AIDES A LA REFLEXION

Safety Culture

From Understanding to Action

"Safety Culture" working group

Publication coordinated by Denis Besnard, Ivan Boissières, François Daniellou and Jesús Villena

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THEME

Safety Culture

Les Cahiers de la sécurité industrielle

ICSI

Institut pour une culture de sécurité industrielle

Seveso, Bhopal, Enschede, AZF, Fukushima… we can all recall examples of accidents or incidents that had a major impact on the environment, devastated families, or jeopardised the economic activity of a particular area.

Given the technical complexity of the subject, the challenges associated with safety, and territorial development imperatives, all stakeholders need to play an active role in the risk management process.

Progress in industrial safety must come from all actors, which is why it is crucial for them to acquire and develop a true safety culture.

That is the mission of the **Institute for an Industrial Safety Culture (ICSI)**, a French non-profit organisation founded in 2003. ICSI is the fruit of a joint initiative between industrial companies, academics, researchers and regional/local authorities working together to:

- improve safety in companies by taking into account all aspects of industrial risk: technical, organisational and human,
- promote open and participatory debate between high-risk companies and civil society, through better risk management and safety improvement "education",
- encourage all members of society to become familiar with the problems surrounding risks and safety.

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This *Cahier de la Sécurité Industrielle* is based on the ICSI working group's work on safety culture and on discussions within the ICSI team. It provides an overview of the safety culture concept and the actions possible to improve it. ICSI also presents its own choices, based on the abundant scientific literature compiled by the working group.

The publication of this *Cahier de la Sécurité Industrielle* was coordinated by Denis Besnard, Ivan Boissières, François Daniellou and Jesús Villena.

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Preface

I am delighted at the opportunity to preface this report on industrial safety culture published by ICSI. It is the result of extensive analysis and draws in particular on the deliberations of a working group set up for this purpose, but also on many discussions held with the employees and partners of ICSI and FonCSI.

From the point of view of ICSI and FonCSI, this document fills a void. Until now, there had never been a comprehensive report expressing the view that these two institutions have of the concept which is a core part of both their purpose and their name. This rather unusual situation has now been rectified.

But from my own point of view, the merits of this *Cahier de la Sécurité Industrielle* extend well beyond this. To me, this *Cahier* is, above all, a comprehensive and accessible reference document for anyone working in the field of industrial safety. Its aim is not to shut down discussions on the concept of industrial safety. Rather, for each point discussed it endeavours to distinguish clearly between current thinking on the one hand and ICSI's choices on the other.

For practical purposes, the document is divided into two parts:

- Part One, "The Essentials", enables readers to familiarise themselves quickly with the key concepts and is also the subject of a standalone document in the new *The Essentials of Industrial Safety* collection[1],
- Part Two, "To learn more", explains the concepts in detail, presents arguments, and provides the scientific references that led to the choices summarised in Part One.

I am convinced that this *Cahier de la Sécurité Industrielle* will be a powerful tool for improving industrial safety culture and, as a result, industrial safety.

It is important for me to add here that the authors of this *Cahier* welcome your feedback on its use. This will be useful for future updates.

Lastly, I would like to thank François Daniellou, Scientific Director of ICSI and FonCSI, who successfully brought the long process of preparatory work to a close in order to publish this *Cahier*.

Paris, 27 November 2016

André-Claude Lacoste, President of ICSI and FonCSI

1. See *The essentials of Safety Culture*, september 2017

Acknowledgements

This *Cahier de la Sécurité Industrielle* is the result of the work conducted by the "Culture de sécurité" working group which was set up by ICSI's "Human and Organisational Factors of Industrial Safety" discussion group and gathered between 2014 and 2016.

ICSI would like to thank the following people, who contributed to the creation of this document by participating in the debates that took place within the working group, sharing their experiences, and getting involved in the writing phase.

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1. JRD stands for « jeune retraité dynamique » in French, or dynamic young retiree. A number of JRD volunteer at ICSI to share their experience and mentor trainees.

The scientific reviewers

Claude Gilbert, Hervé Laroche, Florence Osty, and Gilbert de Terssac contributed to this *Cahier* by reviewing the different versions and making suggestions.

FonCSI's strategic analysis scientific groups (GSAS)

When drafting this *Cahier de la Sécurité Industrielle*, the authors were able to make good use of the work which was being conducted concurrently by FonCSI's "Professionnalisation en sécurité" and "Culture et modèles de sécurité" strategic analysis scientific groups.

Internal contributions

This *Cahier de la Sécurité Industrielle* has benefitted from the comments and suggestions made by FonCSI and ICSI's internal teams, including the consultancy and expertise divisions for Europe and Latin America.

ICSI's boards and committees

The members of ICSI's Steering and Assessment Committee (SAC) enriched this *Cahier* through their remarks made during the meeting on 29 September 2016.

The ICSI coordinators

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Introduction

This *Cahier de la Sécurité Industrielle* is based on the ICSI working group's work on safety culture and on discussions within the ICSI team. It provides an overview of safety culture and the actions possible to improve it. ICSI also presents its own choices, based on the abundance of scientific literature compiled by the working group.

This document is aimed at anyone with an interest in industrial safety: executives, operational or HSE managers, heads of contractor companies, employee representatives, regulatory authorities, etc. It will also be of interest to academics and students.

It is relevant to a large number of sectors: industries with centralised sites or scattered networks, contractor companies, transport companies, local/regional authorities, the building and public works sector, the health sector, etc.

Research and debate on the topic of safety culture are constantly evolving. This *Cahier de la Sécurité Industrielle* will be updated over the coming years to reflect any significant changes.

This document is divided into two parts:

- Part One, "**The Essentials**", enables the reader to become rapidly familiar with the key concepts.
- Part Two, "**To learn more**", explains the concepts in detail, presents arguments, and provides the scientific references that led to the choices summarised in Part One.

The  symbol in the margin in Part One links to the relevant chapters in Part Two.

The list of abbreviations, which applies to both parts of the *Cahier*, explains the abbreviations and acronyms used.

Part One

The Essentials

Contents of Part One

1

What prompted the interest in safety culture?

The safety culture approach emerged when certain major events could no longer be explained by individual behaviours alone, and thus it became necessary to understand the part played by the organisation.

In 1986, two major accidents occurred: the explosion of space shuttle Challenger just after lift-off, and the nuclear accident in Chernobyl. In both cases, analysis revealed that these were **organisational (or systemic) accidents**: they could not be explained solely by inappropriate behaviours on the part of "sharp-end" workers (front-line staff); rather, they were the result of a gradual accumulation of failures within the organisation which had weakened all protective barriers, one after the other.

How the organisation can weaken protective barriers

Example

These examples are drawn from the analysis of major accidents:

- Different departments are made to compete with one another and information does not flow between departments, because it provides a competitive advantage.
- The organization's response to errors, or the lack of response to reported issues, blocks the upward flow of information (operational experience feedback).
- Warnings are brushed aside.
- Budget cuts affect HSE, positions that are critical to operations, or the maintenance or documentation policy.
- The industrial policy encourages contractors to keep silent.
- The labour policy and lack of job security (extensive use of temporary workers, for example) prevent workers from developing a deeper awareness of safety issues or feeling a sense of responsibility for safety.
- An overly bureaucratic safety management system reduces the time that operational managers can spend on risk analysis.
- Performance reviews focus on productivity and do not value safety-related actions.
- Top management focuses on occupational accident indicators and overlooks those relating to industrial safety.

In these two accidents, and in others that followed, the investigators revealed that **certain ways of doing and thinking which were widely shared within the organisation were incompatible with safe operations**. Due to the organisation's culture, the decisions made by the various actors did not grant sufficient importance to safety.

p. 45
What prompted interest in the safety culture concept?

Awareness of the "safety culture" concept gradually spread to the academic community, institutions, companies, and consulting firms, sometimes with a limited appreciation of the complexity of the underlying notions. Overly simplistic understandings of safety culture and of the possibilities that exist for changing it will not produce the desired outcomes. This document aims to clarify the key concepts and point out the main pitfalls.

ICSI's choices

The prevention of major accident hazards requires **a systemic approach** that encompasses the external context and internal integration, the history, the present and future, technical factors and organisational factors, the behaviours of all echelons of management and those of sharp-end workers, the ways of thinking (mindset) and the ways of doing (practices).

2

Safety culture: what is it?

The safety culture reflects the influence of the organisational culture on the ways of doing and ways of thinking that affect safety.

What is safety culture?

Definition

The safety culture is a set of practices (ways of doing) and a mindset (ways of thinking) that is widely shared by the members of an organisation when it comes to controlling the most significant risks associated with its activities. It is forged gradually by the interactions between people and it continues to evolve.

2.1 The safety culture is not something that is specific to each individual; rather, it is a characteristic of a group or of the entire organisation

An individual can, when performing their duties, have a general attitude that is more or less attentive to safety. But **the word culture** is used to refer to the practices and beliefs that are shared by a group of people.

Individual behaviour is influenced by different social groups: the team, the occupational group, the country, the ethnic group, the entity (work establishment or unit), the company. Every human group develops a culture.

Company culture or organisational culture?

Key point

Because we could be discussing the culture of an industrial group, a branch, an entity, etc., in the remainder of this document we will use the term **organisational culture** rather than company culture. Depending on the context, our readers can replace it by "company culture", "business unit culture", and so on.

The organisational culture influences the actors' ways of doing and ways of thinking when performing their duties. The safety culture reflects the influence of the organisational culture on the ways of doing and ways of thinking that affect safety. A safety culture approach consists in identifying how the culture of the groups and the organisation (company, entity) influences work practices, and the importance granted to safety in all of their decisions.

p. 59
The safety culture

2.2 Ways of doing and ways of thinking (mindset)

p. 49
What is a culture?

To understand the safety culture, we first need to look more generally at the organisational culture of the entity in question.

The individuals that make up the organisation are diverse, and each, based on their history, has developed ways of doing and ways of thinking that are specific to them. Talking about **organisational culture** means acknowledging that, as is the case in all human groups, each organisation has a culture, i.e. practices (ways of doing) that are shared, repeated and convergent, based on **ways of thinking (knowledge, beliefs, common values)**. This organisational culture was forged gradually by the interactions between actors over time, and it continues to evolve, allowing the organisation to adapt to its external environment and ensuring the integration of its members.

p. 53
The company culture: an organisational culture

Diversity and integration

Key point

The organisation must create cohesiveness between people and groups that do not necessarily share the same backgrounds, duties, powers, interests. To do so, it must provide a narrative concerning the organisation's objectives and the way in which they are implemented in processes so that their significance and relevance become clear to each individual when undertaking their daily tasks. Integration is never complete, never fully achieved; and it is at the core of the daily interactions between actors.

There is a visible part to the organisational culture and an invisible part.

The visible part includes:

- an organisational structure (an organisational chart, formal rules, procedures, processes) that is reflected in the technical systems and artefacts,
- a range of shared behaviours, rituals,
- stated and espoused values.

The invisible part is composed of accumulated knowledge, beliefs, shared values that are active but not stated, implicit assumptions, which are not written down anywhere but which influence the ways of thinking (mindset) and the ways of doing. This part is the most difficult for an outside observer to perceive and it is also the most difficult to change.

FIG. 2.1 - *The organisation, the visible and the invisible*

Likewise, human activity has a visible part and an invisible part.

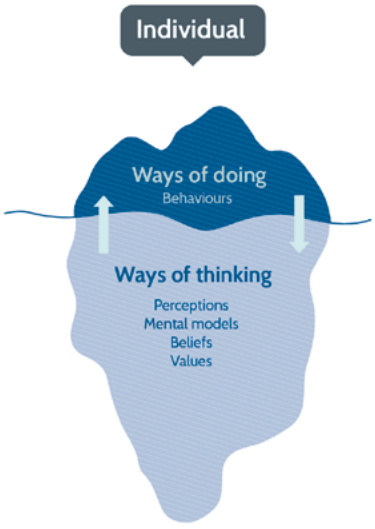

FIG. 2.2 - *Human activity, the visible and the invisible*

Definitions

Behaviour, belief, perceptions/mental models, value

Human activity includes an observable part (movements, posture, speech, etc.) and a non-observable part (the processing of information by the brain, the biological phenomena associated with emotions, beliefs, values, etc.). **Behaviour is the observable part of the activity.**

A **belief** is an idea that is held as true without there being objective proof to support the conviction. For example, "systematically punishing any rule breach is the only way to achieve a high level of compliance" is a belief.

Perceptions and **mental models** are mental constructs that partially reflect reality and guide actions. They are influenced by the information available within the working environment, by the person's own history, their duties, and the groups to which they belong.

A **value**, for an individual or an organisation, is what is considered essential and must guide action. There is a distinction between "explicit values", which are stated or espoused (but not necessarily embedded in practices), and "active values" or core values which effectively influence actions without necessarily being explicitly stated.

Each individual's ways of doing and thinking are therefore influenced by the ways of doing and thinking that are shared within the organisation, the groups to which they belong, and society.

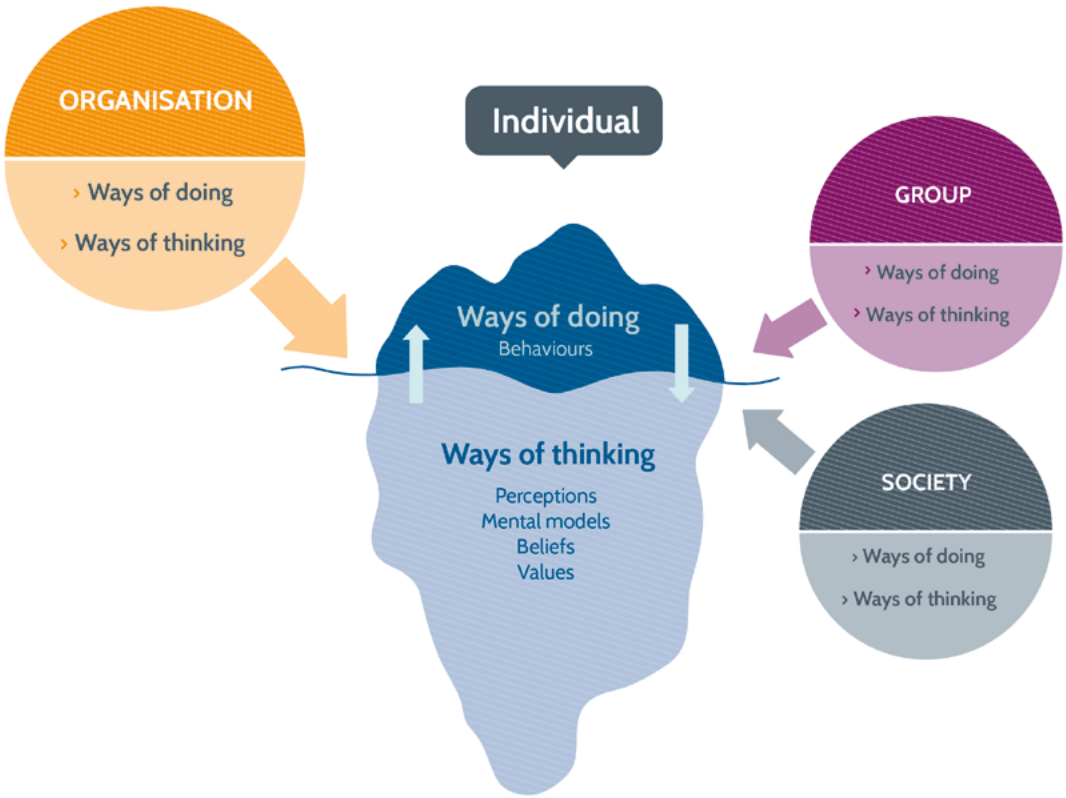

FIG. 2.3 - *The influence of organisational culture, groups and society*

It is important to note that the ways of doing and ways of thinking influence one another. For example, how managers react when a dangerous situation is reported to them will influence sharp-end workers' perceptions of the importance granted to safety, as well as their future behaviours when it comes to reporting.

2.3 Safety is just one of the priorities embedded in the organisational culture

Safety is not the only priority the organisation's actors have to manage. **Within a constrained environment**, they must produce products or services that fulfil customer requirements, using specific raw materials, within a given time frame, etc.

p. 55
Navigating between the hazards

Accidents are not the only danger that threatens the entity. It can also be jeopardised by customers taking their business elsewhere, shareholders pulling out, short-term profitability pressure, administrative sanctions, public opposition, technical problems, lengthy industrial action, constant staff turnover, etc.

Taking these different challenges on board and deciding on compromises and trade-offs are an essential part of the duties of top management, but also of the actors in the company's many departments, particularly production. At every level, compromises and trade-offs must constantly be made between cost, lead times, quality, safety, etc.

What importance does the organisational culture grant to safety in all of these compromises and trade-offs? How can safety be given more weight in these decisions?

These are the two questions raised by a safety culture approach.

It is clear that safety should not be placed in a "bubble" separate from the other priorities and challenges: the safest company would be one at a complete standstill. The question, then, is this: how does an organisation, which must produce goods or services within its own specific environment, encourage a satisfactory consideration of safety in all decisions, including those of the company's executives, its management, the business units, the operational staff, the contractors? How is the safety element incorporated into all processes and practices?

The challenges of a systemic approach to safety

Key point

Safety is not delegated to specialists (HSE, OH&S officers) but is ensured daily by the different echelons of management – from the highest level down –, the employees and contractor staff.

Safety is taken into account in all of the company's processes, including those that may seem the furthest from the "sharp end": for example, engineering, procurement (should they select the supplier most likely to keep quiet or the one that pays the most attention to safety?), human resources management (training of young recruits by experienced employees who are retiring?).

ICSI's choices

The safety culture implies shared ways of doing and ways of thinking:

- Long-lasting changes to safety behaviours cannot be made without shifting all actors' perception of safety and its importance.
- The ways of thinking (mindset) cannot be changed unless there is some evolution in the concrete signs given by the chain of command through their technical (quality of working environments) and organisational decisions, and in particular their managerial attitude (willingness to listen, recognition/blame).

The safety culture is forged by the interactions between actors, within an organisation which must simultaneously adapt to its environment and ensure the integration of its members. The categories of actors that most influence the safety culture are managers, employees[1] and their representatives, and occupational groups.

Every organisational entity has a "safety culture", in the sense that actors share certain ways of doing and thinking that have consequences for safety. The mere fact that a safety culture exists does not imply that it plays a sufficient role in risk prevention.

The safety culture reflects the importance the organisational culture grants to safety in all decisions, all departments, all occupations, and at all levels of management.

1. Opposing the terms "manager" and "employee" is an issue insofar as the majority of managers are employees. This linguistic difficulty – for which there is no truly adequate solution in English, since the terms "operators", "actors", "agents" raise other issues – also presents an advantage. Indeed, it enables us to emphasise that the challenges of the manager/subordinate relationship exist at all levels of the organisation: each manager has a right to expect the same level of communication from their own superiors as is expected from them with their subordinates. What is said about "employees" therefore applies to each manager too, in the context of their relationship with their superiors.

3

A starting point: is there a shared awareness of the risks?

The organisation's safety culture must prioritise the most significant risks.

If we consider that every culture is composed of shared understandings, do the actors within the entity (branch, site) at least agree on the main hazards and risks? A first essential feature of the safety culture is the **widely shared understanding, among the organisation's actors, of the accident risks** it is trying to prevent. Is the priority to avoid minor accidents, serious or fatal occupational accidents, and/or major accidents that could lead to a large number of victims and affect the company's facilities or even its external environment?

3.1 Different types of accidents

These different events have different degrees of probability and severity:

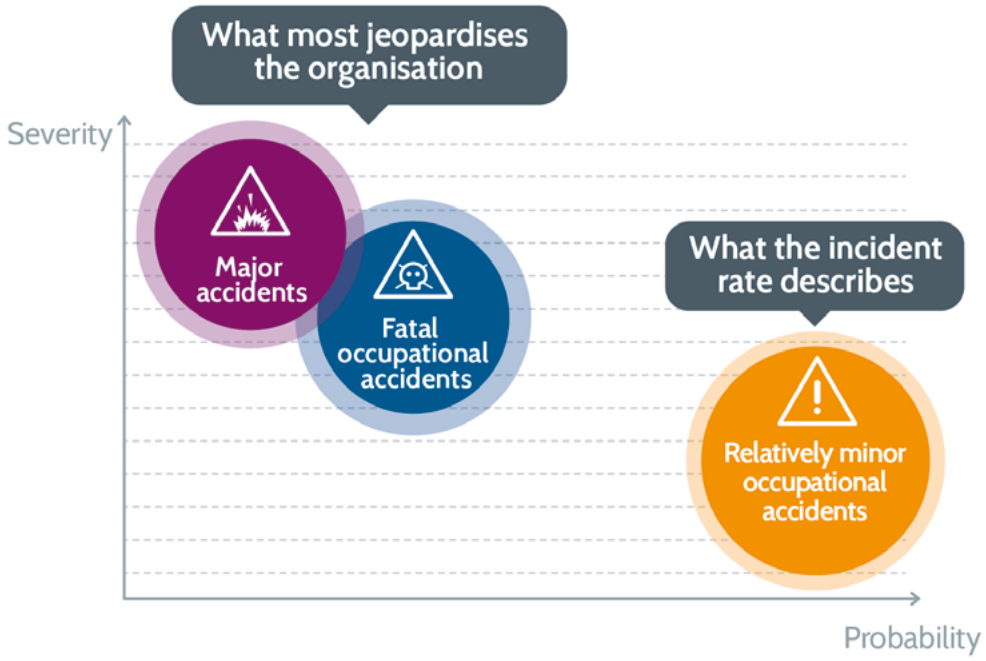

FIG. 3.1 - *Serious accidents and minor accidents*

In many companies, safety is managed based on the incident rate (indicators such as TRIR[1]). This rate reflects accidents that have already occurred, and hence mainly minor accidents. By construction, it does not reflect the probability of a serious or major accident that has not yet occurred – and yet those are the ones that most jeopardise the organisation.

