

Chapter 1

The Organizational Safety Model: Understanding the Big Picture

- The Organizational Safety Model:
How does safety leadership assure improvement?
- The primary importance of the Working Interface
- Understanding the relationship of exposure events to injury events
- The necessity of leading indicators
- Enabling safety systems
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- Leadership creates organizational culture and safety climate
- What motivates leaders to improve safety?
- Influencing the behavior of safety leaders
- Sustaining organizational change: Two critical elements

Note: Throughout this book, the phrase “safety leader” means any person who influences others in the organization regarding safety. This includes the senior-most leader in the organization, all managers, labor representatives, and workers. We also use the terms “safety” and “EHS” (Environment Health and Safety) interchangeably. Our clients use a variety of acronyms to describe these areas of functioning: SHE, HSE, etc. We see the three areas as interrelated and the methods that affect one as appropriate for each of the others.

Effective safety leaders have a solid understanding of a set of core concepts. For those with operations backgrounds, these concepts have been learned from experience and are now intuitive. Leaders from other areas will find these essential concepts easy to grasp, but challenging to execute effectively. Understanding these core concepts is a pre-condition for creating excellence in the leadership of safety performance and provides a systematic way to think about the design of intervention strategies for improvement.

The Organizational Safety Model: How Does Safety Leadership Assure Improvement?

Leaders need to understand, in concrete terms, how safety leadership assures improvement. We know leadership is important to safety excellence generally, but what are the specific mechanisms that connect the leader to safety performance improvement? As a safety leader, I need to know what specific mechanisms produce results. It is not sufficient to say that “management needs to support the safety effort.” Of course management support is needed, but we need to be much more specific about what is expected of the safety leader to assure his or her success. What are the common threads that run through safety improvement mechanisms, and what behaviors does the leader engage in to assure them? How do the things I do and say, or fail to do and say, influence the work configuration and the way work is done?

The effective safety leader understands the “big picture” shown in the Organizational Safety Model, Figure 1-1. It addresses how leadership and

The Organizational Safety Model



LEADERSHIP

Seeing the right things to do to reach objectives and motivating the team to do them effectively. Safety leadership is exercised by decision-making, which is related to the beliefs of the leader and demonstrated by his or her behavior.

ORGANIZATIONAL CULTURE

The driving values of the organization. "The way we do things around here." The unstated assumptions about how things are done. Distinguishable from safety climate, which is the emphasis perceived to be given to safety by the organization's leaders.

WORKING INTERFACE

The interaction of equipment, facilities, procedures, and the worker. A combination of these factors creates or eliminates exposure to hazards.

SAFETY ENABLING SYSTEMS

The set of mechanisms that enable safety in the Working Interface. Different organizations classify these in different ways, but usually include basic safety mechanisms: hazard recognition and mitigation, training, regulations, procedures, policies, and safety improvement mechanisms.

ORGANIZATIONAL SUSTAINING SYSTEMS

The set of systems that sustains enabling safety systems and assures their effectiveness. This includes selection and development of people, performance management, organizational structure, employee engagement, and other management systems.

Figure 1-1. The Organizational Safety Model.

culture influence the organization's safety enabling systems and organizational sustaining systems to reduce exposure to hazards in the Working Interface.

The Primary Importance of the Working Interface

The Working Interface is the configuration of equipment, facilities, systems, and behaviors that define the interaction of the worker with the technology. Hazards exist in this configuration. Safety excellence is directly related to how effective the organization is at controlling exposure to hazards in the Working Interface. Essentially, safety concerns how workers interact with the organization's technology. Each element in the Organizational Safety Model plays a critical role in controlling exposure to hazards.

Enabling and sustaining systems are designed to reduce and eliminate exposure to these hazards, either by eliminating the hazards themselves (e.g., through modified production processes) or by introducing hazard control measures (e.g. guarding or venting systems).

We have intentionally avoided saying what proportion of incidents comes from what type of exposure in the Working Interface. Many in the safety community believe a high percentage of incidents, perhaps 80-90%, result from behavioral causes, while the remainder relate to equipment and facilities. We made this statement in our first book published in 1990. However, we now recognize that this dichotomy of causes, while ingrained in our culture generally and in large parts of the safety community, is not useful, and in fact can be harmful.

There are several reasons for that. First, the dichotomy is not representative of what actually happens to cause injuries. The equipment doesn't simply malfunction, independently of how it has been designed and maintained, and the worker doesn't simply behave unsafely, independently of the system configuration. Rather, the worker interacts with the technology, and the interface that results comprises a system. Multiple variables influence the system: the quality of design, appropriateness of training, influence of culture and climate, and the quality of leadership.

