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OUR SERVICES

Cherrystone consults in the area of safety culture for nuclear power plants and other industrial installations. We cover topics and assignments such as:

- What is culture and why does it matter?
- Creating a clear, structured description of the desired culture
- The role of the leader
- Mini and extended assessments
- Implementing programs that work
- Delivering seminars and training
- Assisting with action plans for improvement

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SAFETY CULTURE

Introduction

Safety is known by the ABSENCE of events, which makes it a difficult challenge to achieve. We know that essentially all major safety events have their roots deep into the past practices of the organizations involved and grow out of long causal chains involving the way that people work. In most cases the pre-cursors of events were there to see, but the organizations were not able to recognize them.

Safety requires people to adopt a set of habits and ways of thinking that are often difficult and unnatural (e.g. reporting one's own mistakes, stopping a job in the middle, etc.). As such, building a strong safety culture is a specific challenge of leadership. Safety never sleeps and organizations cannot achieve exceptional performance without a deep-rooted set of beliefs, practices and behaviours that guide people's decisions and action at all times.

We believe that the culture of an organization embraces everything it does. It includes the policies, procedures and standards. It includes the housekeeping and the procedures and tools. A strong culture is one that is widely shared

and based on a common and well-understood identity. A weak culture is diverse and differs from area to area in the organization. But a strong culture is not necessarily an effective culture (i.e. it may not achieve the required results) and it will also be resistant to change.

Definitions of Safety Culture

The IAEA first introduced the phrase "Safety Culture" in the INSAG-4 document, and defined it as follows:

"Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance."

The ACSNI Human Factors Study Group in the UK reported in 1993 that:

"The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of an organization's health and safety management."

The Institute of Nuclear Power Operations (INPO) in the USA defines safety culture as:

"A set of shared attitudes, values and beliefs that characterize an organization's respect for the reactor core as demonstrated through an integrated pattern of observable behaviours".

(Both the ACSNI and INPO definitions explicitly built on the IAEA definition as they tried to incorporate the thinking of the intervening years.)

All of the definitions capture the understanding that the intangible or non-observable aspects of the organization such as attitudes and beliefs exert a significant influence on the observable aspects such as behaviours and ultimately, safety proficiency. The investigations into virtually all major accidents in the past 20 years or so have revealed this to be correct. In particular, events show that organizations develop powerful patterns of behaviour that perpetuate unless challenged, and that mindsets about key issues such as vulnerability to hazards propagate invisibly and exert a compelling influence over what people do in specific situations. The evidence is strong that the mindset or beliefs of senior managers, coupled with their ability to communicate these in words and actions are the dominant features that drive improvement in a safety culture.

OUR TYPICAL PRODUCTS

We work with clients to create a structured description of the desired safety culture, which focuses on specific outcomes. The frameworks we produce are normally structured around four areas:

- Outcomes: What is the culture required to produce or to ensure? (E.g. what specifically is meant by "safety")
- Guiding Principles: The underlying beliefs and assumptions that the organization wants everyone to hold
- Structure: The visible structures such as processes & procedures, housekeeping, event-free tools, communications, etc. that are critical to achieving the outcomes
- Behaviours: Brief descriptions of the desired behaviours. We break these into leadership behaviours and individual behaviours, and we work with the organization to capture them in both positive and adverse terms, which helps people to see exactly what is required.

Our models are based directly on current industry documents and best practices

Why produce your own safety culture framework when there are other documents available?

- OWNERSHIP: Leaders create or shape cultures. Therefore the leadership should own the description of the culture that it wants, and should make it uniquely theirs.
- GROWING THE CULTURE: Most safety culture guidelines have been created to facilitate assessment, but

assessment is not the same as building the culture. As a parallel, the framework for judging the exhibits in a flower show is not the same as the framework the gardener uses to grow them. Our work aims at helping the gardener.

- **OUTCOMES:** The existing safety culture guidelines do not generally state the essential outcomes of the culture, but focus on attributes. Many desirable attributes can be found to exist in an organization and yet the safety risk can still be high.

The safety culture framework forms the basis for leadership development, training, self-assessment, root-cause analysis and oversight. It also allows external assessments to be readily interpreted into "the way we do business" and it is valuable as the basis for communicating with people about safety. It is designed to be a living document that can be easily updated with experience.

NUCLEAR SAFETY

Nuclear Safety Context

There are some basic facts about nuclear power plants that underpin the management of nuclear safety. Most of these facts apply with only technical differences to all major industrial operations involving high hazards.