1. Internationally, the most widely used indicator is the TRIR (Total Recordable Injury Rate), which takes into account all reported accidents. It is calculated based on a rate of 200,000 labour hours (UKHSE) or 1,000,000 labour hours (IOGP).

3.2 The pitfalls of the Heinrich/Bird pyramid

Writings on the topic of safety often refer to the Heinrich/Bird pyramid, which expresses a proportional relationship between the number of events with different degrees of severity.

Some interpret this statistical observation by stating that a proactive policy of reducing minor occupational accidents guarantees a high level of industrial safety. This interpretation assumes that minor accidents and serious accidents have the same root causes. Only a part of the base of the pyramid – what we call high potential incidents – maintains causal relationships with the more serious events at the top[2].

FIG. 3.2 - *The pitfalls of the Heinrich/Bird pyramid*

Analysis of several major industrial accidents that occurred in facilities with a low incident rate revealed that **focusing attention only on lowering the incident rate can lead an organisation to neglect preparation for the most serious risks**. Many organisations have seen a sharp decline in their incident rate with no drop in their number of fatal accidents.

In practice, if the incident rate is low, obsessively focusing on its reduction can divert the organisation's attention away from the most serious risks. If the incident rate is high, the organisation must manage the prevention of everyday occupational risks and that of rare and serious accidents simultaneously and in a coordinated manner.

It is important to note that preventive actions are not entirely the same for the different risk categories (minor accidents, serious or major accidents): organisational failures generally play a much greater role in serious accidents than in minor accidents (figure 3.3)[3]. Indeed, the occurrence of a serious event usually implies the systemic failure of a large number of barriers.

2. Note that when it comes to psychosocial risks, seemingly minor events (tearful outbursts, emotional collapse) – particularly if they are recurring – must be considered high-potential incidents for safety, as they are likely to be symptoms of an unhealthy organisation. See chapter 8, "The health of employees and the health of the organization" in Daniellou, F., Simard, M., Boissières, I. (2011). *The Human and Organizational Factors of Safety: State of the Art.* Issue 2011-01 of the *Cahiers de la Sécurité Industrielle.*
3. This illustration indicates a general trend and is not intended to reflect a precise numerical value.

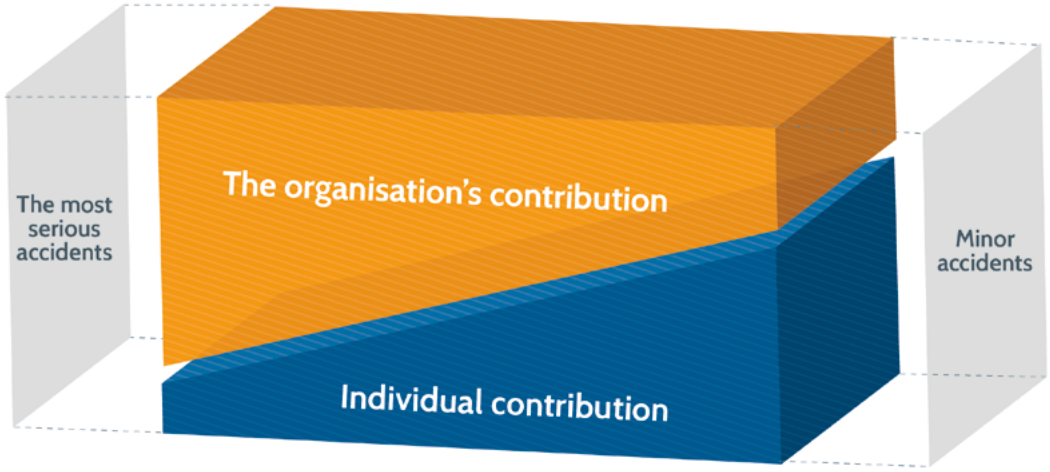

FIG. 3.3 - *The contribution of the organisation and of individuals to the different types of accidents*

The prevention of major accident hazards should therefore never be based on actions that only target individual behaviour: it requires commitment from the entire organisation.

The first questions to focus on when considering the safety culture of a company or entity are therefore:

- What are the risks that most threaten the organisation? The answer is obviously different for each specific situation (some entities are more at risk of falls from height, others of fire, explosions, electrical risk, violence against staff, etc.).
- Is this vision of the most serious risks and of the way to ensure safety widely shared by the organisation's members? Do forms of "collective blindness" exist concerning certain risk categories?
- Do the organisation's safety efforts target the most serious risks first?
- Has the organisation given itself the means to assess its level of preparedness with regard to the most serious risks?

ICSI's choice

A safety culture approach must target the most serious risks as a priority, i.e. those that jeopardise the survival of the organisation. This approach is more likely to be consensual, to rally all actors, and it can have a positive effect on the less serious risks – whereas the reverse is not true.

Shared awareness of the most significant risks is the foundation stone of a company's safety culture. The most significant risks can vary depending on the activity, the site, the occupation, but they must be known and shared by all members of the organisation.

Consideration of the most significant risks should include those that threaten employees, contractors, customers, local residents, the environment, the facilities, and the continuity of operations.

4

How do the "pillars of safety" influence safety culture?

To improve safety performance, coherent action is required in 3 areas: technical aspects, safety management, and human and organisational factors. These different "pillars" all influence the safety culture.

It should be emphasised that, in any given company, safety priorities have undergone several phases of chronological development, with each new area of concern being added to the previous in order to **improve safety performance**:

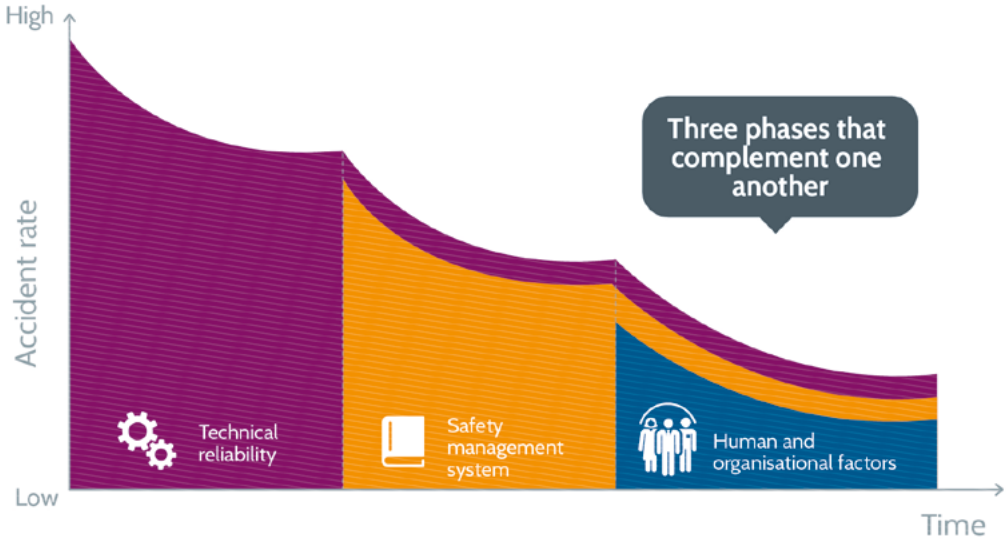

FIG. 4.1 - *Areas of concern for safety professionals over time*

- a phase focusing on actions in the **technical sphere** (facility design, equipment quality, redundancy, fault sensors, automated protection systems, etc.);
- followed by the development of **safety management systems** (SMS, formalisation of all processes, procedures and rules implemented to promote safety);
- and finally, more recently, recognition of the importance of **human and organisational factors** (HOF), or in other words the identification and integration of the factors necessary in order for a human activity to be conducted efficiently and safely[1]:
  - individuals (skills, state of health, etc.),
  - the work group (quality of the groups and discussions, sharing of information and knowledge, solidarity, etc.),
  - the working environment (the extent to which it is designed to take into account human characteristics and the tasks required),
  - the living organisation (particularly the role of managers, the involvement of employees in setting the rules, a participative approach to handling problematic situations…).

1. See Daniellou, F., Simard, M., Boissières, I. (2011). *The Human and Organizational Factors of Safety: State of the Art.* Issue 2011-01 of the *Cahiers de la Sécurité Industrielle.*

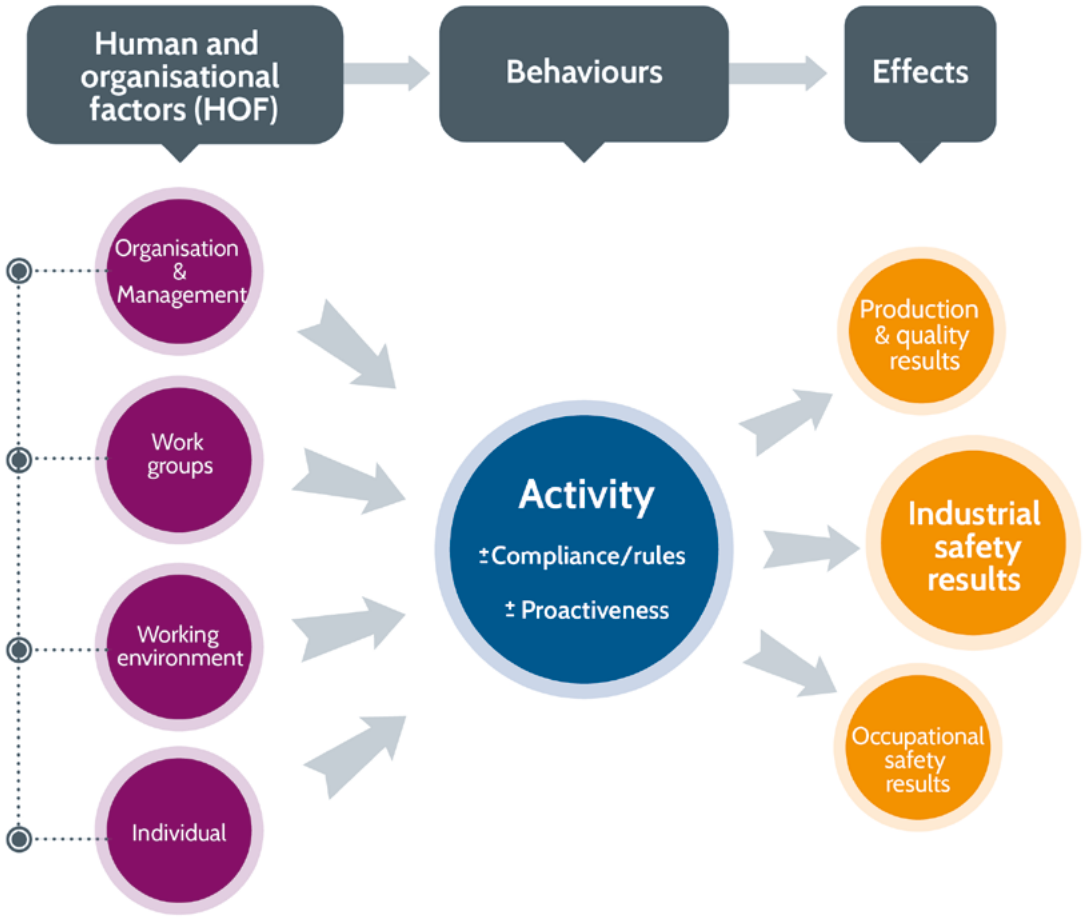

FIG. 4.2 - *The human and organisational factors of industrial safety*

In many companies, this area of concern of human and organisational factors remains the one with the most significant scope for progress.

These three "pillars of safety" – namely the technical aspects, the SMS and HOF – are, of course, not independent from one another: well designed and well maintained facilities, along with clear, applicable rules contribute to safe human activities.

Key point

Progress and setbacks in process safety

Following some significant technological accidents, regulations imposed new means of improving process safety from the very first stages of a project. Highly technical and thorough risk analyses are developed by company experts and external consultants.

Though this "office-based risk analysis" has led to major safety improvements, it can go hand in hand with a loss of knowledge of major accident hazards at the "sharp end", particularly among those who are newer to the organisation. As a result, preventive measures that create more work can be seen as pointless constraints. Production staff should be more involved in the risk analysis process. The results of the risk analyses and the safety cases must be widely available to the organisation's management and production teams.

In this three-pillar representation, some place "safety culture" in the "human and organisational factors" category, by focusing the approach on the behaviours of individuals. But an organisation's culture is also directly influenced by the technical aspects and by safety management.

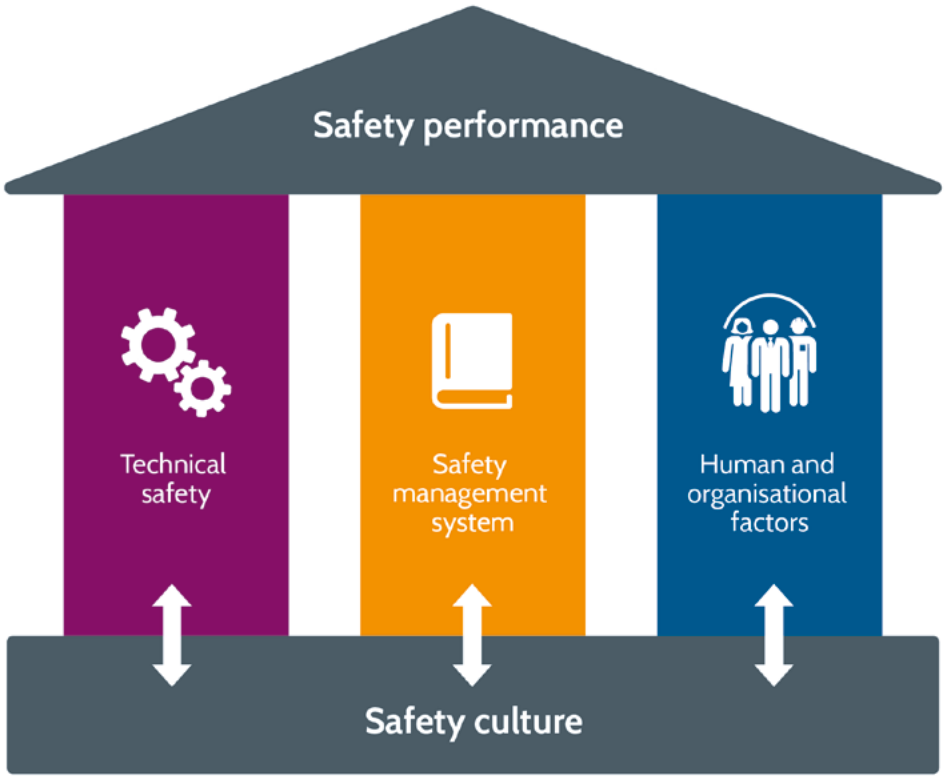

FIG. 4.3 - *Safety culture and the pillars of safety*

In fact, there is a **two-way relationship** between safety culture and these three "pillars of safety":

- The safety culture **results** from the organisation's practices in terms of technical safety and management systems: defective technical systems and rules and procedures that are difficult to apply will be perceived as signs that the organisation attaches little importance to safety and will contribute to the disengagement of all actors.
- The organisation's safety culture **influences** the decisions that are made in terms of technical design and rule formulation: for example, if the company has a participatory culture, operational staff are involved in the facility design process and in the drafting of procedures.

It is impossible to change the safety culture without modifying the signals which the organisation sends through the greater or lesser quality of what it offers in terms of technical design, safety management systems, and integration of human and organisational factors.

ICSI's choice

Work on safety should often include a greater integration of human and organisational factors.

Improving the safety culture requires an integrated approach to safety through coherent actions in 3 areas: technical aspects, safety management, and human and organisational factors. **The "safety culture" approach cannot make up for insufficient action in these three areas.**

5

Is there a “one-size-fits-all” model? What is the right balance between rule-based safety and managed safety?

When it comes to safety, every organisation must endeavour to be exemplary in managing its own specific constraints. There is no “one-size-fits-all” model.

An organisation’s culture supports a vision of the way safety is generated. This vision attaches more or less importance to each of these two essential elements:

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A “good” safety culture?

- the anticipation of situations by experts (production, HSE, etc.) and operational staff, leading to the establishment of rules to follow;
- the professionalism and involvement of the workers and teams present on the spot in real time.

The right balance between these two contributions to safety is different depending on the environment within which the company operates.

5.1 Preparing for the foreseeable and managing the unexpected

Every production operation undergoes prior assessment. Based on the supposed context and the result to achieve, the organisation will have established rules and procedures to follow and allocated technical resources.

But in reality, the situation is rarely exactly as anticipated. To achieve the desired output, the human activity must adapt to these variations: work-as-done deviates from work-as-imagined. If the sharp-end workers merely applied standard procedure in a different situation, the result would not be the one hoped for.

Safety is therefore underpinned by:

- The best possible anticipation of situations that could occur, and the implementation of safety barriers and work rules: rule-based safety. Its focus is on compliance with rules and procedures.
- The skill of the workers who are present on the spot in real time, identify the actual situation and react appropriately: managed safety. Its focus is on proactive and appropriate individual or collective initiative when faced with a situation.

These two elements are not mutually exclusive since, for example, managed safety can include the adoption of rules by employees. Moreover, the rules that constitute rule-based safety can also change based on the experience gathered in managed situations.

In the end, safety is ensured by an appropriate combination of these two elements in interaction with each other:

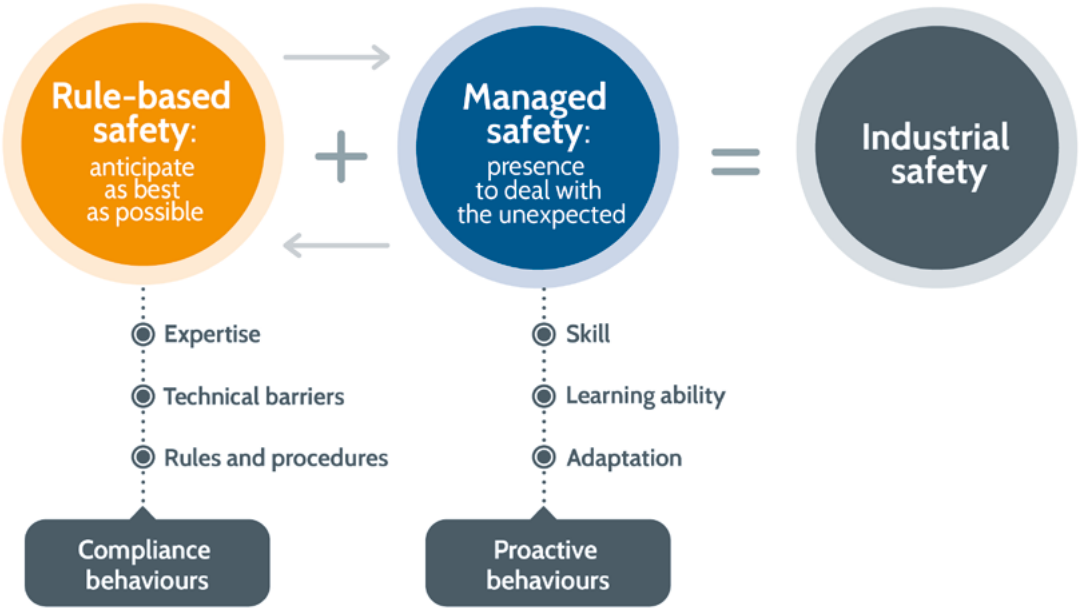

FIG. 5.1 - *Rule-based safety and managed safety*

Safety can be threatened on both fronts:

- insufficient anticipation of the situations that could occur, or non-observance of fundamental rules in clearly identified situations;
- an insufficient ability to adapt to unexpected situations – for example, strict adherence to rules in a situation where someone should have realised that they were not applicable.

The organisation must therefore invest in both aspects:

- for rule-based safety: identify critical tasks, implement technical safety (barriers, automated procedures), ensure that procedures are feasible and reality-based;
- for managed safety: develop the skills of front-line workers and managers, improve the way they function as a collective group.

It must also encourage coordination between the two, through better integration of operational experience feedback and field experience in working instructions. This is a crucial part of the role of front-line management. Certain organisational structures lead to an unbalanced approach, with rule-based safety being seen as the only aspect to develop. This approach often gives an illusion of control over safety. **In many high-risk companies, managed safety is not given enough attention in the safety culture.**

5.2 Different types of knowledge and expertise

Rule-based safety and managed safety are underpinned by different types of knowledge and different forms of expertise, generally present in different departments:

- the scientific knowledge of technical experts and safety specialists;
- the individual and collective experience-based knowledge of front-line workers and managers.