Second, the dichotomy tends to encourage blaming. If the purpose of understanding what causes injuries is to establish fault, it is useful to have neat (although inadequate) categories like “worker behavior” or “equipment and facilities” as sources of the injury. This is a natural reaction and one seen regularly in the popular press — “the accident was the result of operator error.” But it is often counter-productive because it leads to blame. And blaming is always a mistake.

The useful question is not “Who was at fault?” but rather “How can this injury, and others like it, be prevented in the future?” If we fail to realize this we fall into the trap of arguing over fault, and the process of understanding why the injury occurred becomes biased by various points of view that want the outcome of not being blamed! Anyone familiar with the incident investigation process in a weak organizational culture has seen how destructive this process can be. Incident investigation committees can waste time, make poor recommendations, and undermine the safety climate at the facility, whether by calling things “operator error; instruct the operator to act differently” or by seeing everything as facility-related or the fault of management.

High-functioning safety organizations have gone beyond the entanglements of blaming and recognize that getting safety right means designing and influencing systems that reduce and eliminate exposure.

Of course, not all exposure is equal in terms of the potential for serious injury it represents.¹ Some exposures to hazards will result in more serious incidents, some in less serious ones.²

Understanding the Relationship of Exposure Events to Injury Events

Leadership must understand *the relationship of exposure events to injury events*. H.W. Heinrich first described this relationship in 1959³. It has been used in most standard safety texts since. It is expressed as the familiar “safety

¹ Manuele, F.A. February 2004. “Injury Ratios”. *Professional Safety*, 26-30.

² Defining the precise relationship needs to be done on a case-by-case basis and will vary by type of industry, and a number of other factors.

³ Heinrich, H.W. 1959. *Industrial Accident Prevention, 4th Ed.* New York: McGraw Hill.

triangle” showing fatalities at the top and less serious injuries further down in the base. Recently this concept has been criticized^{4,5} because it does not account for the fact that some hazards are much more likely than others to cause serious injuries, and so there are dramatic differences in the ratio of major to minor injuries depending on the specific hazard in question. Critics argue that when the focus is on frequency alone, emphasis can be mistakenly placed on those hazard types associated with many minor injuries — rather than focusing on the smaller number of minor injuries related to hazard types more likely to be predictive of the risk of major injuries. This criticism is valid in our view. It would be simplistic to assume that all exposure events are equal in the severity they represent or would warrant the same types of intervention. However, *it would also be a serious mistake to forget that more frequent low-severity events may be indicators of the potential for high-severity events.*

Actually, this concept is very useful, in safety as well as in other applications. It can be used to understand a wide variety of “unwanted events” — outcomes recognized as undesirable yet difficult to predict and control. The critics of this principle often fail to realize its significance and implications. Examples range from catastrophic events to crimes, college dropout rates to medical errors, just to mention a few. The underlying principle states that many small or less severe events precede a single large or serious one. Those smaller or less severe events may be similar in type but lower in severity (e.g., small leaks vs. a large one) or may be precursors on a chain of events leading to the major event (e.g., not blanking a line, leading to a major fire).

This principle has two significant implications: a) when a single serious event occurs, it can be inferred with high probability that many related smaller events have occurred previously; and b) to prevent workplace incidents, small events and their precursors must be taken as seriously as large ones. Each time a worker is exposed to a hazard, that exposure represents an important risk, whether the actual result is no harm, a fatality, or another

⁴ Kriebel, D. 1982. Occupational Injuries: Factors Associated with Frequency & Severity. *International Archive of Occupational & Environmental Health* 50: 209-218.

⁵ Manuele, F.A. 2002. *Heinrich Revisited: Truisms or Myths*. Itasca: NSC Press.

type of catastrophe. This fact has very important implications for the practical day-to-day things we do in organizations to improve safety. It means that an injury-free culture is not simply one that doesn't tolerate incidents. *An injury-free culture is one that doesn't tolerate exposure to hazards.*

This principle provides fresh insight when applied to performance issues outside of safety. As an example, let's look at a student living in a college dormitory who is found to be using heroin. The college administration wants to know if this is an isolated event, or whether other students are also using the drug. The "exposure to event" principle suggests that the probability of a single serious event occurring in isolation is very low and that if one serious event has occurred, it is *highly likely* that many other less serious events of the same kind have happened previously. In this case, one student using heroin indicates that other students on campus are probably doing the same.