- Release of radio-isotopes can cause immediate and delayed fatalities and widespread environmental damage, and the potential costs of an accident are extremely high
- The reactor core must be controlled, cooled and contained at all times. It is never passive, even when "shutdown".
- Reactor control, fuel cooling and radioactivity containment are provided by the plant equipment. Therefore, plant configuration must be controlled and plant material condition must be good.
- Plant configuration and plant material condition are determined by three inter-related elements: people, plant and processes. Together (and only together) these provide the safety barriers.
- The barriers are always subject to "erosion" - a loss of effectiveness - either through human error, equipment degradation or inadequate processes.
- The severity of the hazards and the complexity of maintaining the barriers means that there have to be multiple barriers in place for each hazard, or "defence in depth".
- All of the safety barriers are designed, constructed, strengthened, broken or eroded by the action or inaction of people. The people side of the business is absolutely critical for safe operation and cannot be separated from the technical side.
- The concept of safety culture has been developed to embrace this vital integration of the people, the processes and the technical sides of the business.
- Safety is never static. As soon as safety is not being improved it will degrade. This is true for the plant condition and also for human performance. Consequently there has to be relentless continuous improvement.
- The safety challenge demands high levels of bureaucratic "structure" in processes and procedures. This need for rigour and control can drive out thought and innovation. The counterbalance to this tendency is to build an organization that learns and pursues positive change.

Fundamental Principles

These facts lead to a set of eight fundamental principles for safety excellence. These are embedded into the structure and concepts of our work.

Effective Leadership

The words and actions of the leaders create the identity and purpose of the organization. The leaders are responsible to portray excellence, to provide clear direction and to create an environment in which people can contribute their best and generate the required results. The leaders have to convince people of their vulnerability to the hazards.

Business & Safety Integration

Safety emerges from the entire system of work that the organization performs. It cannot be separated out, but it does require special disciplines of thought and action at all levels.

Systematic & Institutionalized Approaches

Good safety management relies on defence in depth, through overlapping physical, administrative and human performance barriers. These all require the rigour that comes from institutionalizing good practices.

People's Attitudes and Behaviours

All of the safety barriers are designed, constructed and applied by people, and maintenance of the barriers requires disciplines and practices that are not easy or natural. People's attitudes and behaviours are fundamental to safety, and emerge from the entire organizational system.

Quality Equipment

The physical condition of the equipment and the operating configuration (or line-up) is vitally important to safety and must be established and maintained at or above the design standards.

Constant Improvement

Complacency and stagnation are the enemies of excellence. Good performance depends upon a culture of continuous improvement, organizational learning and individual development.

Open Communications

An environment of trust and openness is required to support positive attitudes and behaviours, to encourage people to identify latent weaknesses and to foster an improvement culture.

Public Responsibility

The long-term prospects of the organization depend on respecting the public's interests and expectations. This includes an overriding concern for public safety and health, open disclosure of information and meeting regulations.

NUCLEAR SAFETY LINKS

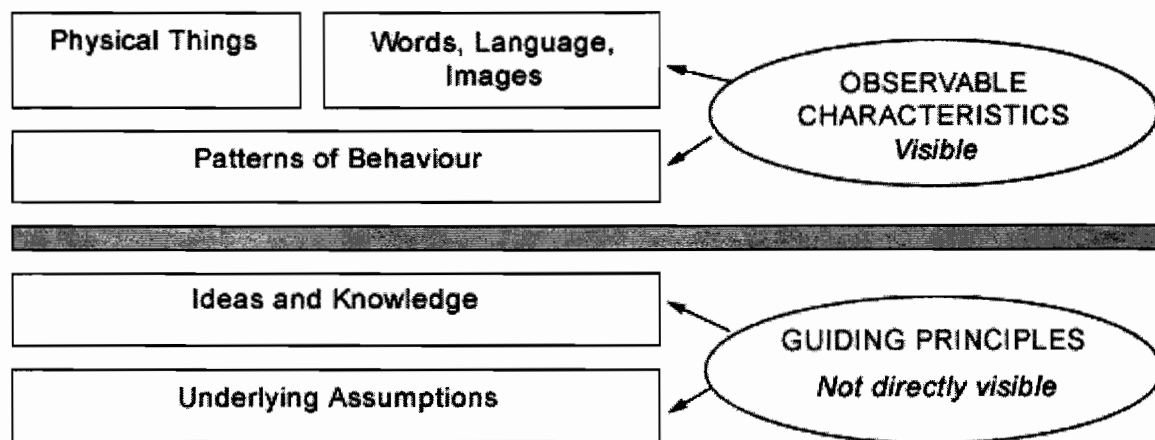
Canadian Nuclear Safety Commission: <http://www.nuclearsafety.gc.ca>

US Nuclear Regulatory Commission: <http://www.nrc.gov/>

International Atomic Energy Agency (IAEA): <http://www.iaea.org/worldatom/>

THE STRUCTURE OF CULTURE

Although "culture is everything" that goes on in an organization (communications, procedures, housekeeping, the way of running meetings etc.), for practical purposes it can be considered to exist in layers. Some of the layers are directly observable, and some are invisible and have to be deduced from the things that can be observed in the organization. A way of thinking about the layers of culture is shown below.