The organisational culture attaches more or less value to each of these sources of knowledge as contributions to safety. **Safety performance requires an acknowledgement of the fact that no single person holds all of the information and knowledge necessary to ensure safety**. It means acknowledging and debating several relevant points of view.

Similarly, to improve the safety culture, front-line management must be given recognition not only for implementing rule-based safety, but also for their capacity to strike the right balance between rule-based safety and managed safety, specialist knowledge and sharp-end knowledge.

5.3 There is no single, "one-size-fits-all" model

The right balance between rule-based safety (S_R) and managed safety (S_M) varies according to the industry. The following table presents a number of extreme configurations to emphasise the need for a specific positioning of the "cursor" based on the specifics of each activity.

Safety model	Predominance of rule-based safety	Predominance of managed safety	Necessary balance
Cursor positioning			
Examples of sectors	Nuclear facilities Air navigation Blood transfusion	Commercial fishing Extreme sports Disaster medicine	Petrochemical industry Energy transmission
Main characteristics	Accidents are infrequent but their consequences are major. Strong regulatory and international pressure. System is stopped if all the right conditions are not in place. Large number of technical barriers and procedures. Sizeable investments channelled into safety.	High accident rate. Exposure to risk is part of the job, within a changing and sometimes very unpredictable environment. Rules exist but are few in number. Extreme formalism would kill the business. Safety hinges on the expertise of leaders and their ability to take appropriate initiatives rapidly.	Risk taking is not sought, but significant variations in conditions must be managed without halting production. Considerable work goes into anticipation and barrier set-up. But teams (not just individuals) are required to take initiatives in terms of detection and correction. High degree of collective regulation of individual behaviours.

TAB. 5.1 - *Different safety models (according to R. Amalberti)*

In large organisations, rule-based safety and managed safety are usually handled by worlds that have no knowledge of one another. They can be the source of confrontations rather than an appropriate joint effort.

5.4 Choose the right model

Based on the high level of safety achieved by the first model, some might think that it is the one to adopt in all circumstances. But choosing the wrong model for an activity carries serious risks: immobilising fishing boats at port by imposing on them rules equivalent to those applicable in the nuclear industry is no more advisable than entrusting the control of a reactor to a wizard who would push the reactor to its limits in order to maximise its power.

The right model is the one which enables the organisation to fulfil its missions to the highest standard of safety that can be achieved within the limits of its own specific "world of constraints": it is possible to make considerable progress within a world, as long as its particularities are properly identified.

Giving priority to rule-based safety is only viable in a sector where there is little variation in the environment, and where the activity can be halted as soon as the right safety conditions are no longer in place. Even in this scenario, a certain degree of managed safety is necessary to enable appropriate reactions when unexpected situations occur.

Within a same company, several "worlds" coexist: for example, exploration drilling and oil refining, or the production activity and the maintenance activity. The respective investment in rule-based safety and managed safety must be adapted to each activity.

ICSI's choices

There is no "best" safety culture per se; rather, there are safety cultures that are more or less suited to the environment in which the organisation is embedded. Rather than importing models that were developed for other contexts, each entity must make strategic choices in order to strive to be exemplary in managing their own "world of constraints".

Increasing managed safety - as a complement to rule-based safety, which is always necessary - is an often under-exploited avenue for progress. While rule-based safety is often the result of a centralised and regulated approach, to consolidate managed safety the organisation will need to invest in the skills of its staff – particularly decision-making skills –, give front-line managers some free rein, and encourage debate between professionals as well as group discussions about operational experience feedback between departments and functions.

6

What sort of leadership is expected from management? What do sharp-end workers contribute?

For most companies that are advanced in the area of safety, the way forward lies in shifting to a culture that encourages better collaboration between management and sharp-end workers where safety-related matters are concerned.

The safety culture, which reflects the importance the organisational culture grants to safety, is forged gradually by the actors: the company's executives, the different echelons of management, the support departments (HSE, engineering, HR, procurement – particularly in terms of the industrial contracting policy, etc.) and the sharp-end workers, particularly the occupational groups.

6.1 Four broad safety culture categories

Four broad safety culture categories can be identified, based on the weight that management and employees assign to safety in their decision-making process:

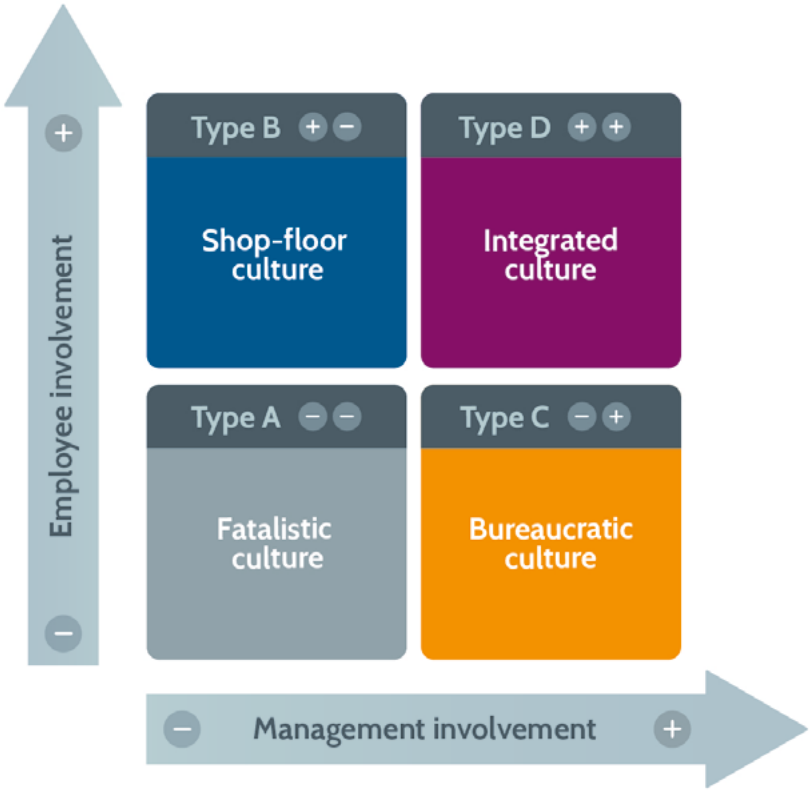

FIG. 6.1 - *The types of safety culture according to Marcel Simard*

- **In a fatalistic safety culture,** people are convinced that it isn't possible to influence the level of safety; accidents are perceived as "a stroke of bad luck" or as acts of god.

- **A shop-floor safety culture** occurs when management does not place much importance on safety, but sharp-end workers develop their own prudent work practices to protect themselves against the risks associated with their occupation. These practices are perfected and get passed down from one generation to the next (one example is miners taking canaries down into the mines).
- **A bureaucratic safety culture** develops when the company and its managers become responsible for the safety level. It introduces a formal safety system, takes safety into account in investments, and relies on the different echelons of management to pass down orders and ensure they are followed. Safety measures developed in this top-down fashion may conflict with standard work practices within some occupational groups. Sharp-end workers may be reticent about implementing the requirements of the formal system or may have trouble doing so.
- **An integrated safety culture** also aims to achieve a high level of safety, but results from the shared conviction within the organisation that no single person holds all of the knowledge necessary for ensuring good safety performance. The prevention of major accident hazards requires the combination of a wide range of skills; it requires information to be circulated and evaluated, and the concern for safety should be reflected in all decisions at all levels as well as in all company processes.

In any given company, a combination of several types of safety culture can usually be found, rather than just one.

6.2 Strengths and weaknesses of the bureaucratic safety culture

As a result of regulatory constraints and external audits, most high-risk companies have developed a safety culture that leans strongly towards the "bureaucratic", with a heavy investment in process and HSE experts, technical safety, procedures, etc. This type of culture has strengths and weaknesses that are generally well-known, but they must be confirmed or ruled out via an analysis in each particular situation.

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Strengths and weaknesses of the bureaucratic safety culture

The table below summarises these classic strengths and weaknesses, which are explained in detail in Part Two.

Strengths	Weaknesses
Acknowledgement of the company's responsibility where safety is concerned. Drive to constantly improve safety: numerous audits and action plans. Sizeable investments channelled towards safety. Defence in depth. High degree of formalisation (rules, SMS, etc.) and skills testing (accreditations). Presence of dedicated safety experts. Audits by independent bodies.	Rules and procedures are sometimes difficult or impossible to apply because they are written by experts who work far from the "sharp end". Excessive focus on rule-based safety to the detriment of managed safety. Loss of awareness of the major risks: focus on the incident rate, process safety is entrusted to experts… Illusion of control over risks (due to significant investments, numerous action plans, indicators that are improving). Risk that safety will be perceived as a function ("the HSE guy's job"). Deviation becomes the norm: there are too many rules, so they can't all be followed. Employee silence: important information is available at the sharp end but does not flow upwards. Unbalanced human and organisational factors approach: places most of the focus on the individual behaviours of the sharp-end workers and little on the organisation. Difficult to drill down to the organisational causes of accidents.

TAB. 6.1 - *Classic strengths and weaknesses of a "bureaucratic" safety culture*

6.3 Towards an integrated safety culture

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Organisational culture attributes that promote safety

An integrated safety culture encourages all stakeholders to contribute to the establishment of safety measures, their implementation, and their continuous improvement.

It requires a **commitment from the company's top management**, visible through announcements but also the decisions made and the managerial style (for example, forms of presence at the sharp end).

It requires **a mobilisation of all managers** on matters relating to safety. This is a two-way contribution: each manager educates their team on the importance of the company's safety policy and reports back to their superior(s) any difficulties encountered with implementation (such as conflicts with other instructions), the dangerous situations that remain, and any suggestions for improvement. He/she also contributes to improving interfaces between departments.

Management's safety leadership[1]

Key point

A frequent finding in many high-risk companies is insufficient safety leadership[2] on the part of management, on different levels. All aspects of safety leadership can be affected:

- creating the safety vision (so that employees understand the rationale behind the safety policies);
- encouraging employees to buy into the vision (so they get behind it and get involved);
- giving safety its rightful place in the decision-making process (for a technical and organisational environment that promotes safety);
- being credible (by "walking the talk" where safety is concerned);
- encouraging team spirit and cross-functional cooperation (to create a culture of shared vigilance);
- being present in the field (to align management requirements with reality at the sharp end);
- giving recognition for good practices and reacting fairly to rule violations (to create a just culture and a climate of trust).

These different aspects should be adapted appropriately at all levels of management.

The role of front-line managers is key: they must be given sufficient leeway to find the right balance between rule-based safety and managed safety, as they are closest to the sharp end of operations.

Employee involvement is valued (participation in facility design and in the establishment of procedures, operational experience feedback, incident reporting). Initiatives that promote safety are given due recognition.

Employee involvement in safety

Key point

Employees contribute to safety by demonstrating professionalism each day:

- adherence to applicable rules and reporting those that are not;
- a questioning attitude, shared vigilance, discussion of unusual situations with colleagues and superiors;
- proactiveness (pointing out dangerous situations, suggesting technical or organisational improvements to management and the occupational health and safety committee).

The professionalism of employees is continuously improved through:

- training that is adapted to the reality of operations and includes simulation of unusual situations;
- the discussion of problematic situations with other professionals.

1. See the "Leadership in safety" working group (2011). *Leadership in safety, industrial practice*. Issue 2013-06 of the *Cahiers de la Sécurité Industrielle*.
2. The term "management leadership" refers to the manager's personal involvement in safety, in their dual role representing managerial expectations of the team and communicating the reality at the sharp end to the upper echelons of management.

Employee involvement should also be encouraged when planning technical or organisational changes, undertaking risk analyses, establishing procedures, and drafting documentation.

A speak-up climate depends on the trust created by the organisation and on managerial practices. The above applies both to the client's employees and to contractors.

The organisation encourages opportunities (times and places) to discuss safety:

- ▷ Social dialogue, particularly within the occupational health and safety committee (CHSCT in France), is maintained;
- ▷ Management adopts a participative-directive style;
- ▷ Opportunities for professionals to discuss the handling of risky situations are encouraged.

These discussions are not only encouraged among the client's employees, but also **in dealings with contractor companies.**

The HSE specialists provide support to management, drawing on sound knowledge of reality at the sharp end and underlying process hazards. They ensure that any dangerous situations reported are analysed and corrective measures implemented, even if this requires attention and resources from higher levels of management.

Support functions (engineering, procurement, HR...) know what their role is when it comes to safety and they include safety in their objectives.

Discussions about safety are organised with external stakeholders (regulatory authorities, local residents, local/regional authorities).

ICSI's choices

The aim should be an integrated safety culture: for most companies that are advanced in the area of safety, the way forward lies in shifting from a bureaucratic safety culture to an **integrated safety culture** which takes into account both what experts and management anticipate as risky situations and what front-line staff have to say about the reality at the sharp end.

An integrated safety culture requires everyone (managers and sharp-end workers) to share the responsibility of ensuring the safety of the system when performing their work, and to interact with all other actors concerned with this goal in mind.

This approach requires strong **leadership from management, increased participation of employees** and their safety representatives, a redefinition of the role of HSE experts, and effective communication between departments and with contractor companies. Developing management's leadership and giving them more free rein is often the first step to creating the conditions for this shift (see chapter 8).

The following figure summarises this complementarity between management leadership and employee involvement. It is necessary the improve both the prevention of the most significant risks and the organisation's overall performance.

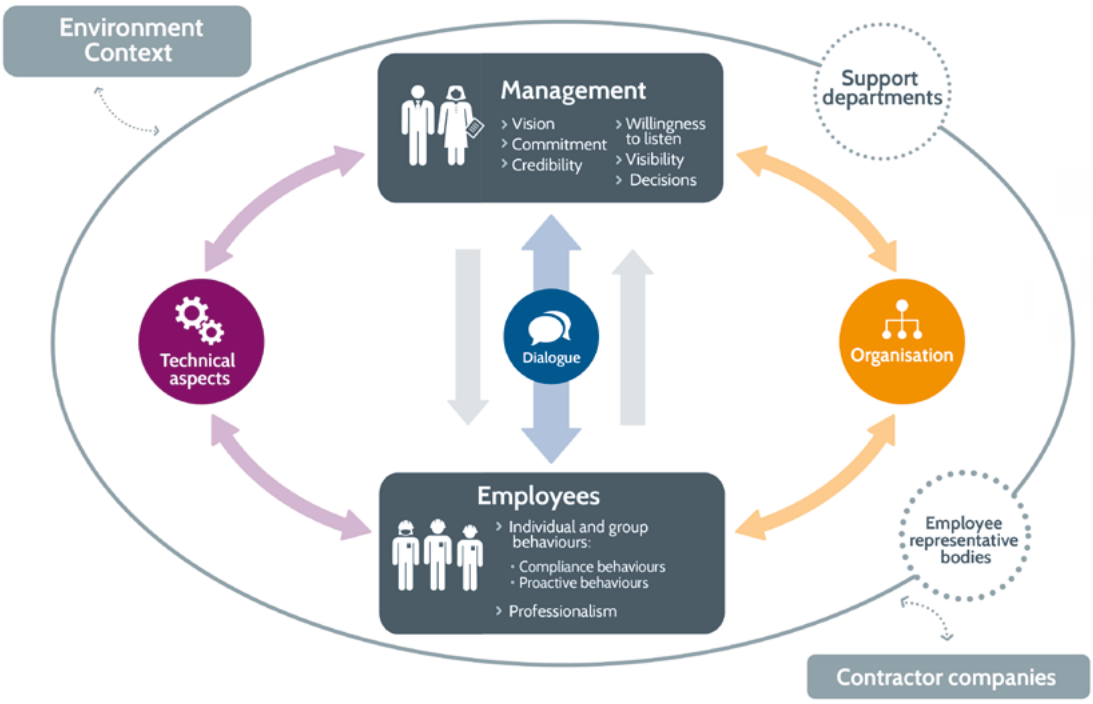

FIG. 6.2 - *The interactions necessary to achieve an integrated safety culture*

7

How do we assess our current safety culture?

A safety culture assessment aims to put up for discussion an overall picture of what the different categories of actors are thinking and doing when it comes to safety.

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Under-standing the current safety culture

The actors within a company may be required to examine its safety culture:

- following a serious accident or a series of accidents;
- when demographic changes occur (retirements, massive staffing changes);
- when a significant technological or organisational change takes place;
- due to pressure from regulatory authorities, etc.

A change in safety culture can only happen if **a large number of actors are mobilised**. A company's top management should only seek to better understand the safety culture if it is ready to:

- involve all concerned parties in the process (all echelons of management, employee representatives, operational teams, support departments, contractor companies, sometimes local residents or regional/local authorities, etc.);
- hear, share and discuss news even when it is bad;
- draw from the assessment the necessary consequences in terms of action.

7.1 What must be identified

Evaluating – or describing – a safety culture means **understanding how the organisational culture** (and its different elements) **positively or negatively influences safety-related decisions**. It is therefore a pro-active approach that aims to reinforce the factors that make positive contributions to safety, and collectively address those that are likely to jeopardise it.

To understand the complex range of causes and effects that a culture encompasses, the assessment seeks answers to the following questions:

- to what extent is the prevention of the most serious risks a priority shared by all (internal employees, contractors, sometimes even external actors)?
- what is the perceived level of consistency between the words and actions of the different echelons of management when it comes to safety?
- what are the variations between the ways in which the different actors perceive the current state of safety?
- to what extent does the technical design and that of the safety management system and procedures take into account the reality of activities and the constraints faced daily?
- in what ways do work practices already ensure a good level of safety? What is the human cost of this for workers?

- how does the organisation strike a balance between rule-based safety and managed safety? How does it encourage compliance and proactiveness? Is safety a recognised aspect of professionalism?
- how does management demonstrate leadership where safety is concerned? To what extent is management present at the "sharp end"?
- what is the quality of the processes for communicating operational experience feedback to the upper echelons, for dealing with the feedback, and of ensuing measures/actions? Are there any signs of "employee silence", due for example to the ill-considered use of punishment or the absence of recognition?
- how flexible is the organisation in adapting to unexpected events?
- to what extent does the industrial policy encourage the contributions of contractor companies to operational experience feedback and, more generally, to risk management?
- do certain aspects of the social environment (for example, local regulations, short-term employment contracts, etc.) have consequences on the entity's safety culture?

The results must be interpreted in relation to the particular "world" of constraints – other than safety – which the organisation must manage.

Figure 6.2, presented earlier, is an example of a model for analysing the interactions between these different elements.

7.2 How does one describe a safety culture?

The safety culture combines ways of doing and ways of thinking (values, implicit assumptions). Its least visible layers are those that most influence the behaviour of actors. It is illusory to imagine that a quick and simple *measurement* could identify these. The literature contains several cases where the "measurement" of an entity's safety culture via a questionnaire proved reassuring yet, when an accident occurred shortly afterwards, a detailed analysis of it revealed significant failures in the safety culture…

It is better to think in terms of "assessment", "diagnosis", "evaluation" or "description" rather than measurement. A safety culture assessment is **a process involving all actors**. It draws on several mutually complementary methods:

- an understanding of the entity's context, history, and of the constraints other than safety which the organisation must take into account;
- analysis of internal documents (for example, procedures, SMS, accident rate, etc.);
- an analysis of how each category of actors perceives the effects which the organisation and working conditions (environment, tools) have on everyone's contributions to safety (for example, based on a questionnaire and individual or group interviews);
- field immersion to observe work situations and the decisions and compromises that are made there each day.

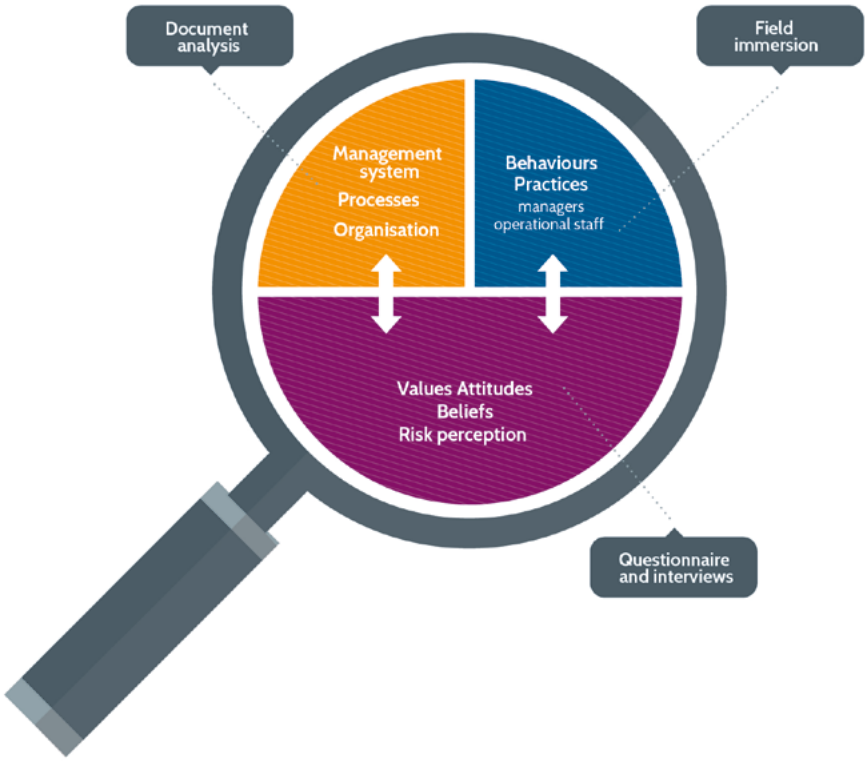

FIG. 7.1 - *The different elements of a safety culture assessment (ICSI)*

7.3 The results of the diagnosis: a starting point

The results of the assessment are not an objective measurement which everyone is expected to accept as true. It is an intermediate objective that must be communicated to the actors concerned, put up for discussion, fine-tuned and amended in order to arrive at a widely shared diagnosis which will serve as the starting point for a change process.