Similarly, if a single fatality occurs in a manufacturing environment, *it is highly likely that its causal roots — the particular exposures to hazards that caused it— occur frequently in the Working Interface.* (This is not to say it is always present. If the Working Interface is free of this exposure the great majority of the time, but it is present even five percent of the time, we can expect injuries to follow.) Leaders are often slow to recognize this statistical fact. It's easier to think that the serious event represents a "fluke." As the statistics professor used to say, "Rare events happen, *rarely.*" Most of the time, the outcome is unusual, but the events leading up to it are common.

Let's explore an example. We observe a car crash on the road to the office. For some unknown reason, the driver swerved into oncoming traffic. He was not wearing a seat belt and was thrown from the car and killed. What is the probability that the driver usually wore a seat belt, but didn't do so that day? It could happen, but the likelihood is very low. It is much more likely that the driver frequently did not wear a seat belt, and the day of the accident was no exception.

Similarly, a worker falls to his death from an elevated surface and the incident investigation finds that he was working on inadequate scaffolding and not wearing fall protection. What is the likelihood that inadequate scaffolding and failure to wear fall protection are rare events within that facility? It is possible, but the likelihood is low. It is more likely that these hazards

occur with regularity and have previously produced smaller events like near misses or minor injuries. *Further, this means that the leadership has tacitly accepted these events.*

To review, an exposure event is the exposure of a worker to a hazard within the Working Interface. It includes exposures related to facilities, equipment, actions, and most importantly, their interactions.

The same number of exposure events in a given time period will lead to a different number of incidents in the same time period. This is a statistical fact stemming from random variability. A given exposure today has a different result than it will tomorrow, simply by chance. If this basic statistical relationship is not understood, leadership will inevitably overreact to incident data. A few months will go by in which injury frequency is unusually low, and leaders will conclude that safety is actually improving, when in fact it may or may not be. Or in a period of a few months, a “rash of injuries” will occur, after which leaders say that safety has deteriorated when in fact exposure may have been reduced. None of this is to say that safety is ultimately a matter of luck, but it does say that *incident frequency is subject to random variability*. Effective safety leaders need to understand these relationships.

The Necessity of Leading Indicators

To understand the relationship of exposure events to injuries requires reference to leading indicators. Leading indicators are measures of variables that can be shown to have a statistically valid, predictive relationship to injury frequency. When viewed in relation to lagging indicators (for example, the number of injury events divided by hours worked), leading indicators allow organizations to take proactive measures that prevent injuries. Figure 1-2 shows some leading indicators.

Perhaps the most interesting aspect of all this is that most safety professionals already understand it, while *safety leaders*, including executives who make important safety-related decisions, frequently don't.

Leading	Lagging
<ul style="list-style-type: none">· Working Interface assessment	<ul style="list-style-type: none">· Environmental events
<ul style="list-style-type: none">· Hazard assessments	<ul style="list-style-type: none">· Injury rate
<ul style="list-style-type: none">· Working observations of exposures (e.g. % safe)	<ul style="list-style-type: none">· Illnesses
<ul style="list-style-type: none">· Safety participation rates	<ul style="list-style-type: none">· Workers' compensation costs
<ul style="list-style-type: none">· Near misses	<ul style="list-style-type: none">· Lost work days

Figure 1-2. Leading and Lagging Indicators.

Enabling Safety Systems

Enabling safety systems combine to reduce and eliminate exposure to hazards. These are the basic safety systems or programs that assure adequate safety functioning. Most large organizations have them in place and audit them regularly. The effective safety leader knows what these systems are, how they are audited, and how effective they are.

Interestingly, most organizations have discovered that two sites can have practically identical audit scores of site-level enabling systems, identical or near-identical technology, and similar workforces, and yet report *very different incident frequency rates*⁶. Enabling systems are necessary but not sufficient for excellent safety performance. As we will see, there is a great deal more to safety success than enabling systems.

⁶ Petersen, D. April 1998. "The Four Cs of Safety: Culture, Competency, Consequences & Continuous." *Professional Safety*. 32-34.

Sustaining Safety Systems

An organization's sustaining safety systems are those that sustain safety performance excellence. Most organizations have these systems, but variation in their quality is much larger across organizations than with enabling systems. Perhaps more importantly, most organizations fail to appreciate the relationship of these systems to the Working Interface, to safety enabling systems, and to safety performance outcomes.