We use a CULTURE MAP to illustrate the layers of culture in a single page graphic. If you would like a copy of the Culture Map mailed to you please click [Contact Us](#) and request it: don't forget your address!)

Feedback on the Culture Map

"Culture is a very foggy term that has been made very clear"

"Superlative & thought-provoking"

Underlying Assumptions

Edgar Schien (whose work is used by the IAEA in safety culture documents and assistance projects) proposes that cultures are based on a set of underlying assumptions about reality. In the practical context, this means that an organization will display observable artefacts and behaviours that result from what it assumes about things such as vulnerability to an event, the nature of people (how are they motivated) and the importance of following rules. Unless the leaders are intrusive about spreading the appropriate assumptions in their organizations, people will simply form assumptions based on their own experience. This is normally bad for a safety culture. (For example, few people will have experienced a very severe event so the majority will hold unconscious assumptions about the probabilities and consequences of an event that are far removed from the assumptions required to drive a conservative and cautious approach.)

Ideas and Knowledge

The next layer of culture in organizations is the set of basic ideas and specialized knowledge that management and others have about what to do, why to do it and how to get it done in their organization. There is therefore a whole layer of organizational culture made up of the patterns of thinking and ideas about things such as how to direct people, how to run meetings and whether to measure things. All of these ideas ultimately manifest themselves in observable forms such as documents and behaviours. In general it is management that leads the way in these patterns of ideas. However, management must also make sure that other people understand and hold the "right" thinking patterns for their tasks. Examples are where specialized knowledge or insight is key to performance (e.g. skilled operators, designers). In these cases the organization must train and develop people to hold the appropriate ideas and insights for the situations that may be encountered.

Patterns of Behaviour

People in organizations develop patterns of behaviour that become deeply embedded and which are passed on to new staff very quickly. They range from the specialized (skills of the trade), through important traits such as complying with procedures or wearing (or not wearing) protective equipment, and into less defined areas like raising concerns and running meetings. These patterns of behaviour are the most obvious manifestation of the culture in the human dimension and ultimately are of critical importance to safety.

It is known that people will imitate others very strongly in order to "fit in" to a new culture, that patterns of behaviour are strongly triggered by specific situations, and that the patterns can be very hard to change. These facts mean that the task of leadership in guiding and shifting behaviours is a serious challenge and requires a long-term effort.

Physical Things

The culture also exists in physical aspects such as documents, tools and equipment, housekeeping standards etc. These can be of vital importance to performance. If the physical environment makes it hard for someone to do "the right thing" but easy to do the wrong thing then performance will almost certainly suffer. An example would be out-of-date procedures. In this type of situation people will tend to apply their assumption that what is really required is to "do it right", and they will not follow the procedures. Procedural non-compliance then becomes a pattern of behaviour, which on occasion will cause a serious event when a correct procedure is not followed. At this stage (if the event was sufficiently serious) management will typically say: "We have a cultural problem".

Words, Language and Images

Finally the culture exists in words, language and images. Indeed without a structured language of organizational concepts and concerns people cannot effectively form a cohesive culture. It is an important task of leaders to create and use the language of an organization. People become especially

attached to jargon, and the use of specific language will also trigger specific behaviours. Therefore it is sometimes necessary to change the jargon and the language, or to introduce new images in order to change the culture.

RULES OF CULTURE

There are some general rules of culture that can help to solidify the concepts.

1. In social cultures the layers generally tend to get more stable from the top down. However, in organizational cultures management has particularly strong control over the ideas and knowledge. This means that it is often easier to change the patterns of thinking in an organization than to change its patterns of behaviour (e.g. new managers can come in with new ideas, but fail to get people to change their old behaviours.)
2. Cultures are not good or bad in themselves, but are good or bad at achieving certain results such as safety or quality.
3. There is always a safety culture in an organization. The question is whether it is what management needs it to be, and whether it is improving or degrading.
4. Cultures are a product of social learning. Therefore they cannot be shifted without a learning orientation and without a lot of explanation and discussion as well as action.
5. Cultures have a natural tendency to degrade in the sense that the basic assumptions can get forgotten leaving the patterns of thought and action; these then degrade in turn through complacency, changes in personnel and other means. Therefore cultures always need renewal at the lower (invisible) layers, even to "stand still".
6. Leaders change culture by intervening at all levels: they hold new and different assumptions and patterns of thinking, they establish new patterns of behaviour and they can change the physical environment and the language and images. In particular, leaders constantly refresh the lower, invisible, layers of culture.
7. People do not generally know their own underlying assumptions, and people do not all hold the same underlying assumptions.
8. Cultures reduce anxiety for their members by establishing shared patterns of thinking, speaking and acting. Therefore changing the culture will always increase anxiety until the new patterns are learned. Leaders must make the anxiety of learning less than the anxiety of staying in the old culture.

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