Too many companies conduct a safety culture assessment and fail to follow it up with actions that are appropriate given the findings. This is counter-productive: the employees will have developed expectations as a result of the assessment being carried out and may feel cheated if no follow-up action is taken.

ICSI's choices

A safety culture cannot be "bought" by applying an external frame of reference constructed in a different context. It is the mobilisation of all parties based on a **shared vision of the strengths and weaknesses of the current situation** that makes it possible to gradually change an organisation's safety culture.

An assessment of the current safety culture is a crucial starting point for any process for change. It looks at both the practices of the different categories of actors and at their perceptions of safety management. The more this assessment is shared by all stakeholders, the higher the chances of mobilising them later on.

The methods for describing the current safety culture must be adapted to each situation. Their relevance depends on their capacity to show all stakeholders a description of the organisation's strengths and weaknesses with regards to safety.

The assessment is not an objective in itself. It is best to avoid embarking on this type of undertaking if the organisation is not ready to collectively face and deal with the (often deep-rooted!) problems which the assessment reveals.

8

Can the safety culture be changed?

To improve the safety culture the focus should be on transforming the aspects of the organisation that led to the emergence of undesirable perceptions and behaviours with regards to safety, while encouraging the development of existing strengths.

The safety culture results from the interaction between numerous actors within the organisation. It is not a process that can be easily steered. Changing a safety culture is not like changing an organisation chart, a manufacturing process, or installing a new machine. **It is impossible to change the safety culture of an organisation without changing the "soil" from which it was born:** it is impossible, for example, to improve the reporting of dangerous situations by sharp-end workers without changing the sanctions policy that hinders reporting or if positive contributions to safety go unrecognised.

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Changing the safety culture

The continuous reinforcement of the importance given to safety in the organisational culture is a long-term process which requires a steadfast commitment from top management to mobilise all stakeholders for the long run.

8.1 From assessment to action: an accumulation of disparate actions is not the way to go!

The assessment of the existing safety culture highlighted some troubling points? The trend sometimes observed in certain companies is that top management implements a vast plan of incongruous corrective actions with the aim of correcting all diagnosed problems simultaneously. From a safety culture perspective, this method does not work. The culture is underpinned by values, behaviours, shared assumptions, so a list of disparate actions is not enough to change both practices and mindset.

If the current safety culture poses a problem and the organisation wants to give it a chance to evolve, a real plan for medium- and long-term change is needed. For this, a series of prerequisites need to be in place:

- the existence of resources, including time: significant changes to a company's safety culture take many years to appear (as an example, three or four years for a regional company, and much longer for a large company);
- a shared conviction that change is necessary if safety is to improve;
- the mobilisation of all relevant actors (senior executives, all echelons of management, employee representatives, support services, teams, contractor companies and so on);
- top management commitment. It is not possible to imagine a change in safety culture if top management's attitude is "there is nothing to change on our end; it's the operational staff and front-line managers who need to change" or "we know what is right for safety, they don't; so we will tell them and make them fall into line." It is the behaviour of senior executives and the different echelons of management that most influences that of the other actors;
- assistance from an external party that can provide positive criticism without being complaisant. The deployment of the process can involve hiring outside help and setting up a dedicated team internally.

8.2 Identifying the ambition

The aim must be a more integrated safety culture that is adapted to the company's own set of constraints.

Based on the shared vision of the current situation, mobilised actors will need to identify a **small number** of specific priority objectives, some examples of which are presented in figure 8.1 and the table below (for a detailed explanation of the figure, see Appendix A on p. 96).

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A "good" safety culture?

FIG. 8.1 - *The attributes of an integrated safety culture*

The strategy	Restore priority to the prevention of the most serious risks. Define what balance should eventually be achieved between rule-based safety and managed safety. Develop trust and foster a speak-up climate.
The actors	Improve knowledge of the reality of operations at all levels of management. Improve management's safety leadership, its presence at the sharp end, support the directive-participative style and give managers and supervisors more free rein. Develop all measures that encourage employee involvement: worker input in the design of technical equipment and facilities and in the establishment of rules; opportunities for debate between professionals; the occupational health and safety committee's contribution to industrial safety. Improve communication between departments and with contractor companies.
The processes	Introduce the concern for safety into all company processes (for example: technical and organisational design and modification processes, procurement, industrial policy, recruitment and onboarding…). Increase the attention given to technical and organisational safety barriers, in design and in daily operations. Encourage the development of trust and collaborations between entities. Develop safety-focused partnerships with contractor companies.

TAB. 8.1 - *Examples of targets for change*

These targets must be shared with all actors.

They establish the elements which the organisational culture should aim to include in the medium term. They will determine the coherence of the change programme, which will establish the steps needed in order to move forward.

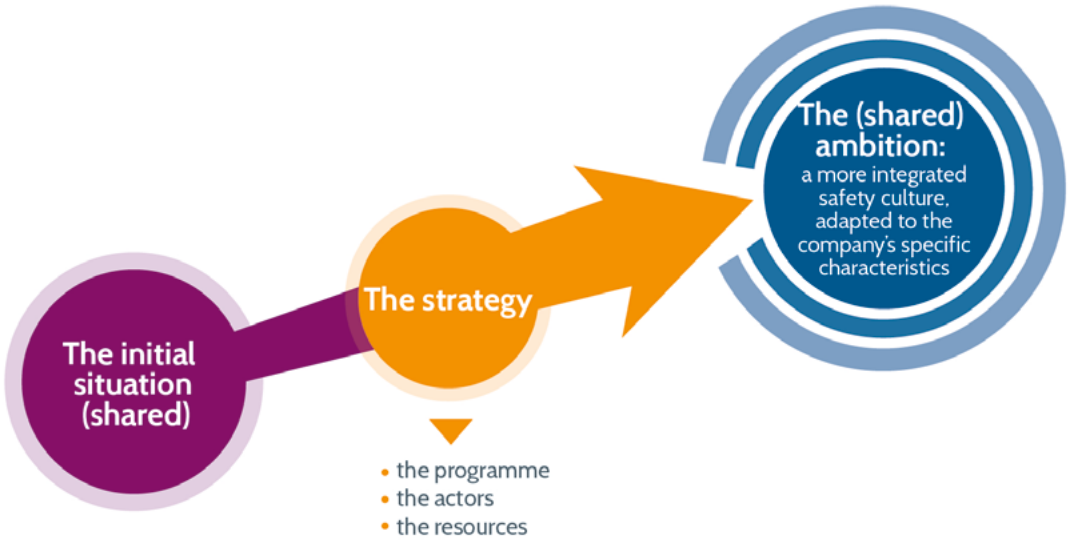

FIG. 8.2 - *Action on the determining factors of the safety culture*

8.3 Setting the course

To change the safety culture, **different actors need to be involved** in all phases. The elaboration of the change programme is a good opportunity to begin developing the more participative approach aimed for (involvement of different levels of management, employee representatives, contractor companies, adaptation of the programme to the reality faced by the entities, etc.).

To achieve the long-term objectives set, mobilised actors will construct a programme combining:

- quick wins on points that are easy enough to deal with, provide a quick benefit to various actors, and demonstrate that a process of positive change has begun (for example, the rapid improvement of very difficult working conditions);
- symbolic actions which are more difficult to implement but tackle a significant problem which had been pointed out a long time ago. These are the ones that have the greatest impact on staff;
- perception correction actions, which aim to correct misunderstandings or fight rumours;
- actions to reinforce the entity's strong points in order to maintain or develop the practices that already ensure a good level of safety;
- substantive actions, including the integration of human and organisational factors, that can be initiated rather quickly but require different stages and produce effects gradually.

The levers chosen will be those which, in the daily activities of all actors in the organisation, encourage decisions that grant a greater importance to safety.

Examples of possible levers are outlined in Appendix B of this *Cahier*. They should be selected and adjusted based on the reality and constraints of the entity in question.

8.4 Programme deployment

Action implementation must be planned, detailed at the operational level (for example, creation of new positions or new interfaces, procedure modifications, new tools, new premises), supported and adjusted, closely monitored, and evaluated.

Good communication about the programme is a must (the language used is adapted to the audience, transformations are regularly checked against objectives, contributing actors are given recognition, concrete effects are described through testimonials from the sharp end, difficulties are disclosed, next steps are outlined). "Victories" are celebrated. Any difficulties encountered are identified, analysed and dealt with. Periodic progress reports are prepared and discussed by the executive committee and the occupational health & safety committee.

One of the major challenges lies in ensuring consistency in the collective process over the long term, despite possible staff turnover. Indeed, the pull to revert back to previous practices is very strong.

ICSI's choices

A change in safety culture cannot be brought about by an accumulation of disparate actions implemented in a top-down fashion only. It requires a **real plan for change**.

Such a change requires a broad consensus on the initial state of the safety culture and a shared vision of the level of safety culture sought for the future, as well as a coherent programme that involves a large number of actors.

The change in culture is not limited to safety: it must be based on deep transformations of the different aspects of the organisation and of the management style that gave rise to some of the undesirable characteristics of the current culture.

Changing the safety culture takes time. Improving safety performance is an ongoing process which requires an iterative approach and unwavering commitment from all concerned.

9

What are the benefits of a safety culture approach?

Because it addresses fundamental aspects of the organisation, safety culture-related action has positive effects on the company's overall performance.

The safety culture approach is a lever for ensuring the long life of the company, whose survival can be jeopardised by the most serious accidents.

It can also have benefits that extend beyond improved risk management. It forces the discussion of phenomena that were kept quiet or hidden. **It is an opportunity to conduct a strategic assessment of the organisation's strengths and weaknesses**, and of its capacity to deal with a changing environment, while maintaining a good level of integration between its members. The safety culture approach involves an analysis of the way in which safety priorities interact with other strategic priorities.

A safety culture approach can encourage:

- greater congruence between the company's strategic decision-making and the reality at the sharp end;
- a more balanced positioning of middle management between what feeds downward from upper management and what feeds upward from the sharp end, and more leeway given to locally manage any variations in situations;
- improved integration of human and organisational factors (in design, during modifications and in daily activities), and thus an improvement in material and psychosocial working conditions;
- an increase in professionalism and in the feeling of "a job well done" at different levels of the organisation;
- an improvement in relations between the chain of command and employees;
- continuous improvement and innovation, through increased participation;
- a breakdown of barriers between departments and more effective communication;
- deeper partnerships with contractor companies;
- an improvement in labour relations and in the way employee representative bodies function;
- an improvement in relations with regulatory authorities, local residents and the media;
- better environmental results, and improvements in other areas of corporate social responsibility;
- an improvement of other aspects (product quality, brand image, adherence to lead times…).

Over time, it has an effect on the company's overall performance.

ICSI's choice

The safety culture approach proposes to improve safety performance by working on the **underpinnings of the way the organisation operates**.

From this perspective, **safety is a strategic lever for improving the company's overall performance**. Because it can be a consensual subject, prevention of the most significant risks is a good entry point for working on the organisation. Any progress made will yield results not just in the area of safety, but potentially in all other areas.

Part Two

To learn more

Part One of this *Cahier de la sécurité industrielle* presents the key concepts relating to safety culture, its description or assessment and its transformation, as well as ICSI's own choices.

This second part explains the concepts in further detail, provides arguments, and cites the scientific references that led to the choices summarised in Part One. It describes in more detail the properties of any culture, which help to understand what might go wrong if actions to change the safety culture are based on an overly simplistic vision of said culture.

Contents of Part Two

10

What prompted the interest in safety culture?

10.1 The emergence of the concept

Safety has been a prime concern for a very long time. The focus on "safety culture", however, is much more recent. The "safety climate" concept appeared in the scientific literature in 1980, in a study of 20 Israeli organisations[1]. But it was two major accidents in 1986 that highlighted the organisational origin of accidents and the concept of "safety culture".

10.1.1 The space shuttle Challenger accident

On 28 January 1986, the space shuttle Challenger exploded shortly after lift-off, killing the 7 astronauts on board. The immediate cause of the accident was an O-ring failure in one of the solid-rocket boosters. However, the investigation revealed that the supplier had tried to warn NASA that the overnight temperature conditions prior to the launch[2] could cause problems with the seals, but that these warnings went unheeded by the people in charge. When looking back over several years into NASA's reorganisations, it was discovered that these had introduced competition between research and development teams, poor information flow, and distrust of whistle-blowers. It was only once these deep-rooted characteristics of the organisation had been identified that the decisions made in the final hours before the launch could be understood.

10.1.2 The nuclear accident in Chernobyl

Analysis of the Chernobyl accident which occurred on 26 April 1986 by experts from the International Nuclear Safety Group (INSAG) revealed that the many violations committed by the power plant operators could not, for the most part, be explained by individual attitudes, but rather by a flawed system of values and practices within the entire organisation, on site and in the central departments. The report (INSAG-7, 1992) therefore blamed a "deficient safety culture[3]". INSAG defined the concept (INSAG-4, 1991) 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.*

For these two accidents, the origin was to be sought not only in the decisions made by the front-line staff in real time, but also in the much deeper characteristics of the organisation.

10.2 Other examples

The same conclusions were reached for other accidents. Among the many accident investigations where deficiencies in the safety culture were blamed[4], the following two in particular can be mentioned.

1. Zohar, 1980.
2. Rogers, 1986; Vaughan, 1997.
3. "Nuclear safety is the set of technical precautions and organisation measures relating to the design, construction, operation, shutdown and decommissioning of basic nuclear installations, as well as to the transport of radioactive substances, taken with a view to preventing accidents or mitigating their effects." This term is the equivalent to the term "industrial safety" used in other industries.
4. For example, the fire at the King's Cross underground station in London (1987), the sinking of the Herald of Free Enterprise ferry (1987), the Clapham Junction rail crash (1988), the Überlingen mid-air collision (2002), etc.

10.2.1 The aftermath of the AZF explosion

In 2002, in the *Débat national sur les risques industriels* (National Debate on Industrial Risks) report requested of him by the French Prime Minister, Philippe Essig wrote:

> *In France, we are lacking a true safety culture. [...] Developing a safety culture means admitting that we don't know everything, that errors are possible. [...] We should acknowledge our knowledge gaps. Developing a safety culture means admitting that everyone has a personal and collective responsibility: thus, it means rejecting the systematic suspicion of others and not succumbing to the easy option of finding a scapegoat, as most of the time this will lead to concealing the facts. [...] This attitude is, after all, futile. This does not mean that errors or failures will not be punished by law where appropriate. But I firmly believe that the key to success in our quest for safety lies in trusting others. Developing a safety culture means introducing doubt – something that is so dear to our British friends – in problem analysis. It means introducing the unforeseeable and the unknown, and consequently adding a "probabilistic" approach to the "deterministic" approach in all of our safety cases. Developing a safety culture also means having the courage to tackle the most critical situations."*

And further on:

> *We must develop a safety culture that meets the demands of our time. Not a culture of fear or indifference, but a culture of "responsible knowledge" that makes it possible to accept the real situations in which we live, and one that is "participative" in choosing the actions for the future."*

This report extended the safety culture concept beyond the boundaries of the organisation. It led to a variety of stakeholders working together to create ICSI and FonCSI.

10.2.2 The Texas City accident

On 23 March 2005, the explosion that occurred at a Texas City refinery during the restarting of a hydrocarbon isomerisation unit killed 15 people.

The Chemical Safety Board, which conducted the investigation, described the incident as an "organisational accident". It blamed the company's safety culture, the organisation of the HSE departments, budget cuts, insufficient investments and maintenance, widespread non-observance of certain rules, a lack of upward information flow, a focus on occupational accidents to the detriment of major accident prevention, the lack of safety leadership… The independent panel chaired by Senator Baker (2007) confirmed group-wide safety culture deficiencies.

10.3 The spreading of the safety culture concept

These analyses revealed that the origin of the accidents was to be found not only in the real-time behaviour of front-line staff, but also in **the ways of doing and ways of thinking (mindset) of all actors, as these were well ingrained in the organisation**. Several international organisations quickly latched on to the concept of safety culture, proposed definitions for it, and spread it far and wide. Below are a few examples of these institutional definitions. The definition suggested by ICSI will be presented in chapter 13.

Definition

Multiple safety culture definitions

Eurocontrol (Gordon et al., 2006) put forward the following definition: "*Safety culture is a sub-element of the overall organisational culture. It is an abstract concept which is underpinned by the amalgamation of individual and group perceptions, thought processes, feelings and behaviour which in turn gives rise to the particular way of doing things in the organisation. Safety culture factors in turn will characterise and influence the deployment and effectiveness of the safety management resources, policies, practices and procedures*" (Kennedy and Kirwan, 1995).

The HAS (Occelli, 2010) uses the definition put forward by the European Society for Quality in Health Care: "*Culture of safety: an integrated pattern of individual and organizational behavior, based upon shared beliefs and values, that continuously seeks to minimize patient harm which may result from the processes of care delivery.*"

Health Foundation (2011): "*Safety culture refers to the way patient safety is thought about, structured and implemented in an organisation*".

The Institute of Nuclear Power Operations (2012) writes: "*Nuclear safety culture is defined as the core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment.*"

The International Association of Oil and Gas Producers (OGP, 2013): "*A positive Safety Culture is a culture in which safety plays a very important role and is a core value for those who work for the organisation. This contrasts with organisations in which safety concerns are treated as marginal or an irritating diversion from the real business.*"

WANO (2013): "*Safety culture is defined as the core values and behaviours resulting from a collective commitment by leaders and individuals to emphasise safety over competing goals, to ensure protection of people and the environment.*"

This variety of definitions may seem surprising. In fact, since its appearance, the safety culture concept has been the subject of much scientific research and debate, of intense institutional activity, and is also an area in which consultants sell their expertise. The purpose of this *Cahier de la sécurité industrielle* is to present, in this vast landscape, the main elements that can guide the thinking and actions of the people concerned.

10.4 The risks of oversimplification

The spreading of the safety culture concept gave rise to oversimplifications which result in action that is neither effective nor sustainable. It is important to identify these in order to truly understand the extent and depth of what we are embarking on when we want to work on an organisation's safety culture.

First oversimplification: "*The safety culture is the general behaviour of workers, which is not safe enough and needs to change*"

The safety culture concept encompasses the shared ways of doing and thinking at all levels of an organisation. We will see that the signals sent by the organisation via managerial practices and technical and organisational decisions provide the main "soil" from which an entity's safety culture develops.

Second oversimplification: "*The safety culture is the importance which top management grants to safety in relation to productivity*"

The company's top management is a major contributor to the safety culture. But it is not the only one. The entire chain of command, the support departments, the workers and their representatives all play a role in the daily decisions and activities that produce safety.

Third oversimplification: "*A safety culture can be changed quickly; it's just a matter of deciding to do so*"

The shared ways of doing and thinking that make up the culture of an organisation are deeply rooted in its history. If certain traits of the safety culture are problematic, long-term action will be required to change the "soil" which gave rise to them.

Fourth oversimplification: "*The safety culture is a consensual issue*"

Even though all actors might wish to avoid serious accidents, action taken to change the safety culture is not consensual by nature:

- it challenges the power that stems from the possession of information and strategic tools;
- it requires efforts to be made, sometimes by some more than others, and invites a re-assessment of the way contributions are ordered, appraised and recognised;
- it can clash with the culture of certain groups and is may undermine their identities and their powers.

10.5 Culture of a group, culture of an organisation, safety culture

To avoid these oversimplifications, before proposing a definition and some courses of action with regard to safety culture, the next chapters will answer the following:

- What is a culture? (Chapter 11)
- What is an organisational culture? (Chapter 12)
- What is a safety culture? (Chapter 13)

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11

What is a culture?

This chapter presents the general characteristics of a culture. These need to be taken into account to understand the difficulties and the possibilities in changing a safety culture. It is based on an anthropological view of the concept of culture.

11.1 The culture of a human group

All lasting human groups develop their own culture. This encompasses the **shared experience of repeated and convergent *ways of doing* (practices), associated with *ways of thinking* (knowledge, beliefs, values and so on).**

11.1.1 Ways of doing

A group's culture is primarily reflected in their ways of doing, behaviours and practices: the ways of greeting one another, dressing, behaving, observing one another, eating, celebrating a sad or happy event, their common language, marked exuberance or discretion. To fit in to the group, a newcomer must learn these ways: this is the case for children, for whom it takes years; it is also the case for immigrants or new recruits.