Is safety leadership a criterion for jobs that are central to safety outcomes? Is there a process to develop safety leaders? Is the structure of the organization such that safety is given adequate emphasis? Does the performance management system meaningfully address safety leadership issues (not just through lagging indicators)? Are there mechanisms to assure employee engagement in safety? Is there a systematic way of holding leaders accountable for safety processes and outcomes?

Leadership and culture determine how well these systems work. But saying that is the easy part. Leadership has the task of continuously improving both enabling and sustaining systems. But the workplace is complex: technology changes, organizations change, operations pressures exist, cultural factors may not be ideal, and so on. Given the real world, how does the safety leader assure safety improvement?

Leadership Creates Organizational Culture and Safety Climate

Ultimately, the safety improvement objective is to create a positive safety climate and a culture in which safety is a driving value. But if we look realistically at many organizations, we often see issues such as low trust, poor communication, and mixed management credibility. Many leaders are failing to address hazards and front-line employees are often not engaged. How do we change all that? How do we create a culture in which safety really is a driving value?

The change process starts with leadership itself. A core group of leaders who have influence over the organization needs to get aligned on what they really value, and what principles represent those values. Then they need to

know what behaviors of theirs are necessary to convey to the organization that they are serious about change and to stimulate the right behaviors among other leaders. There must be consistency across leadership on saying and doing the right things: making the right decisions, communicating the right information, and articulating the right vision.

Culture changes slowly, but it is changing all the time. Leaders are always changing the culture each time they make a decision, leave an issue hanging, take a stand, or address an issue. The change process is about directing and accelerating the natural change that is already happening. That it takes time to change a culture is both good and bad. It means that a weak or ineffective culture will take a long time to change, but at the same time, it means that when safety becomes a driving value in the organizational culture, that value will endure.

The strength of site-level enabling and sustaining systems is not sufficient to predict variability in performance. To understand the reasons for variation in the frequency rates of incidents, safety leaders also need an understanding of *organizational culture and safety climate*. If two locations have similarly well-developed enabling and sustaining systems, similar technology and workforce, but different incident frequency rate levels, the difference between them will likely be found in their cultures.

Organizational culture is the shared values and beliefs that drive behavior in an organization — commonly described as “the way we do things around here.” The concept of culture is widely understood, but the relationship between organizational culture and the safety climate, and their role in safety excellence, is not.

We discuss culture and climate in depth in Chapter 4, but for now, we will provide a brief overview. Where organizational culture involves unstated assumptions that govern how we do things around here, safety climate refers to prevailing influences on a particular area of functioning (safety in our case) at a particular time. Thus, organizational culture is deeply embedded and long-term; it takes longer to change and influences organizational performance across many areas of functioning. Safety climate, on the other hand, changes faster and more immediately reflects the attention of leadership. Think of organizational culture as background influence on the organization,

while safety climate is foreground. Climate changes faster than culture.

The safety leader must do more than influence site level improvement elements. He must also take on the task of influencing the organization's culture and safety climate. Further, *site level safety improvement elements are managed, but organizational culture and safety climate are led*. Chapter 3 addresses the difference we intend between management and leadership, as well as specific best practices in safety leadership. In short, management has to do with *what things get done*, and leadership has to do with *how they get done*.

Ultimately, the safety leader's job is to contribute to and support mechanisms that reduce and eliminate exposure to hazards.

What Motivates Leaders to Improve Safety?

Based on our experience in working with leaders ranging from first-line supervisors to CEOs, three primary motives drive safety improvement: feeling compassion, building a performance platform based on cultural unity, and contributing to profitability.

When we first began working with senior executives many years ago, some on our team were surprised to find that while leaders vary, *the predominant motive driving senior leaders to improve safety is human compassion*. We find this holds true for safety leaders generally, whatever their level in the organization. The leader who works to improve safety is usually doing so out of a deep sense of integrity, a grounding in ethical principles, a feeling that it is the right thing to do.

This kind of motivation differs fundamentally from other business motives. The leader's motivation to get safety right is about compassion, not operating profits or personal success. This fact has very interesting implications for working on safety improvement with leaders at all levels.

Although "cultural unity" is usually a secondary motive, it can be critically important. Achieving real unity in the organizational culture is very difficult for most companies. Even leaders in this area recognize that they have a long way to go. Organizational life is inherently challenging. Often the organization's most important goals seem disconnected from the worker and

the supervisor, if not the manager. Organizations sometimes impose a set of “values” on their employees to try to improve performance. Employees often view such efforts with cynicism. *Highly effective leaders recognize that taking a leadership role in safety gives them an opportunity to create real shared values in the organization.* When done carefully, this has remarkable effects on organizational citizenship, the ability of employees to work effectively as teams, and to overall organizational effectiveness. We will discuss this in depth in Chapter 4.

