension between this vision of the future and the inherited habits of the past.

This is a description of what happens in a company when a few people begin to see the possibility of working free of incidents and injuries. Before long, others catch the inspired dream, commit to its fulfillment, and spread it across the organization. However, this possibility can run counter to cultural norms, such as command and control, which have evolved over time and proven to be successful. A safety culture may have developed in which unsafe practices are tolerated or even celebrated in a heroic fashion, and reporting incidents may be treated with suspicion. The old safety culture may have resulted in conditions causing problems to be buried and employees to be blamed when a disaster strikes. When this confrontation occurs between those who stand for a new paradigm for safety and the old safety culture, the resolution demands the attention of those with formal authority. It is the owners and managers, those who determine how resources are allocated, who must step in and model the cultural changes that must take place.

Formal leaders can do this by first acknowledging the adaptive nature of the challenge and then taking on three areas of change already identified herein:

1. They must take on the new mindset themselves and express it in their actions;
2. They must confront the current level of safety culture (reactive, conforming, achieving) and commit to becoming a high-performing safety culture; and
3. They must commit to the practices that reflect a mindful, or Integral level of development if the desire is to build a high-performance culture.

The *Incident and Injury-Free* approach to safety—which encompasses the best of the *personal safety* and *process safety* worlds, is founded on a commitment to protection of people, assets and the environment and requires culture change in order to be sustained.

In Summary

This paper has reviewed these concepts: personal safety, process safety, and the cultural and leadership (both formal and informal) aspects of safety. *Personal safety* and *process safety* are distinct, yet related to the attainment of an *Incident and Injury-Free*® workplace. Personal and process safety each include a unique perspective, a trained "set of eyes" to perceive the hazards associated with those domains. It will not do, therefore, to substitute one for the other, or to pay too much attention to one area over the other. The view expressed here is that **there is value in distinguishing the perspectives of both personal and process safety, and even greater value in integrating them.**

Personal safety incidents still result in the greater number of people being harmed in the workplace, and there is still a great distance to go to eliminate them. Process safety incidents occur less frequently but can lead to multiple injuries or deaths, major property losses, and damage to the environment. It is clear that when we are committed to the elimination of all injuries and incidents, we must pay attention to both.

The importance of safety culture also has been addressed. A way of thinking about safety culture has been offered that distinguishes the subjective aspects of culture from the practices of high-performance safety. These practices include:

- **Listening** to people closest to and most aware of risks and acting to eliminate hazards
- **Reporting** every possibility of failure without fear of blame
- **Mobilizing** people with expertise quickly to identify and resolve hazards
- **Renewing** practices, processes and procedures based on lessons applied
- **Building in layers of overlapping protection** wherever there are risks
- **Active caring** throughout the workplace
- **Keeping people continually engaged** and visibly committed to the vision of working safely

These practices correspond with the high level of safety culture development we call Integral, and this, we assert, creates a clearer picture of what Karl Weick means by mindfulness.

Finally, the roles of formal and informal leaders, both in creating a workplace free of incidents and injuries, and in generating an Integral Safety Culture, was explored. Whether formal or informal, leaders must understand that the nature of this kind of change is adaptive, and therefore *transformational.* Cultural transformation (change) requires individual mindsets, culture, and practices to be willingly changed in order to create sustainable workplace in which nobody gets hurt and where assets and the environment are protected from harm. This kind of change is neither easy nor quick to produce. However, when a group of committed people choose it, they can make significant and sustainable progress toward their goals.

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