Definitions

Activity, behaviour, practices, perceptions/mental models, belief, value

The **activity** is the way each person performs their tasks, using their body, skills, subjectivity and values.

Behaviour is the observable part of the activity: it is always accompanied by non-visible aspects (the search for information, decisions, movement planning, emotions and so on).

Practices are socially-transmitted ways of doing.

Perceptions and **mental models** are mental constructs that partially reflect reality and that guide actions. They are influenced by the information available within the environment, by the person's own history, their duties, and the groups to which they belong.

A **belief** is an idea that is held as true without there being objective proof to support the conviction. For example, "milk is an antidote for many poisons" is a belief.

A **value**, for an individual or an organisation, is what is considered essential and must guide action. There is a distinction between "explicit values", which are stated or espoused, and "active values" or core values which effectively influence actions without necessarily being explicitly stated.

These ways of doing involve different "objects" that also reflect the culture: clothing, tools, types of construction, works of art, institutions, ceremonies…

11.1.2 Ways of thinking

These shared practices are linked to less visible aspects of the culture: common thought patterns, specific knowledge, beliefs, values, and often founding "myths".

A culture influences the ways of thinking of its members on two levels, which interact with each other:

- an **explicit level**: values that are stated and espoused, formal rules, formalised philosophical or religious principles, stories about heroes or founders;

- **a much more implicit level**: all cultures are underpinned by "assumptions[1]" that are not written anywhere and are not discussed, but which have a profound influence on the ways of thinking and doing. These include shared knowledge, visions of the world, of human nature, of what is and is not acceptable in terms of behaviour, and also relationships with time and space. This aspect of culture is the most difficult for an outside observer to discern. It is also the most difficult to change.

The degree of coherence between the values and explicit rules and the implicit assumptions is more or less great depending on the history of a culture.

11.1.3 The interrelationship between ways of doing and ways of thinking

Within a group, the ways of thinking and ways of doing mutually influence each other. When it is possible within a group to act according to one's own ways of thinking, doing so reinforces them. If, however, individuals are prevented from acting in accordance with their own convictions, they find themselves in an extremely uncomfortable state of cognitive dissonance[2]. Either they can leave the group, or they will tend to change their ways of thinking so that they become compatible with the allowed actions. Pressure on practices has a very significant influence on beliefs.

11.1.4 Totems and taboos

Social groups often adopt **totems** or identity symbols (flag or national anthem, team jersey). Criticising or attacking a totem is tantamount to criticising or attacking the very identity of the group.

They also produce **taboos**, which are cultural proscriptions, practices that are forbidden in the group (for example, the banning of certain foods, or informing against a member of the group), and subjects that must not be brought up.

Attacking a totem or breaking a taboo is likely to prompt a strong reaction from the group and the exclusion or even the elimination of the "guilty" party.

11.1.5 Internal and external

A culture therefore has aspects that are external to individuals (rules, values, symbolic objects), and is written into the psychology of each individual, since it influences their ways of thinking and their ways of doing. But there is not much point in discussing a person's "culture" without discussing those of the groups to which they belong: above all, culture is shared.

The chicken and the egg

Key point

Culture is constructed by individuals and culture influences individuals. This is a classic paradox of sociology and anthropology: in the short term, the existing social structures influence the behaviour of their members. In the long term, it is the social activity of these members that changes the social structures.

11.2 Origins and functions of a culture

11.2.1 The origins of a culture

The culture of a group fulfils two functions: **adaptation** to the environment and **integration** between members.

It is therefore influenced by the characteristics of the environment in which the group must survive and develop: the geographical constraints, the sources of wealth, the production methods, the health risks, the

1. An *assumption* is something that is taken for granted without proof. Cultural assumptions are similar in nature to paradigms in science, which influence theories without us even being aware of their existence.
2. See the *Cahier de la sécurité industrielle* on Human and Organisational Factors, and more particularly Daniellou, F., Simard, M., Boissières, I. (2011) *The Human and Organizational Factors of Safety: State of the Art.* Issue 2011-01 of the *Cahiers de la sécurité industrielle*, section 5.6.

existence or absence of rival groups, etc. Over the course of its history, the group selected ways of doing and thinking that enabled it to survive and develop within this particular environment, and it incorporated them into its culture. Certain traumatic events (such as natural disasters or wars), and the strategies that enabled the group to survive them, may have a profound influence on its culture.

Similarly, the group has retained certain ways of doing and thinking that make member integration possible: rules regarding relationships (including sexual), clearly assigned roles and powers, ways of choosing leaders, ways of exercising authority and possibilities for debate, educational processes, initiation rites, positive recognition or negatives sanctions for behaviour…

A culture is thus the condensate of a long process of collective learning, trials and errors, shared positive or negative emotions, the result of the establishment of ways of doing and thinking that enable the group to function.

11.2.2 The reduction of uncertainty

Sharing ways of doing and thinking within a same group is a way of instilling meaning, ensuring stability, reducing uncertainty, and thus lessening member anxiety. Indeed, the existence of a culture makes a whole portion of the behaviours of others and the way the members of the group will interpret a particular action largely predictable. A traveller arriving in an unfamiliar country is constantly confronted with behaviours that surprise them and, in the same way, their own behaviours are difficult for the natives to understand. The brain then has to process a great deal of information that is usually "free". The shared culture frees up cognitive and subjective resources to manage more important things, whereas cultural shock monopolises a large portion of mental activity, at great cost.

Finally, culture is an aspect of the identity of groups which guarantees their long life and establishes their differences in relation to other groups. Challenging a culture always means challenging identities.

11.2.3 The evolution of a culture

Certain ethnic cultures have managed to remain the same for centuries due to their isolation and the stability of their environment. However, most cultures undergo evolutions due to various influences:

- changes in the external environment – climate, for example –, in natural resources or technology;
- contact with other cultures;
- internal modifications – population size, for example.

These factors compel the group to evolve in order to continue to survive and develop. But change is usually accompanied by crises, insofar as the most visible aspects can change faster than the beliefs and, more importantly, the implicit assumptions. The new culture that emerges will often include different "layers" from the earlier contexts coexisting more or less harmoniously.

11.3 One culture, several cultures

Some of the most famous anthropological studies focus on relatively isolated civilisations and show a great deal of homogeneity and coherence in the different cultural traits.

But in modern organisations there are numerous influence processes between the different human groups and thus between their cultures.

11.3.1 Different scales

Macrocultures

Macrocultures are those of large human groups such as ethnic groups or nations. The differences between national cultures, for example, have been the subject of many studies.

Macrocultures also include organisational cultures such as company cultures, which will be discussed in the next chapter.

Subcultures

Subcultures concern human groups that must manage similar situations in diverse locations, irrespective, for example, of their nationality of origin. Thus, it could be considered that all engineers or all commercial pilots or all stone cutters have certain common cultural traits even though, of course, there are differences in their situated practices.

Microcultures

Microcultures are those of small groups which, based on their history, have established specific ways of doing and thinking. The petty quarrels that arise between neighbouring villages are a good illustration of this.

At the crossroads of different influences

Key point

A particular individual's ways of doing and thinking are thus shaped by the influence of the macrocultures, subcultures and microcultures to which they belong. This leads them to having to find their own way at the intersection of influences that are potentially conflicting.

11.3.2 The intersection of cultures

A complex human group in a globalised world always develops at the intersection of different macrocultures, subcultures and microcultures. It would be illusory to think that it could develop its own culture independently without the influence of the different groups it intersects.

One of the significant traits of the culture of a complex group is thus its capacity to both allow the rather harmonious **cohabitation** of different, specific cultures, and to **engender** ways of doing and ways of thinking that are sufficiently shared to enable its own collective survival and its development.

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12

The company culture: an organisational culture

It is impossible to understand the safety culture of a company without looking more broadly at its culture. Indeed, large organisations, such as corporations, trade unions, public services, and non-governmental organisations, develop their own culture. We call this an **organisational culture**.

Organisational culture or company culture?

Key point

In what follows, we will talk about organisational culture rather than company culture, because even though some of the phenomena described must be observed from the perspective of the company as a whole, others will only be visible within a branch, a regional zone or a site. What is common and what is different between the various entities of a company is not immediately obvious and needs to be analysed. The reader should therefore replace organisational culture by group culture, branch culture, site culture and so on, depending on the context.

An organisational culture possesses most of the general characteristics of a culture presented in the previous chapter: it fosters ways of doing and ways of thinking, espouses certain values and is underpinned by implicit assumptions.

The way we do things around here

Example

The simplest definition of organisational culture was provided in 1996 by Marvin Bower: "the way we do things around here". Behind these shared ways of doing things, we can find common ways of thinking (mindset), but also a normative aspect: not just "how we do things", but also "how we are supposed to do things".

The organisational culture also possesses two specific characteristics, which are very different from an ethnic culture for instance:

- in most cases the members of the organisation have not grown up in it, they enter it at a given time in their life with a prior history: other different cultures have already had a profound influence on them;
- the organisational culture doesn't only undergo slow, "natural" evolutions: some actors explicitly try to force it to evolve rapidly, or even to "manage" it. In chapter 16 we will discuss the limits and the conditions for cultural change within an organisation.

Like all other cultures, an organisational culture must enable survival and development within an environment, as well as the internal integration of its members. In what follows, we will focus on the company culture.

12.1 Surviving and developing within an environment

The companies for which the concept of safety culture is relevant have **highly diverse organisational cultures.** Indeed, the external constraints which affect them have a strong influence on their cultures. There are many factors at play. Here are a few examples.

12.1.1 A more or less stable and predictable environment

Every environment includes some degree of variability, in the sense that it is never exactly as predicted. But depending on their industry, companies must deal with more or less significant and more or less predictable variations: the rail transport environment can hold some surprises, but the magnitude of the variations is smaller than in the maritime environment. The commercial environment is often less predictable than the physical environment.

Irrespective of their objective frequency and magnitude, these variations in the environment can be more or less accepted by the company culture: the unexpected can be seen as a deviation that should not exist, or as a normal part of the job.

The instability of the environment can also increase rapidly due to external changes, and this may spell trouble for an organisational culture that has structured itself around a rather stable environment.

12.1.2 Processes that are more or less difficult to control

In case of an anomaly, a machine operator can usually activate an emergency shutdown system. A fisherman cannot do this if suddenly caught in a storm. In the aviation industry, a decision can be made not to take off, but a plane cannot stop mid-flight.

Depending on the situation, a company's processes are more or less easy to halt or adapt. Just like a large oil tanker which needs several nautical miles to stop, it is very difficult to redirect certain investments or strategic choices once they are under way. In other industries, adjusting a few parameters will enable a swift change in direction.

The agility or inertia of the processes in place has a significant influence on the organisation's culture.

12.1.3 Clients that are more or less captive and malleable

Some companies – an increasingly small number – have a quasi-monopoly in the marketplace and their clients' choices pose little threat to them. Sometimes, however, these companies are judged, by public opinion and the government, on their capacity to deliver a quasi-public service.

Other companies are in a competitive and volatile business environment, or depend on a very small number of major clients with contracts extending over short or long periods.

The organisational culture will probably value different criteria for client relations in each case.

12.1.4 Employees who are more or less replaceable

The difficulty in retaining competent employees is a major issue in certain industries. In others, the company aim is to be able to quickly adjust headcounts according to variations in production.

The required technical skill, the state of the job market, the quality of existing educational processes, national laws, and employee relations will all influence the company culture.

12.1.5 Short- or long-term financial backers

Early shareholders in the first major capitalist companies invested in the company's development over the medium to long term.

In certain sectors, current shareholders – pension funds, for example – want a quick return on their investment or the sale of a company once a financial profit is guaranteed.

Uncertainty with regards to the decisions of shareholders can also influence the company culture.

12.1.6 A more or less restrictive political environment

The entity under consideration develops within a political and regulatory environment that is more or less restrictive in terms of employment contracts, insecure employment conditions (short-term or temporary work contracts), collective agreements, remunerations, employee representative bodies. Depending on the case, the company culture encourages the use of locally-accepted minima as a reference, or the group's higher standards.

12.1.7 Regulatory authorities that are more or less present

Depending on the sector, regulations are more or less precise and the monitoring of the quality of products and/or safety measures and/or damage to the environment by regulatory authorities is more or less stringent and more or less frequent.

The strict external justification requirements that prevail in certain industries have a profound impact on their organisational culture.

Similarly, we could describe the influence of the difficulty in obtaining quality raw materials or the necessary machines and services, of the role of production seasonality, of the profit margin achieved per product sold, of the time that has gone by since the company was founded, of the extent of globalisation, of successive mergers, of whether facilities are grouped or spread out, of the forms of damage that may be caused to the environment, of the potential magnitude of an industrial disaster, etc. All of these traits and many others will influence the organisational culture.

12.2 Navigating between the hazards

A company can only survive and develop by avoiding different hazards: customers taking their business elsewhere and turning massively towards the competition, shareholders pulling out, closure by the regulatory authorities or as a result of government decisions, rejection by public opinion, technical problems, a major industrial or public health accident, mass strikes, or constant staff turnover…

Consequently, there are multiple **actors whose judgment can jeopardise the company** and they each have a different level of importance depending on the situation: customers, shareholders, regulatory authorities, public opinion, employees and their representatives have different levels of influence depending on the industrial sector. The expectations and criteria of these actors are reflected internally by specialised departments: marketing, legal, quality, safety & environment, human resources, etc. The influence of a department within the company can often be measured by the importance granted to the judgment of the actors it represents.

The company's **management** consists in creating constantly updated compromises between the different priorities, represented notably by the qualified internal actors, and weighted according to the speed and magnitude of the threats they can represent. It is therefore constantly underpinned by **compromises and trade-offs in decisions**, some of which are made by top management, others by the other echelons of management, and others still by front-line workers as they perform their duties at the sharp end of operations. Focusing too exclusively on the priorities of the group of actors that is the most influential at any given time can prove deadly in the medium or long term, as the neglected priorities often manifest themselves more or less suddenly and in more or less conspicuous ways.

A certain vision of the risks

Key point

The company culture therefore reflects a certain vision of what is a source of risks (commercial, financial, social, technical), and a weighting of the risks as they are perceived.

12.3 Ensuring integration

Companies try to maintain an acceptable level of harmonious cohesion between actors who do not spontaneously share the same priorities or the same interests.

To do this, they implement a number of explicit processes, systems and schemes: processes for recruitment, training, promotions; task allocation; a clear definition of roles and authority; company rules; allocation of work space, tools and equipment; work procedures; information systems; negotiating bodies; processes for positive recognition or negative sanctions; company benefit schemes… all of these formal processes and systems make up the **organisational structure**.

But the organisation is not limited to the structure it produces. Indeed, it only holds together thanks to **the interactions** of the actors within it – their social activity –, which can strengthen the structure or create tension within it.

If, for example, there are rules that nobody ever follows, or if the agents systematically turn to someone other than their direct superior for help, there will be tensions between the living aspect of the organisation and the structure, and eventually these will result in crises.

In addition to a structure and interactions, all organisations also include a third dimension, and that is the one that is of most interest to us here: **the organisational culture**. The structure put in place and the social activity that takes place within it are indeed influenced by elements that are a lot less visible. The ways of doing and the **explicit assumptions** are combined with implicit assumptions relating to a vision of the world, of human beings, to what is considered desirable or intolerable, what can and can't work, the value of particular individuals and how others perceive them based on their position, the value of compliance and initiative respectively, the types of relationships that are encouraged between individuals, the importance of truth and the manner of seeking it out, how individuals handle authority, debates and conflicts, what is owed to clients or to society, the relationship with money, time and space… Most of these elements are not made explicit anywhere, but they shape the organisational structure and interactions.

Stated values and implicit values

Key point

The "values" of the company are often mentioned. These are present on two levels:

- in the form of explicit values that are clearly stated in the company's internal and external communication;
- in the form of implicit assumptions, which are not written down anywhere yet profoundly influence practices.

Depending on the organisation, there can be a high degree of coherence or a great deal of conflict between explicit values and implicit assumptions. For example, the company may proclaim "the right to make mistakes" while, due to its history, the assumption that "any breach should be punished" is still deeply ingrained in its culture.

12.4 The life of the organisational culture

12.4.1 The origins of the organisational culture

When a new company is being set up, the organisational culture is largely influenced by the macrocultures and subcultures of its founders and of the employees they hire: national culture; engineer culture, Royal Navy or finance culture; religious, political and philosophical culture… These influences are reflected in the chosen organisational structure or the stated values and in the shared implicit assumptions.

The culture is not deliberately established

Key point

The founders do not define an organisational culture as one would draw up the plans for a machine. At the very most, they can espouse explicit values. It is their ways of doing, their decisions, and the positive or negative judgements they make, particularly in the most critical situations, that, in interaction with the other actors, gradually forge the organisational culture.

The challenge of being confronted to the external environment and the requirements of internal integration, especially during growth phases, successes and crises, will prompt interactions between the actors and cause this original culture to evolve. In general, it will not disappear completely; traces will remain that run more or less deep and are more or less visible. All cultures have a "half-life"[1] and their influence only slowly decreases once the causes that gave rise to it have ceased to exist.

12.4.2 The evolutions of the organisational culture

Any changes in the external environment, the size of the company or its population will thus lead to evolutions in the culture so that the organisation can continue to survive and develop. These evolutions can happen slowly, more or less organically, or they can be sought by specific managerial actions.

But the organisational structure, the stated values, the social activity and the implicit assumptions do not evolve at the same pace: tensions often appear and these will be overcome more or less successfully.

Indeed, it is not enough to merely change the organisational structure in order for the social interactions to reinforce the new structure put in place. Furthermore, changing the organisational structure alone will have

1. Expression used by C. Owen.

a very limited influence on the implicit assumptions and on the values that these reveal, and this could lead to major crises. The difficulties that arise during company mergers are not only due to the complexity of the construction of the new organisational structure: sometimes two different views of the world are colliding and they will coexist for a long time before combining. The case of public utilities that are too suddenly made to compete in the marketplace demonstrates the risks to which both people and the organisation itself can be exposed when the organisational culture is underestimated.

12.5 The company culture: one culture, several cultures

Within any company there are numerous social groups: professional, national or regional, religious, generational, sports-focused, trade unions, associations… Each of these groups has its own culture, and each individual's practices are influenced by the cultures of the different groups to which they belong. Within a company, therefore, there is no single culture.

Key point

Commonly encountered subcultures

Three subcultures frequently have a significant influence:

- the engineer (or technocrat) subculture, characterised by the conviction that reality can take on the form that has been designed for it;
- the finance subculture (or executive or CEO subculture), for which any value created or spent can be reduced to a monetary equivalent;
- the operator (or line) subculture, for which, regardless of what was anticipated and decided by those "in high places", production always requires adaptations, and therefore skills, in real time.

These three subcultures combine in different ways within the company culture.

At the same time, the prolonged experience of belonging to the company is also a source of organisational culture which establishes common goals, and shared ways of doing and thinking. All actors in the company thus find themselves caught in both the company's overall culture and the culture of the specific groups to which they belong. Their practices are therefore influenced and judged by different sources.

Key point

National differences according to Hofstede

The most well-known research work on the differences between national cultures is that of Hofstede (1983). He studied the cultural differences of 50 countries. From field research conducted between 1967 and 1978, he extracted 4 fundamental dimensions:

- Individualism/collectivism: countries with a high degree of individualism attach greater importance to individual skills, whereas collectivist societies focus more on professional development.
- Power distance index: in countries with a high power distance, people may have trouble expressing disagreement with their superiors. This situation can prevent the adoption of a questioning attitude and push people to give in to group pressure at all times, even if teamwork could be facilitated.
- Uncertainty avoidance index: countries with collective cultures have a lower tolerance threshold for uncertainty and ambiguity. They tend to produce a large number of rules and procedures. Although these can be beneficial in routine situations, they can become restrictive in a changing context.
- Masculinity/femininity: this dimension determines how gender roles are divided within a society. In certain cultural stereotypes, men are supposed to be assertive and competitive while women are expected to be focused on caring for others. The extreme points of the social masculinity/femininity dimension indicate different needs in terms of management.

The relationships between the different cultures are not nesting or inclusion relationships, but rather intersection and harmonisation relationships. The organisational culture of the Tunisian subsidiary of a French industrial group is not a subset of Tunisian culture. It is influenced by the culture of the parent company, but must also deal with certain traits of local cultures. The description of a large entity's organisational culture should make it possible to identify how it manages the two major challenges: taking into account diversity and ensuring cohesion.

Certain company cultures are very open to the diversity of the cultures with which they interact and which the organisation has identified and takes into account by giving a great deal of leeway to local managers: the company culture then sees the acknowledgement of differences as necessary to achieve the common goal; nevertheless, the organisation will still impose certain common practices on the different groups present.

Other companies aim for strong cultural alignment at their different locations. They can succeed in greatly homogenising certain professional practices. However, the different groups present within the company may still retain certain traits of their own cultural practices, as long as they don't draw attention.

Lastly, in certain sectors such as civil aviation, there are international rules in place that standardise many practices in airports and air traffic control centres worldwide (Wisner refers to "anthropotechnological islands"), without cultural differences disappearing completely.