Nothing undermines the effort to create cultural unity faster than a workplace that is perceived to be unsafe.

In some companies, highly significant costs are associated with injuries. However, in our experience, injury costs are more relevant to the justification of needed resources than to motivating leadership. Further, improving safety to reduce costs can be taken wrongly by front-line employees if they think it is the only reason leaders want to make safety improvements.

Influencing the Behavior of Safety Leaders

Organizational leaders vary in their abilities and skills to provide safety leadership. This is as true for the senior leader as the first-line supervisor. Some leaders have a natural inclination towards safety and need little help; others are quite reluctant to take on safety issues, and may even be apprehensive about it. Leaders are often chosen for their technical ability, and providing excellent safety leadership is necessarily a “people activity” requiring high levels of interpersonal skills.

We will look at these issues in depth in the next three chapters as we examine the Safety Leadership Model. A summary of the main points that address this issue follows:

1. Safety leadership behaviors are subject to the same principles as any other set of behaviors. *However, doing the right things to influence behavior may vary widely from the senior leader to the manager, supervisor, or worker.*
2. Great safety leaders are great leaders who are motivated to improve safety; they are no different than great leaders generally.

3. We know the personality characteristics, leadership styles, and best practices of great safety leaders. We can describe the specific behaviors and practices that are necessary to provide safety leadership and culture change. And we can specify the attributes of a healthy organizational culture and safety climate and how to measure them.

Sustaining Organizational Change: Two Critical Elements

Every leader has seen initiatives that fail to sustain a desired change. In fact, it is more usual than unusual for change initiatives to run their course in a few years, leaving only a small effect on the performance area intended for long-term change.

We think this unfortunate fact of organizational life is unnecessary if the change effort is approached properly. There are two elements that distinguish short- and long-term change efforts in safety performance:

- 1) Mechanisms and Processes
- 2) Serious Employee Engagement

It's difficult to overstate the importance of these two elements. Most leaders have grown accustomed to mediocre change efforts and have come to expect them to have minimal impact. But this need not be the case if the strategy addresses these two critical elements adequately. "Mechanisms" and "engagement" are active words, not descriptions in manuals that describe how things are supposed to be. They refer to sets of behaviors that are performed routinely as part of day-to-day operations that make the crucial difference between "training programs" and real organizational change.

Mechanisms and Processes

A mechanism is a set of ongoing activities undertaken to create an organizational change. Say we want to improve the way supervisors relate to the Working Interface. One strategy is to train them and then hope that what they learn will be applied in their day-to-day work. This isn't likely to work

well because it leaves them on their own to figure out the most difficult aspect of the change — how to integrate what they learned into what they do every day.

Another strategy is to create a system that requires supervisors to perform regular actions, and uses a data tracking system to follow its results and provides organizational leaders with measured data points. For example, supervisors could be required to look systematically at the Working Interface, make notes and enter them into a data system, and produce summarized monthly reports for senior leaders. Another system, described in Chapter 9, would have workers participate in keeping the Working Interface free from hazards. And the behavior observation and feedback system NASA adopted to improve the behavior of its leaders, described in Chapter 12, would be still another.

Mechanisms require that people get involved to operate them. This leads to the second element: serious employee engagement.

Serious Employee Engagement

The closest thing to magic in organizational change is getting the employees excited about what is going on. And the most effective way to do this is to involve them, to give them actual responsibilities in making the mechanisms and processes work. It's a lesson organizations have to learn over and over, and they still tend to forget it. There is no substitute for employee engagement.

Most organizations learned this lesson in the '80s and '90s doing quality improvement. But as other changes became necessary — new leaders, new technology, new challenges — the lesson was lost to many. In our experience with NASA's culture change effort, this lesson was brought home. Each aspect of the intervention plan was effective, but what really caught the attention of both leaders and individual contributors, what told everyone in the organization that things were really changing, was the fact that employees got involved. Ironically, this involvement could well have been lost because it required so much time from employees — time no one had. But, like physical exercise, doing more ends up being less. As the body gets in shape, new energy emerges.

Throughout this book, we will maintain this central orientation: organizational change requires that the concepts and theories developed to support the change be put into specific ongoing mechanisms and processes. Employee engagement is both a way to keep processes active as well as being a process itself.

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