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13

The safety culture

The safety culture can be defined as a **set of ways of doing and thinking that are widely shared by the actors of an organisation in order to control the most significant risks associated with their activity**. It is therefore the *effects of the organisational culture on the approach to safety*: how does the organisational culture impose or support behaviours, ways of speaking to each other, rules and values that have effects on safety?

As explained in the history of the concept presented in chapter 10, the safety culture approach makes it possible to avoid attributing observed behaviours only to the properties and attitudes of the individuals concerned, as this line of reasoning rapidly reaches its limits when it comes to prevention. It aims to understand which elements of the organisational culture influence the behaviours of individuals in a way that is favourable or unfavourable to safety.

Accordingly, the safety culture deserves the same precautions as those just outlined for the company culture: it includes aspects that are easily observable – tangible systems and processes, rules, espoused values – and implicit assumptions.

All human groups have a safety culture

Key point

Remember the word of caution included in the introduction to this document: "safety culture" does not mean "organisational culture that makes it possible to achieve a high level of safety". The mere existence of a safety culture is not enough to mitigate risks. **Every social group has a safety culture**, in the sense that safety has a place in its culture (even if the approach is a fatalistic one with beliefs such as "accidents are due to *bad luck*").

In this chapter we will present certain broad traits that differentiate safety cultures. In the next chapter, we will discuss the attributes of an effective safety culture for a given sector.

13.1 The safety culture does not exist independently of the organisational culture

The organisation doesn't only have safety to manage: the safest company would be one at a complete standstill. In the previous chapter we described the decisions, trade-offs and compromises it must make between numerous priorities in order to survive and develop within its environment, and these are the foundations of the organisational culture.

The importance granted to safety in these decisions, compromises and trade-offs obviously depends on the weight it is given amid all the other competing priorities. Understanding this calibration is essential to understanding the safety culture.

The importance granted to safety by the organisation has different cultural manifestations: objects, rituals, rules, espoused values, but also the behaviours, views and practices of actors at all levels in the company. These different expressions can be convergent or divergent. The visible place of safety in managerial decisions and those of the support departments, the attitude of front-line management, the design and provision of safe equipment, the clarity of procedures, the wearing of PPE by everyone when the environment requires it, the shared vigilance within a work group, the type of relations forged with contractor companies, the reporting and handling of issues, and the attitude towards positive recognition and sanctions are all examples of elements that form the safety culture.

Key point

Do not separate safety from the other priorities

It is this range of ways of doing and ways of thinking about safety that we try to decipher when we look at an entity's safety culture. It is also what we seek to influence when trying to change the safety culture. But analysis and transformative action have no chance of bearing fruit if safety is isolated from the other constraints with which the organisation is grappling: the company can die from perils other than accidents, and the safety culture can only be reinforced if it is part of a move to improve overall performance.

13.2 What safety are we talking about?

One first essential trait of safety culture is **the organisation's understanding of the accident risks it is trying to guard against**: more or less minor occupational accidents, fatal occupational accidents, and major accidents likely to result in a large number of victims and affect the company's facilities or even its external environment.

If we define risk as the combination of estimated probability and potential severity, the way of thinking about risks differs depending on the types of accidents. Low-severity accidents do indeed occur, and thus their probability can be more or less deduced from their frequency.

As for the most serious accidents, these are obviously rare or have never occurred. Their probability cannot be deduced from an observed frequency; in general the probability is estimated using different techniques, but it is both extremely low and highly uncertain. All major industrial accidents have been the result of a combination of highly improbable factors. And yet, **the most serious and least probable accidents are those that pose the most serious threat to the survival of the organisation**.

To try to prevent them, the organisation must therefore put specific tools in place.

In many cases, we find that organisational thinking with regards to safety is dominated by the incident rate: this reflects incidents that have actually occurred, so it holds no significance for describing whether the organisation is well prepared when it comes to major accidents. An erroneous interpretation of the Heinrich and Bird pyramid leads to the assumption that a proportional relationship exists between minor accidents and serious accidents, but this would only be true if the causal mechanisms at work were the same in both cases. Reducing the base of the pyramid by focusing only on reducing minor accidents does not in any way guarantee a reduction at the top. Several studies show that some large organisations reduced their incident rate considerably without the number of fatal accidents dropping in parallel, particularly when contractor companies are included in the statistics (BST & Mercer, 2011; Health insurance statistics France).

A safety culture is thus underpinned by a **shared vision of the risks** that must be taken into account, and often too a shared blinkered approach to the risks considered so improbable that they are not worth taking into account in the decision-making process. Through the concept of **industrial safety culture**, this document focuses on the way the organisation and its actors try **to prevent the most serious risks** in their line of work.

13.3 Safety culture and safety climate

In the literature, the terms "safety culture" and "safety climate" tend to be used more or less interchangeably. In fact, the difference between safety culture and safety climate is the same as that between someone's personality and their mood. The culture (or personality) refers to deep structures that vary little or very slowly. It is difficult to gain a thorough knowledge of them. The safety climate (like a person's mood) varies more rapidly depending on the circumstances, while remaining profoundly influenced by the deepest layers of the culture.

The safety culture determines the extremes between which the safety climate is likely to vary. In certain cultures, a traumatic event (serious financial problems, a redundancy scheme) will significantly damage the safety climate. In others, despite tensions, strong collective vigilance will be maintained where safety is concerned.

The perceptions of the safety climate can be determined via a quantitative assessment (chapter 15). It is much more difficult to measure the deep-rooted characteristics of the culture.

13.4 The safety culture is forged by the actors

The safety culture is a reflection of the organisational culture; it is a social construct. The company's executives, the different echelons of management, and the operational staff shaped it gradually through the decisions they made and the actions they chose and witnessed in all situations where safety was at stake amid other factors. Safety can be given more or less importance at different hierarchical levels, and the ways of taking it into account can be more or less convergent.

According to the weight which the two main groups of actors (management and sharp-end workers) give to safety in their decisions, Marcel Simard distinguishes four typical safety culture categories:

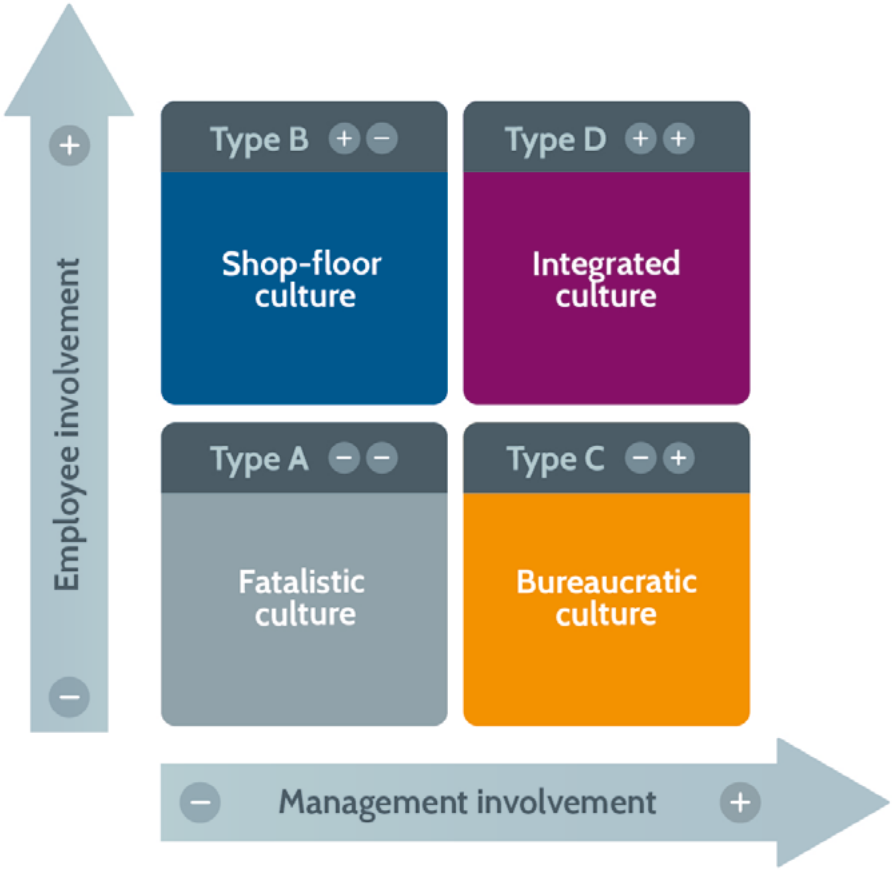

FIG. 13.1 - *Four types of safety culture according to Marcel Simard*

- **A fatalistic safety culture** reflects a culture where the actors are convinced that it isn't possible to influence the level of safety; accidents are perceived as "a stroke of bad luck" or the result of divine will.
- **A shop-floor safety culture** occurs when management does not place much importance on safety, but sharp-end workers develop their own prudent work practices to protect themselves against the risks associated with their occupation. These practices are perfected and get passed down from one generation to the next (one example is miners taking canaries down into the mines).
- **A bureaucratic safety culture** develops when the company and its managers become responsible for the safety level. It relies on process and HSE experts, takes safety into account in investments, introduces a formal safety system, and relies on the different echelons of management to pass down orders and ensure they are followed. The risk is that the safety measures developed in this top-down fashion may conflict with standard work practices within that occupation. Sharp-end workers may be reticent to implement the requirements of the formal system or may have trouble doing so.

- **An integrated safety culture** also aims to achieve a high level of safety, but results from the shared conviction within the organisation that no single person holds all of the knowledge necessary for ensuring good safety performance. The prevention of major accident hazards requires the combination of a wide range of skills; it requires information to be circulated and evaluated, and the concern for safety should be reflected in all decisions at all levels as well as in all company processes.

In reality, in any given company one would generally find a specific combination of all four of these rather than just one type.

Later on (p. 70), we will discuss other types of safety cultures as well as the known strengths and weaknesses of the different categories identified.

13.5 Regulated safety and managed safety, experts and the sharp end

The organisation puts a number of measures in place in order to predict the hazardous situations that are likely to occur and set up the barriers necessary to contain them: procedures, automated systems, protections, etc. This is called **rule-based safety**; it is based on anticipating what can be planned for.

No matter how good this anticipation is, situations regularly occur that had not been planned for in the details (work-as-done deviates from work-as-imagined). In this case, safety will depend on the skills of the people present on the spot and on the individual and collective actions they take: this is **managed safety**.

These two dimensions are not mutually exclusive: managed safety can include the adoption of formal rules, the decision to use them as is or to "adapt" them to situations perceived as exceptional; it also relies on "rules of custom" (solidarity, mutual assistance between colleagues) and on "rules of experience", based on a range of situations experienced by the individual themselves or in the history of the occupation.

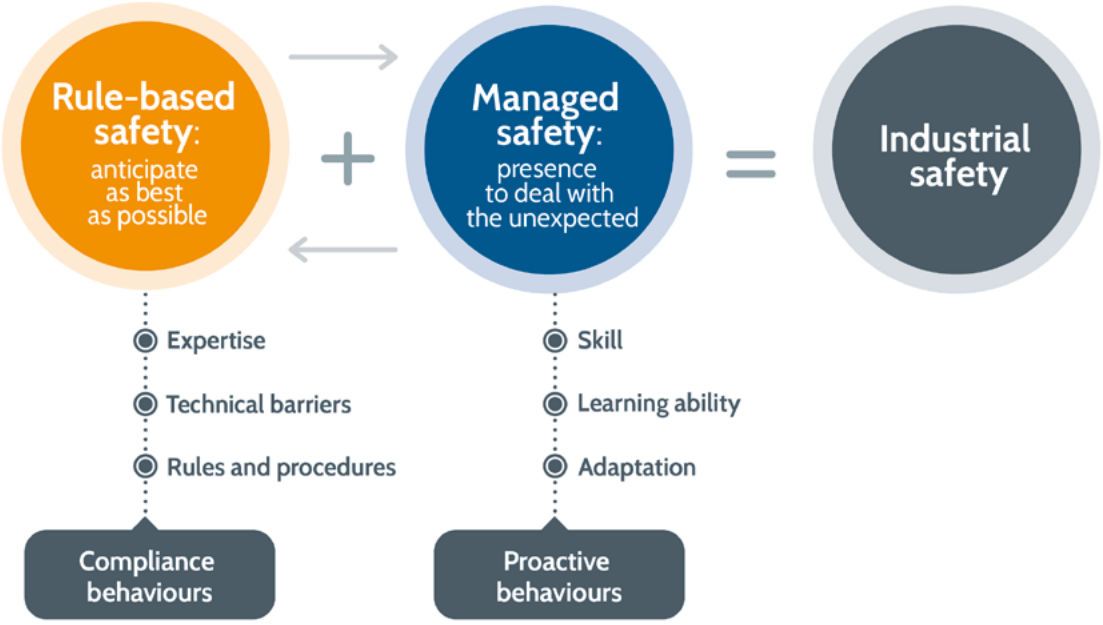

Fig. 13.2 - *Complementarity between rule-based safety and managed safety*

Among other elements, the right balance between rule-based safety and managed safety depends on the frequency and predictability of the incidents that occur, but also on whether they can be controlled or not (see chapter 14). But even in comparable industries, safety cultures can vary greatly in the way these two dimensions are perceived: the organisation can place immense trust in the possibility of anticipating all situations and consider that managed safety is a sign of having failed at anticipation; or, on the other hand, the organisational culture can leave greater room for doubt ("*the next accident has never been so close and we can't anticipate everything*") and recognise that the contribution of the individual and collective skills of the employees present in real time is necessary.

The organisational culture thus assigns more or less value to each of the two sources of knowledge that contribute to safety: the scientific knowledge of experts and the knowledge of sharp-end workers, gained through experience. It puts more or less emphasis on **compliance** with rules as the main source of safety, or recognises the need for **proactive behaviour** on the part of employees and managers, and invests in one or the other of these dimensions accordingly.

13.6 The organisation's resilience

Systems are designed based on assumptions about their conditions of use, and safety is considered from the perspective of the contexts thus identified. Different circumstances can contribute to the appearance of operating conditions that are far removed from the initial assumptions:

- external events, such as exceptional natural disasters;
- shifts in usage: the capacity of a plant that worked well in the conditions of use for which it was designed is gradually pushed beyond the initial design assumptions;
- the ageing of the facilities is not compensated by sufficient maintenance.

History shows that there are vast differences between organisations when it comes to their capacity to ensure safe operations in configurations that are far removed from the normal conditions for which they are prepared. Organisations are said to be more or less **resilient**, with resilience being defined as "*an organisation's ability to anticipate, offer early detection and respond appropriately to variations in the working of a system in relation to reference conditions, with the aim of minimising their effects*" (Hollnagel, Woods & Leveson, 2007) or "*the intrinsic ability of a system to adjust its functioning prior to, during, or following changes and disturbances, so that it can sustain required operations under both expected and unexpected conditions*" (Hollnagel, Pariès, Woods & Wreathall, 2010).

There is some degree of contradiction between an organisational culture which aims to anticipate as much as possible all the situations that could occur – in order to decide on the right response beforehand –, and an organisational culture that encourages an appropriate response to unexpected variations. One of the major challenges of industrial safety is therefore to know up to what point it is possible to combine strong resilience and a high level of safety in known situations.

13.7 Technical aspects, SMS, and human and organisational factors

It is customary to say that industrial safety is underpinned by three pillars:

- **the technical aspects**: the design of facilities that are as safe as possible, the fitting of fault sensors and automated protection systems, and facilities maintenance;
- **the formal management of safety**, through a set of rules and formal processes and procedures, including the Safety Management System (SMS) for companies that are obliged to have one;
- **the recognition of the importance of human and organisational factors**, i.e. the identification and integration of the factors necessary for human activity to be conducted efficiently and safely[1]:
  - individuals (skills, state of health…),
  - the work group (quality of the groups, sharing of information and knowledge, solidarity, etc.),
  - the working environment (the extent to which it is designed to take into account human characteristics and the tasks required),
  - the living organisation (particularly the role of managers, the involvement of employees in fine-tuning the rules and technical systems, the discussion and handling of problematic situations…).

What is the position of the safety culture concept in relation to these three pillars? **The organisation's safety culture has a profound influence on the decisions taken in the three areas:**

- the share of investment channelled into safety, whether operators are involved in the design process or system designers work in isolation, and the resources allocated to maintenance make up the technical pillar of safety and also reflect the organisation's safety culture;

1. See Daniellou, F., Simard, M., Boissières, I. (2011). *The Human and Organizational Factors of Safety: State of the Art.* Issue 2011-01 of the *Cahiers de la sécurité industrielle.*

- in the same way, the SMS may be implemented primarily to satisfy external requirements, or it can be an opportunity to get different actors working together on the hazardous situations that are likely to occur and on the most appropriate measures to prevent them;
- the way human performance and the factors that enhance it or hinder it are perceived very often reflects some of the organisational culture's most deeply ingrained implicit assumptions: are people perceived as the main source of risk – because, after all, to err is human – that must be controlled by frequent sanctions? Or rather as an individual and collective source of fallible reliability[2] whose positive contribution should be encouraged through training, appropriate work tools and suitable forums for discussion?

In turn, the decisions made in the technical and organisational areas contribute to forging the safety culture: poorly designed or maintained facilities and installations or inapplicable rules can unfavourably influence the sharp-end workers' ways of doing and ways of thinking.

Technical aspects, the formal safety management system, and human and organisational factors are and must be the focus of specific actions that do not systematically require a reference to the safety culture concept. But in certain cases, it will not be possible to address the serious failings identified in one or another of these three areas without action on the cultural dimensions that determine them.

13.8 The company culture: one culture, several cultures

The safety culture reflects the organisational culture. Within a complex organisation, the safety culture includes the same intermingling of various influences as that described for the organisational culture: national influences, influences from each subsidiary's types of production, influences from the different occupations…

When examining a safety culture, different levels can be looked at: the ways of doing and thinking that are shared within a same occupation, a same echelon of management, a site, a branch, a group. We can search for the traits common to all entities (these characterise a so-called "strong"[3] safety culture), but also the tensions that can exist between the ways of managing safety in the different elements that make up the company.

Key point

What has the greatest influence?

It would seem that, in large multinational companies, what most influences the characteristics of an entity's safety culture is its type of activity (industry sector). Different entities performing the same activity in different countries have more similar cultures than entities of the company that perform different activities in the same country.

In terms of national influences, the origin of the head office seems to outweigh that of the local country.

13.9 Debates and pitfalls

As indicated in chapter 10, the term "safety culture" has become widespread among the media, companies, consulting firms, regulatory authorities, and international bodies. The fact that it has become so commonplace carries a risk of oversimplification which can affect the capacity to take action.

Below, we present the main points that are the subject of debate. These will be developed in the remainder of this document:

- If we consider that the safety culture is defined by the shared ways of doing and thinking (mindset) within an entity, it should be noted that this is necessarily an approximation: nothing is ever completely shared by all members of an entity. Analysing a safety culture therefore means assessing the practices and beliefs that are dominant, but also those that are not. It means establishing a picture of unity and diversity.
- Certain safety culture approaches have a purely psychological angle: they involve identifying the attitudes of individuals that are more or less favourable to safety. Certain texts even refer to the "safety culture of an individual". We must insist on two points here: the safety culture concept only makes sense at a group level; it consists not only of beliefs and values, but also of shared practices.

2. Same reference.
3. This adjective describes the coherence of the safety culture across all entities, but not its appropriateness: it is possible, within an organisation, to have a "strong" fatalistic safety culture.

- The safety culture is sometimes presented as a variable that could be managed simply: make a decision and implement appropriate actions, and rapid, homogenous and lasting transformation will take place. In the remainder of this document, we will see that actors can decide to change certain determining factors of their entity's safety culture, but that these are lengthy processes requiring numerous interactions; in addition, their unfolding cannot be fully controlled, and the end result is partially unpredictable.
- The safety culture is often presented in isolation, disconnected from the organisational culture. And yet, placing the safety culture in a bubble like this means ignoring that **the organisation must also protect itself against dangers other than accidents**. The safety culture is revealed in the importance given to safety as people go about performing their duties, as it competes with the other priorities they have to manage. To understand the drivers of a safety culture, a more general examination of the company culture and of how its actors deal with the various risks that threaten the organisation is necessary.
- In thinking about safety culture, reference is often made to the safest systems, such as civil aviation. However, as we will see in more detail in chapter 14, the forms of safety management that exist in these fields are not suitable for all sectors. The definition of the most appropriate changes to a safety culture thus implies a realistic assessment of the current state and of the range of requirements and constraints with which the entity in question grapples, in order to initiate appropriate processes for progression.
- Finally, the safety culture may seem like a consensual issue insofar as we can assume that everyone wants to avoid at least the biggest accidents. But any thinking about safety culture must take the question of power into account.

For safety culture-related thinking and action to be appropriate, oversimplifications and references to a single, "one-size-fits-all" model must be avoided.

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14

A “good” safety culture?

As discussed in chapter 10, the safety culture concept became widespread as a consequence of major accidents whose analysis revealed failures in the safety culture at different levels within the company. But if a safety culture can be deemed “defective”, what characteristics must it possess to be deemed “healthy” and “appropriate”? What do we know about the organisational culture attributes that promote industrial safety?

14.1 There is no single, “one-size-fits-all” model

14.1.1 Several worlds

In the previous chapter, we mentioned that it wasn’t possible to apply the same model to all industrial sectors. A company’s existing safety culture should enable it to prevent the most serious risks while maintaining its production and its economic viability.

Certain sectors, such as commercial fishing and mountain climbing, involve daily exposure to risk, in an environment which the individuals concerned do not control and which can vary suddenly. Rules do exist, but they are relatively few. Safety hinges largely on the operational expertise of a few leaders and on their ability to take appropriate initiatives quickly and autonomously (managed safety). But risk-taking is essential to performance, and exploits are regularly applauded. Accidents occur frequently, which does not mean that the actors have no concern for safety. These sectors are highly resilient.

Fig. 14.1 - *The equilibrium point in ultra-adaptive systems (Amalberti)*

At the other end of the spectrum, sectors such as the nuclear and the aeronautical industries are subject to a host of international regulations and are constantly monitored by their regulatory authorities, under the watchful eye of the media and public. They are statistically very safe, but any accident has considerable repercussions. A very large number of possible situations are anticipated by the experts, leading to the implementation of technical, regulatory and organisational barriers: rule-based safety is predominant. Procedures are omnipresent and constantly updated based on operational experience feedback and incident analysis. It is assumed that all accredited personnel have equivalent operational expertise, and individual initiative is not encouraged. If a situation posing a serious risk of loss of control is detected, system shutdown is recommended (emergency shutdown of a nuclear reactor or grounding of aircraft, for instance in reaction to the volcanic ash cloud which followed the Eyjafjallajökull eruption in 2010). Investments allocated to safety represent a very large portion of operating costs. The question is whether the system is able to handle conditions that were not anticipated at all (what is its level of resilience?).

FIG. 14.2 - *The equilibrium point in ultra-safe systems (Amalberti)*

Between the two lie sectors such as the chemical industry and energy transmission. Risk taking is not sought, but sharp-end workers must manage important variations in conditions without halting production. There too, significant effort goes into anticipating and putting barriers in place but, to ensure safety in unusual situations, real-time detection and recovery initiatives are expected, not from individuals, but mainly from the teams. Stringent collective regulation governs the behaviour of individuals. The safety level is good overall but lower than in the second group.

FIG. 14.3 - *The equilibrium point in the intermediate sectors (Amalberti)*

A single company may have activities in several "worlds": oil drilling doesn't share the same constraints as oil refining, and neither do running and maintaining a nuclear facility.

These examples highlight the fact that there is no one-size-fits-all model: immobilising fishing boats at port by imposing on them rules equivalent to those applicable in the nuclear industry is no more advisable than entrusting the control of a reactor to a super-expert who would push the reactor to its limits in order to maximise its power. Organisations should give preference to the safety model that is most appropriate to the specific "world of constraints" in which the organisation must survive and develop. Today[1], we know that **it is possible to improve safety significantly within each world**.

Moving a system from one world to another is a large-scale operation that cannot be carried out within a single company (it could no longer withstand competition) but necessarily applies to a whole sector. As an example, this is what happened in the 19th century when the British government made coal mining companies criminally liable for safety and imposed mine ventilation.

14.1.2 The paradox

To ensure industrial safety, the organisation must be **both** as prepared as possible to manage all the risky situations it is able to anticipate, **and** capable of responding appropriately in real time to situations it hadn't anticipated. And yet, these two objectives are partially conflicting: the excellence to manage predictable situations relies on the anticipation work of experts and the implementation of rule-based barriers that keep the system in check, and the agility to deal with unexpected situations relies on the skill of the teams present at the sharp end in real time and on the degree of flexibility they are given to manage the incident. Merely complying with rules and procedures may be ineffective or even dangerous in unusual situations, but individual initiatives taken by highly experienced sharp-end workers can also be a source of risk. Currently, there is no known, simple and fail-safe formula for maximising safety performance in both unexpected situations and those that can be anticipated.

Each organisation must decide on the balance it makes between investment in rule-based safety and in managed safety according to its own characteristics and context, without ever eliminating one or the other.

1. See Amalberti, 2013.

14.2 Strengths and weaknesses of the bureaucratic safety culture

As a result of regulatory constraints, external audits, and the technical characteristics of their activity, most high-risk companies have developed a safety culture that leans strongly towards the "bureaucratic", with a heavy investment in process and HSE experts, technical safety, procedures, etc. This type of culture has strengths and weaknesses that are generally well-known, but they must be confirmed or ruled out via an analysis in each particular situation.

14.2.1 The strengths

- The company acknowledges that it is responsible for ensuring industrial safety. It is accountable to regulatory authorities, which perform inspections and independent assessments. It owes certain information to local residents and the media.
- There is a drive to constantly improve safety and safety performance is monitored regularly.
- Significant investments are channelled into technical safety, and safety expertise is introduced during the design phase. Multiple lines of defence and different technical barriers are introduced during the design phase.
- Dedicated HSE experts supervise the sharp-end workers and often offer advice.
- There is a strong focus on formalising the ways of doing (SMS, rules, procedures), skills testing (accreditations), and practice monitoring.
- The safety element is addressed in contractor agreements.
- Thought is given to safety when planning special operations (maintenance, for example).
- Operational experience feedback processes are considered important and are formalised.

14.2.2 The weaknesses

- Rules and procedures written by experts who aren't working at the "sharp end" can be difficult or impossible to apply in situ. Some organisations do not have flexible processes for adjusting procedures when required. As a result, they allow a persistent gap to subsist between theory and reality.
- The investments channelled into rule-based safety may give the impression that this is enough to ensure safety. Thanks in part to information on spending on safety disseminated to local residents and the media, the organisation can project an outward conviction that the situation is under control "as long as procedures are always followed". Deviation from the rules is presented as the only possible mechanism that can lead to accidents. There can be insufficient thought given to the fact that unexpected situations will inevitably arise, or to the conditions that produce effective managed safety, as well as to the skills of workers, the cooperation between occupational groups, and the degree of flexibility they are allowed.
- Rules and procedures proliferate, leading to situations where there are so many rules in place that it becomes impossible to continue production if they are all followed to the letter. The risk, then, is that "**deviation will become the norm**": when there are so many rules that it is impossible to follow them all at all times, breaking each rule can become normal. Management is sometimes compelled to set a bad example, by authorising a breach of the rules to ensure production in special circumstances.
- Due to external justification requirements and the amount of administrative work that is required to set up and audit the SMS, the work of HSE experts and operational managers can become focused on safety as it looks "on paper", rather than on the real risks at the sharp end.
- To manage such a system, indicators are required. Often, the main indicator used is the incident rate which, as mentioned in chapter 4, does not reflect the state of major accident prevention. Often, there is no distinction made between prevention of occupational accidents and prevention of major accidents, and this has been identified as one of the causes of a number of industrial disasters: **obtaining a good incident rate can lead to over-confidence in the level of safety at the site**.
- After initially taking safety into account in the design process, insufficient attention can be paid to system migrations and maintenance: the system evolves, is used in conditions that differ from the design assumptions, yet the system in place to guarantee safety is not necessarily updated.
- Operational experience feedback about the reality at the sharp end and the detailed analysis of accidents and near-misses are formally described in the SMS, but are more or less effective.

As an example, if the organisation gives insufficient thought to positive or negative recognition mechanisms, this can lead management to attribute blame in a manner that contributes to employee silence: information that is of great strategic importance is available at the sharp end but does not flow upward within the organisation (see p.81).

- The HSE function is of key importance and a great deal of expertise is available. But the organisation is often "in silos" and places safety in a functional position, parallel to the hierarchical structure and sometimes very far from the sharp end of operations. There is a risk that, for other actors, safety will be perceived as the HSE department's responsibility. This type of structure is also likely to be weakened in the event of budget cuts.
- The technical complexity of the safety cases and risk analyses can make the fundamentals of process safety difficult to understand for the production teams. The small number of industrial accidents, the weight given to occupational safety and the incident rate, and the absence of consultation and discussion between the HSE function and the occupational groups can reduce the teams' awareness of major risks. Process safety may then no longer be central in daily operations.

14.3 The types of safety culture

Different types of safety cultures exist within organisations. We present a few examples here, before summarising the main attributes of an integrated safety culture (p. 75).

14.3.1 A different type depending on the actors involved

Marcel Simard's classification, presented in chapter 13 (p. 61), focuses on the involvement and respective influence of two categories of actors: employees and management. It also describes a historical evolution: after a generalised fatalistic culture, the front-line workers organise themselves to take charge of safety. Then the employer is held criminally liable for safety and this leads to the recruitment of experts and the formalisation of safety-related processes. Thus a bureaucratic safety culture develops, often associated with a decrease in attention paid to feedback from sharp-end workers. The aim should be to achieve an integrated safety culture, which combines specialist knowledge (process and HSE experts) and sharp-end knowledge and experience, at all levels of the organisation.

14.3.2 Different types depending on the attributes sought for the culture

Reason (1997) identified a number of desirable attributes of a safety culture:

- An informed culture: the organisation collects and analyses relevant information;
- A reporting culture: actors are confident they can report safety concerns without fear of blame;
- A learning culture: the organisation learns from incidents and takes steps to rectify unsafe conditions;
- A flexible culture: the chain of command can be reconfigured if the circumstances require it;
- A just culture: the boundary between acceptable and unacceptable behaviour is understood by everyone. Unacceptable behaviour is dealt with in a consistent and fair manner. Positive contributions are recognised.

These attributes will be explained in further detail in the next section (p. 75). They have also been discussed by the International Association of Oil and Gas Producers (OGP, 2013).

The IAEA (1998) highlights some necessary organisational characteristics:

- the establishment of a vision for safety, the definition of missions and goals;
- facilitation and coaching;
- openness;
- teamwork.

It lists practices that are likely to contribute to the development of the safety culture:

- practices for senior management (for which it provides detailed recommendations);
- risk analysis;
- learning from mistakes;
- in-depth incident analysis;
- learning ability;
- the role of training;
- employee involvement;
- contractor involvement;
- communication of safety issues to the public;
- self-evaluation and independent evaluations and audits;
- safety performance indicators;
- the role of the regulatory bodies.

It describes the ingredients and symptoms of a "weakened safety culture".

HSE (1999) lists the following attributes for an "effective safety culture":

- good ways of informing and consulting the workforce;
- recognition of the fact that everyone has a role to play;
- commitment by top management to involving the workforce;
- co-operation between employees;
- open two-way communication;
- high-quality training.

WANO (2014) lists the "traits of a healthy safety culture":

- individual commitment to safety;
- personal accountability;
- a questioning attitude;
- safety communication;
- management commitment to safety;
- leadership accountability;
- systematic, rigorous and thorough decision-making;
- a respectful work environment;
- management systems;
- continuous learning;
- problem identification and resolution;
- an environment for raising concerns;
- processes for planning and controlling work activities.

These different traits are explained in further detail in the document cited above.

Eurocontrol (Gordon et al., 2006) lists the following "safety culture elements":

- Management commitment:
  - priority of safety;
  - responsibility for safety;
  - resources for safety.
- Trust in organisational safety competence:
  - trust in safety process;
  - regulatory effectiveness.
- Involvement in safety:
  - communication about changes;
  - communication problems (speaking up);
  - involvement of air traffic controllers (ATC) in safety;
  - management involvement in safety;
  - working with contractors.
- Air traffic controller safety competence:
  - air traffic controller competence;
  - team effectiveness;
  - training for safety;
  - procedures and working practices.
- A just, reporting and learning culture:
  - error tolerance, no-blame culture;
  - rewards and incentives and performance appraisal;
  - reporting and investigation of incidents;
  - learning from incidents.

Schein (2016) lists the following as the main characteristics of an organisational culture that promotes safety:

- trust and openness;
- humble behaviour from management;
- a helpful attitude;
- management should know what the work entails;
- psychological safety (a speak-up climate).

14.3.3 Different types depending on the maturity level of the safety cultures

Westrum (1991, 2004) proposed a description of three levels safety culture advancement. Hudson (1999), and later Parker, Lawrie & Hudson (2006), built on these and developed five levels of safety culture advancement. Depending on its level of maturity, a safety culture is either characterised as pathological, reactive, calculative, proactive or generative. This classification into five levels was included in the OGP's *Hearts and Minds* programme (2010). It is presented in the table below.

	Pathological	Reactive	Calculative	Proactive	Generative
Communication	No communication beyond what is legally required.	Communication is focused on accidents, otherwise it is top-down only.	Lots of statistics, top-down information, except where accidents are concerned – then it is bottom-up.	Management is present at the sharp end and monitors. Safety is discussed in team meetings and workers are interested.	Safety has priority. Lots of feedback loops. Sharp-end workers actively seek out information.
Organisational attitudes	No trust. Sanctions and micro-management of workers	Responsibility is focused on individuals, who must be trained and follow procedures.	Sharp-end workers have little influence over procedures. Management is perceived as being obsessed with safety but is not taken seriously.	Participation is encouraged, under supervision from management. Obsession with statistics.	Workers see management as partners and respect them. Workers identify problems and management works with them to address them.
HSE organisation	No HSE structure; reliance on experience.	Legal and statistical obligations with no follow-up. Procedures are changed after an accident.	HSE specialists are well accepted. Rewards and sanctions for HSE. Lots of procedures with no concern as to their applicability.	HSE specialists endeavour to take into account the constraints at the sharp end. Safety is taken into account in design.	Small HSE department supporting management. Procedures are drafted by the teams. Continuous improvement. Small number of procedures, included in training.
Organisational behaviour	Denial of problems. Focus is on profits.	Management overreacts after an accident. Workers have little faith in actions from management.	Monitoring of numbers. Conviction that the situation is under control. Difficulty reassessing solutions.	Priority is given to safety over productivity (with competing goals). Management is interested. Analysis of near-misses.	Workers are given lots of free rein and there is trust between workers and management.
Behaviour with regard to working conditions	Working conditions are dangerous. Management is not interested.	Legal obligations. Improvements after an inspection.	Clean environment. Management does not always have sound knowledge of the sharp end.	Priorities and resources are discussed without waiting for an accident to occur.	Management has sound knowledge of the sharp end. Workers influence the working environment. Management disseminates best practices to the other sites.

TAB. 14.1 - *The levels of safety culture advancement according to Westrum and Hudson*

The IAEA (1998) distinguishes three stages of development:

- Stage 1: safety is based solely on rules and regulations;
- Stage 2: good safety performance becomes an organisational goal;
- Stage 3: safety performance can always be improved.

Another maturity model was put forward by the Health and Safety Executive (Keil Centre, 2001); it is summarised in the figure below.

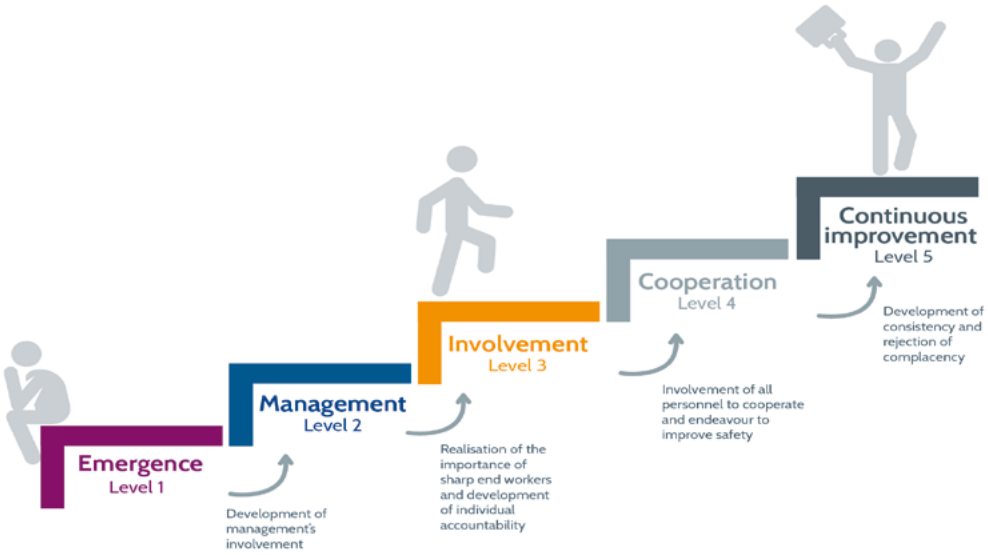

FIG.14.4 - *The HSE safety culture maturity model (Keil Centre)*

14.3.4 HRO - High Reliability Organisations

At the end of the 1980s, a group of researchers at the University of California (LaPorte, Rochlin and Roberts) studied a number of organisations with high-hazard activities that enjoyed a low accident rate: an aircraft carrier, commercial aviation, and a nuclear power plant. They looked at what might have led to this performance and identified certain characteristics that were specific to these organisations and were subsequently found in other sectors. These characteristics which are likely to contribute to the high reliability of an organisation were described by Weick and Sutcliffe (2015, 1st edition 2001), who refer to "mindful organizing" and "sensemaking":

- preoccupation with failure: awareness of vulnerability, actively seek out bad news;
- a reluctance to simplify interpretations: be wary of assumptions, encourage listening, diversity of viewpoints and respect for disagreements, support interaction;
- sensitivity to operations: humility with regard to the reality of operations, presence at the sharp end, knowledge of other people's jobs, use of sharp-end knowledge;
- commitment to resilience: develop professionalism, encourage inter-occupational and inter-departmental contact, be wary of an overly rigid lean approach;
- deference to expertise (irrespective of the person's rank): identify others' areas of expertise, listen to the professional points of view of others even if they are not managers, solicit other opinions.

These different contributions have certain elements in common. The next section describes the organisational culture attributes that are likely to contribute to safety.

14.4 Organisational culture attributes that promote safety

As we have just seen, much research work has highlighted the desirable traits of an organisational culture that promotes industrial safety. These are listed below and detailed in Appendix A. Nevertheless, as previously stated, **there is no such thing as an ideal, "one-size-fits-all" model**. In each specific case, based on an analysis of its own context and its existing safety culture (chapter 15), a company must identify its strengths and weaknesses in order to identify the way forward (chapter 16) and the points to deal with as a priority.

14.4.1 Shared awareness of the most significant risks

There is a shared awareness of the most significant risks, beyond minor accidents. Risk analyses involve operational staff and their results are widely known.

Employees are regularly reminded of the possibility of serious accidents in order to reduce fatalism (if they do occur, it won't be due to a "stroke of bad luck").

Indicators other than the incident rate make it possible to assess the organisation's level of preparedness with regard to these risks.

14.4.2 A questioning culture

There is a shared conviction that risks are never fully controlled. Doubt is valued. Vigilance is shared by all operational staff at all times.

The organisational culture, and more particularly management's forms of presence at the sharp end, encourages sensitivity to operations and paying attention to the human cost of certain operations.

When serious or high-potential incidents occur, their root causes are analysed and lessons are drawn (learning culture).

14.4.3 A culture of transparency

Managerial practices encourage trust and foster a speak-up climate. Top management ensures that words (company statements) and actions (company decisions) are aligned.

Information flow is encouraged.

The risks of employee silence (p. 81) are identified and dealt with, in particular via a clear and shared policy regarding recognition and blame which includes the difference between an error and a violation (just culture).

External communication (including that aimed at local residents) is truthful.

The pitfalls of accountability

Key point

Some companies want accountability for actions at all echelons of management. What does accountability mean? First, it means taking responsibility for one's actions and owning up to them in a transparent manner: *"I gave that instruction"*; *"I was the one who opened the valve"*; *"I dropped a tool in the circuit"*. This can include explaining the reasons for these actions: *"I did it because it seemed to me that..."* But in many organisations, when a person takes responsibility for an action they may be blamed or even punished!

This effectively dispenses the organisation from analysing all of the **contextual elements** that may have led the person to interpret the situation in such a way that they took inappropriate action, or that disrupted their activity. By doing this, they also avoid reassessing all of the **barriers that should have mitigated the consequences** but didn't work. An erroneous understanding of accountability can increase the trend toward seeking the causes of an undesirable event in individual behaviour and avoiding analysing the root causes, particularly the organisational ones.

By adopting a no-blame attitude (i.e. no blame is assigned until the incident analysis is complete) and instilling a just culture (see p. 100), it is possible to avoid the ambiguities of accountability.

An undesirable event must be handled using a two-pronged approach (figure p. 98):

- on the one hand, the technical and organisational root causes must be addressed in order to reinforce defence in depth and prevent the occurrence of another event with the same basic mechanisms. This is independent of the particular people concerned;
- on the other hand, the situation of the people concerned must be addressed by management, which should identify the requirements in terms of support, additional training, and opportunities for forms of recognition or sanctions.

14.4.4 An integrated culture: everyone is mobilised

The organisation acknowledges that no single person holds all the information and knowledge necessary to ensure safety.

Safety requires a commitment from senior executives, managers, and employees in both the operational departments and the support departments (HSE, HR, engineering, procurement, etc.). Each person participates in safety by following the rules and through proactive contributions (incident reporting, suggestions).

The HSE department provides management, teams, and employee representatives with support in identifying and handling risky situations.

Any difficulties with interfaces are identified and dealt with.

The employee representative bodies are essential partners when it comes to safety. Contractor companies are also essential partners when it comes to safety.

14.4.5 Management leadership and employee involvement

Safety is taken into account in all decisions.

When it comes to safety, management adopts a directive-participative approach to leadership that encourages safe compliance and proactiveness.

Safety-related dialogue between management and staff is generalised. The role that workers play in producing safety is recognised and supported.

Debates between professionals concerning safe work practices are encouraged.

14.4.6 Constant attention is given to barrier performance

Technical barriers are defined during design to be compatible with all production and maintenance operations. They are regularly maintained and updated.

The SMS is designed to effectively contribute to safety and not primarily as an external justification tool.

The organisation works with staff to establish the fundamental rules that must be followed at all times (golden or life-saving rules).

The rules are drafted using a participative approach involving all of the teams concerned.

Human and organisational factors are taken into account when designing the working environments.

14.4.7 The right balance between rule-based and managed

The organisation prepares itself both for events that it is able to anticipate and for those it is not.

Predictable events are the topic of group discussions involving the operational teams, and they are also the focus of regular drills.

Resilience in the face of unexpected events is encouraged through individual and group training of staff and managers.

Crisis management methods make it possible to adapt the chain of command to the needs of each incident.

For further details about each of these attributes, see Appendix A on page 95.

The following figure (Fig. 14.5) summarises the way in which each of these attributes contributes to better risk management.

FIG. 14.5 - *Some attributes of an integrated safety culture*

Assessing a safety culture means identifying the characteristics of the organisation – particularly in relation to the themes we have just covered – that positively or negatively influence the behaviour of all actors when it comes to safety. This is what we will be discussing in the next chapter.

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15

Understanding the current safety culture

Different circumstances can lead the actors within a company or entity to question their safety culture. This can happen following one or several accidents, after demographic, technological or organisational changes, or as a result of pressure from regulatory authorities or corporate managers, etc.

Key point

Is it possible to describe and change the safety culture?

Within the literature, there are many stances on the possibility of describing and changing a safety culture.

Some sociologists and anthropologists consider that a culture is a complex historical construct that can neither be described exhaustively nor deliberately changed.

Others emphasise that the "safety culture" is the wrong target, because all it does is reflect broader influences from the organisational culture.

Moreover, some consultants do not see the point in prior assessment: since, according to them, the targets for action (desirable attributes) are always the same, they approach the company's top management directly and suggest the implementation of a programme to improve them (human and organisational factors, just culture, etc.).

The stance developed in this document is as follows:

- it is possible, under certain conditions, to provide actors with a description of the entity's safety culture or, in other words, of the influence its organisational culture has on safety (this chapter, 15);
- it is possible, under certain conditions, to develop, over the long term, actions that change not the safety culture directly, but rather the organisational "soil" from which it is born (chapter 16).

15.1 The conditions for a safety culture assessment

Under certain conditions, it is possible to conduct **an assessment of an entity's safety culture**. But for this, a series of prerequisites must be in place.

- An assessment is never an objective in itself. It must only be carried out if the actors are ready to draw from the diagnosis the consequences necessary in terms of action. Since changing the safety culture is a lengthy process (see chapter 16), having such an assessment performed requires **long-term commitment** from top management.
- The safety culture reflects the influence of the organisational culture on the ways of doing and ways of thinking (mindset) – including decision-making – that affect safety. The diagnosis therefore requires a broad understanding of the organisation's challenges and priorities beyond safety.
- The safety culture is underpinned by the ways of doing and ways of thinking (mindset) of a large number of actors. In order for these ways of doing and thinking to change over time, all actors need to be involved in carrying out and interpreting the initial assessment, and in implementing the transformation programme. A safety culture assessment cannot be a "discreet" or "confidential" undertaking: all actors need to be largely informed.
- The actors must accept that a safety culture assessment will not designate "good workers" (who do everything right and whose current practices are approved of) and "bad workers" (who jeopardise safety and need to change). The ways of doing and ways of thinking of **all levels of the organisation** will be examined, as will the interactions between them.

Decision-makers should be wary of consultants whose propositions do not raise the requirement for the prerequisites listed above. They should also avoid "cobbling together" a safety culture assessment using tools (questionnaires) that are widely available online, without asking themselves whether the overall approach is coherent. It may be necessary to get the perspective of an external party who is competent and able to provide constructive criticism without being complaisant. To carry out the assessment, it is often necessary to have an internal team work with parties that are external to the entity.

15.2 The key questions raised during an assessment

Describing a safety culture means **understanding how the organisation's culture** (and its different elements) **positively or negatively influences the safety-related decisions** of all actors. This implies understanding the current ways of doing and ways of thinking (mindset):

- those that already contribute to mitigating risks and ensuring a good level of safety;
- those that are undesirable when it comes to safety.

The assessment focuses on the future, insofar as it must contribute to reinforcing the practices and ways of thinking (mindsets) that contribute positively to safety, while collectively addressing those that have a negative impact.

A large number of facets of the organisational culture will need to be examined:

- To what extent do people agree on the most serious risks? Is prevention a priority that is shared by the various actors?
- How much do the actors' perceptions of how well these risks are currently managed differ? Is there a more or less widespread belief that the situation is under control and everyone is safe?
- What is the perceived level of consistency between the words and actions of the different echelons of management when it comes to safety? How much trust is there between the different actors?
- To what extent does the technical design (and more particularly the quality of the facilities, equipment and tools) and that of the SMS and procedures take into account the reality at the sharp end of operations?
- In what ways do work practices already ensure safety? What is the human cost of this for workers (effort, working hours, fatigue, risk exposure)? Is this contribution recognised?
- How does the organisation strike a balance between rule-based safety and managed safety? How does it approach compliance and initiative?
- Do the different echelons of management feel that they have the resources they need to perform quality work?
- To what extent does HR management take into account safety-related issues? (staff turnover, generational overlap, vocational training)?
- Is safety covered in initial training, when a worker starts a new job, and in vocational training programmes?
- How does management demonstrate safety leadership? How much free rein are managers and supervisors given? How present are they at the sharp end of operations?
- What is the quality of the processes for communicating operational experience feedback to the upper echelons, for analysing underlying causal factors, and for implementing corrective measures and communicating on their relevance? Are there any signs of "employee silence"?

Key point

Employee silence

Employee silence is a term used to describe a situation where important safety-related information is available at the sharp end but does not flow upwards. It can be explained by a variety of mechanisms:

- the individual defence mechanisms of workers and the collective defence mechanisms of teams: in order to cope with a difficult situation over which they have no influence, individuals and groups may convince themselves that it is not dangerous;
- the defence mechanisms of managers: if the orders coming from top management conflict too much with the information flowing upward from the sharp end, in order to protect themselves, some managers may unconsciously stop the upward flow of information from the sharp end of operations (by focusing, for example, on reporting quantitative performance indicators);
- the effects of group conformism: "*if no one else is speaking up, I don't want to be the first*";
- the illusion of control within the organisation: *"the procedures cover all scenarios; if someone finds themself in a dangerous situation, it's undoubtedly because they didn't follow the procedure*";
- the fear of blame or reprimands;
- the absence of follow-up or feedback when issues or incidents have been reported in the past: "*what is the point of reporting something when nothing will be done about it!*";
- management's lack of technical knowledge of the sharp end of operations and the resulting inability to understand the significance of the issues reported;
- the disqualification of "details": *"this is a truly exceptional case!"*
- the "good worker" ideology: *"a good worker doesn't have problems; if someone has a problem it's obviously because they're no good!*"; "*if you bring me a problem without bringing me a solution, you're part of the problem!*";
- the industrial policy regarding contractors: a good contractor is a contractor who keeps their mouth shut?

- Are certain business constraints or other forms of productive pressure conflicting with safety?
- What is the tone of interactions with regulatory authorities?
- How flexible is the organisation in adapting to unexpected events? What leeway is given locally?
- To what extent does the industrial policy encourage contractor contributions to operational experience feedback and to prevention?
- Do certain aspects of the social environment (for example, local regulations, short-term employment contracts, etc.) have consequences on the entity's safety culture?
- What is the quality of the organisation's external communication?

15.3 Initiating the assessment

Before carrying out the assessment, the following information must go out to all stakeholders:

- the reasons for conducting the assessment;
- who, internally and externally, will be part of the team;
- the practical details relating to how the assessment will be carried out (methods, time frames);
- any important guarantees (anonymity, etc.);
- commitments with regard to communicating the results (to senior executives, the different echelons of management, employee representatives, workers);
- the details regarding ensuing measures/actions.

This phase is not only about informing; it is essential to the success of the process, necessary to obtain a good quality diagnosis, and serves as preparation for the subsequent phase during which the transformation programme will be implemented.

Any objections from stakeholders must be heard and addressed.

15.4 How does one describe a safety culture?

The safety culture combines ways of doing and ways of thinking (values, implicit assumptions). Its least visible layers are those that most influence the behaviour of actors. It is illusory to imagine that a quick and simple measurement could identify these.

The literature contains several cases where the "measurement" of an entity's safety culture via a questionnaire proved reassuring yet, when an accident occurred shortly afterwards, its detailed analysis revealed significant failures in the safety culture (Guldenmund, 2007; Antonsen, 2009).

A safety culture cannot be measured, but we can try to describe it: it is better to think in terms of "assessment", "diagnosis", "evaluation" or "description" rather than "measurement". Only certain perceptions can be measured quantitatively.

Given the range of aspects that need to be described, the literature emphasises that the method used to conduct a safety culture assessment must:

- be based on a clear and explicit model ("When we talk about 'safety culture', what do we mean?"). In Part One, we find two examples of models that can guide the safety culture assessment: the first (Fig. 8.1), aims to identify certain properties of the existing culture, in relation to certain desirable safety culture attributes; the second (Fig. 6.2) aims to identify the social interactions that do or do not contribute to an integrated safety culture, and which could become targets for change;
- take a broader view of the organisational culture and of the constraints, other than safety, which the organisation must manage;
- involve a variety of actors (senior executives, echelons of management, support departments, employee representatives, workers, contractor companies) who are clearly informed about the issues and the process;
- combine a range of tools: document analysis, questionnaire, interviews, and observation. The authors call this "triangulation".

The assessment method used should not seem like a simple consultant's tool chosen by top management, but rather an approach that is deemed interesting by all concerned parties (senior executives, management, employee representatives, etc.).

A number of tools are available to analyse different elements of the organisational culture and of its effects on safety (Fig. 15.1):

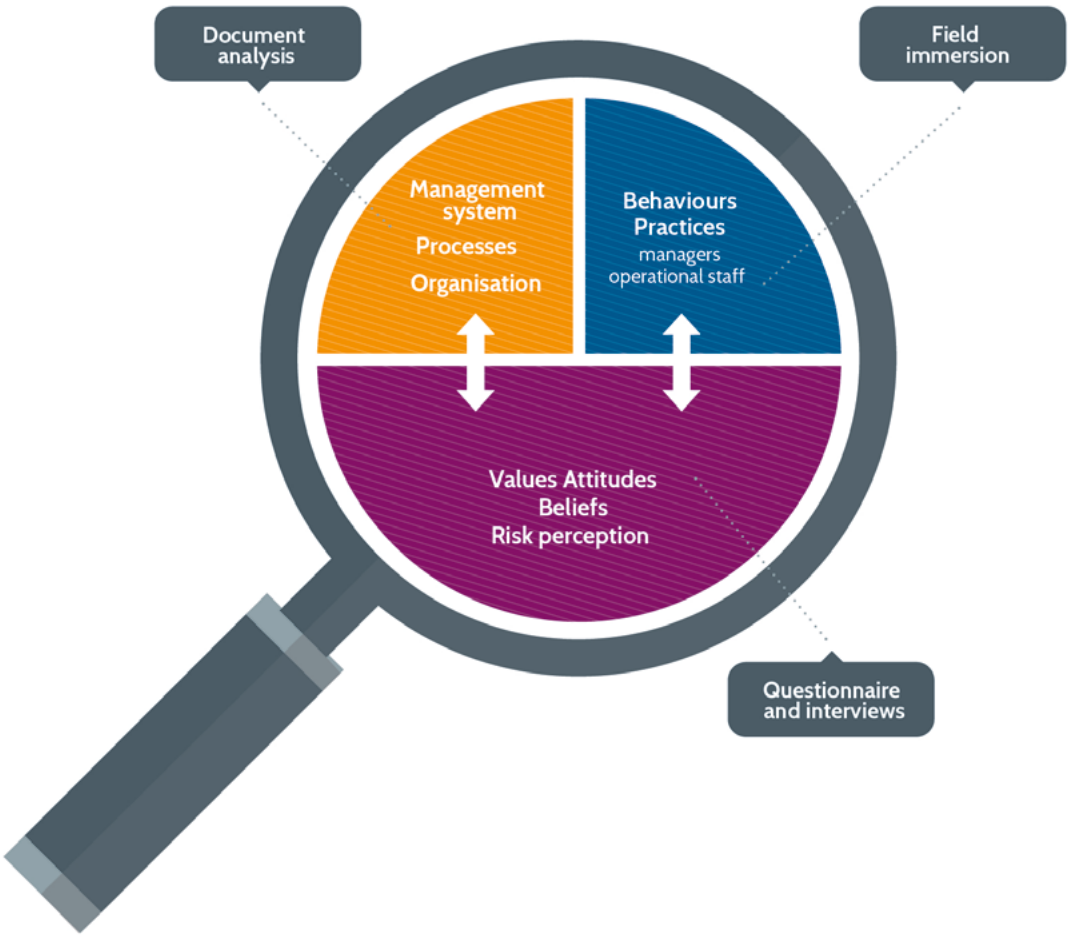

FIG. 15.1 - *Different tools to analyse different aspects*

Individual interviews or interviews with managerial groups (executive committee) are always necessary prior to the assessment in order to analyse the requirement, understand the objectives and assumptions of the requestors, and decide on the way forward. Prior to the assessment, other interviews contribute to gathering information and presenting the approach (to the employee representatives, for example).

Document analysis can include:

- the constraints, other than safety, which the organisation has to manage (for example, relationships with suppliers and customers, the entity's position in relation to the competition, regulatory requirements);
- the history of the organisation and of technical and organisational changes;
- the organisation's espoused values and its frames of reference (company vision…);
- the traces of different compromises and trade-offs made between safety and other priorities;
- production variations (seasonal, qualitative and quantitative); the known sources of crises;
- the characteristics of the company's workforce and of HR management (recruitment, training);
- data relating to accidents and the way they were managed;
- collective medical data;
- the policy regarding recognition/blame;
- the industrial policy relating to contractors;

- the way the employee representatives function and the themes covered;
- the safety management system, the accepted frames of reference, and the HSE organisation;
- relations with the regulatory authorities;
- external communication;
- etc.

The **observation** of certain working environments can provide a better understanding of their diversity, of the technology and procedures, of the gaps between orders and reality, of the state of equipment and working conditions, of the difficulties in applying certain rules or following certain procedures, of the conflicts between safety and other priorities, of the forms of integrated safety implemented by the workers or teams, and of day-to-day communication between departments. The goals of the observation must be clear, the anonymity of the individuals observed must be protected, and there must be no negative consequences for them.

The **questionnaire** aims to identify the **perceptions** of the various actors with regard to major risks and their management, the level of consistency between words and actions, the policy relating to recognition/blame, the reporting of information and ensuing measures/actions, and exceptional situations affecting safety.

Perceptions aren't objective?

Key point

The questionnaire allows people to express their perceptions. Some might say this is not an "objective" method. And yet, people's actions are not guided by the objective analysis of a situation (this would require infinite knowledge), but rather by the mental model they have constructed of it. A mental model only latches on to certain aspects of the situation and can accentuate them or distort them, but it is indeed the mental model that guides the action. If a large proportion of employees perceives that management is insufficiently committed to safety, this may be different from the objective level of this commitment which could be a lot higher than that perceived. But the fact that it is *perceived as insufficient* has an influence on the other actors' ways of doing and ways of thinking (mindset).

One interesting result which the questionnaire can reveal is that there are considerable differences in the way in which different categories of actors perceive a same situation or subject.

There is an abundance of literature on the different questionnaires available and their limitations.

A variety of questionnaires

Key point

Eeckelaert et al. (2011) identify some twelve classic questionnaires on the topic of safety culture. Flin et al. (2000) and Guldenmund (2007) analyse the contents of numerous surveys and question the ability of questionnaires alone to paint a picture of the safety culture.

Some questionnaires contain different questions depending on roles and hierarchy level; others ask the same questions of everyone in order to identify any differences in perception on a same topic.

Elaborating and answering the questionnaire present several challenges:

- the questions must be coherent with a more general model and reflect the specific characteristics of the situation being analysed (vocabulary, specific questions…), which were identified through observation and prior interviews;
- the respondents must significantly represent the different categories of management and operational staff: the smaller a population is in number, the larger the number of respondents needed to ensure the category is accurately represented;
- the questionnaire must guarantee respondent anonymity, but the relevant management and staff categories must be identifiable;
- the questionnaire must meet classical criteria for internal validity (several related questions, positive and negative formulations, etc.);

- the questionnaire must be answered in conditions that avoid influence from any groups and ensure spontaneous answers.

The mere act of preparing the questionnaire and the conditions in which it will be answered therefore requires a significant degree of mobilisation on the part of the organisation.

Group interviews should provide qualitative information and make it possible to better clarify and understand certain trends that appeared when reviewing the answers given to the questionnaires. The interviews must be conducted in a manner that encourages people to speak up as much as possible (for example, managers should all be on the same echelon). Special interviews can be planned with managerial groups, employee representatives, representatives of contractor companies, etc.

15.5 Delivering the diagnosis and initiating change

The result of the assessment (the diagnosis) is not an objective measurement which everyone is expected to accept as true. It is an intermediate objective that must be communicated to the actors concerned, **put up for discussion**, fine-tuned and amended in order to arrive at a **widely shared diagnosis** which will serve as the starting point for a change process.

The aim of the assessment is not to assign the entity to a "known safety culture category": all cultures are hybrids of classic typologies. The assessment will characterise the specific characteristics of the entity's safety culture, which is the fruit of the entity's history within its environment.

The assessment may reveal unexpected and sometimes unpleasant facts (for example, significant differences in the way management and operational staff perceive the actual level to which risks are controlled and managed; or staff perceive that the words and actions of management are really not aligned). Such findings must be communicated openly, as they reflect current perceptions.

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16

Changing the safety culture

As we have seen, the safety culture is clearly influenced by the organisational culture, a complex set of both explicit and implicit ways of doing and ways of thinking (mindset). Furthermore, the safety culture results from the interaction between numerous actors working within the organisational structure. **It is not a process that can be easily steered**. Changing a safety culture is not like changing an organisation chart, a manufacturing process, or installing a new machine. And yet, in many companies, by gradually changing the organisational "soil" from which the culture is born, the actors can, over time, successfully change the safety culture if a number of prerequisites are in place and certain steps are followed.

16.1 Numerous prerequisites

16.1.1 A conviction that the issue needs to be addressed urgently

Since the process we are going to describe requires a high level of commitment, it can only be implemented if the main actors concerned share a conviction that things cannot go on as before. This can be as a result of external constraints (orders from regulatory authorities), internal social tensions, undesirable events, etc.

16.1.2 Safety should not be compartmentalised

In order for the safety culture to change, **safety must be granted more weight in the decision-making process** of all actors. It is crucial that this idea of weight in decision-making be constantly present: giving more importance to safety should never mean that the other priorities which the company must deal with disappear completely from the decision-making process. These priorities must therefore be clearly identified. In fact, one might expect that any efforts made to develop a view of safety that is more closely aligned with the reality at the sharp end of operations will also have a positive impact in other areas: quality, occupational health, managerial practices, social interactions, etc. Working on the organisation's culture forces the meshing of safety priorities with other strategic priorities.

16.1.3 Time

Given the many layers of structures, practices and ways of thinking (mindset) that contribute to the organisational culture, it is illusory to hope to obtain a radical transformation in a few short months. Usually, one might expect to see a visible change in a regional entity within three or four years and this time frame is much longer for a nationwide or international company. This means that top management's commitment must be sustained long term and a coherent change process must be in place which will withstand staff turnover.

16.1.4 Actor mobilisation

A company's top management alone cannot decide on a change of culture and make it so. It is the interactions between actors that forge the organisational culture and influence its evolution. Many stakeholders need to be involved in the assessment of the current situation, in acknowledging the need for change, in identifying the targets and implementing the process: at the very least, all senior executives, the different echelons of management, employee representatives, employees, external contractors, and sometimes even the local residents or regional/local authorities.

16.1.5 Get the adjustment variable right

It is impossible to change the safety culture directly; **any actions must aim to change the "soil" from which it is born**: this can be characteristics of the organisational structure (organisation chart, rules, procedures…); the decision-making processes (during design and everyday operations); the technical characteristics of the facilities (a safety culture cannot be improved if technical systems are defective); the internal and external communication; the managerial practices (presence at the sharp end, sanctions…); forms of time constraints; the style of social interactions; the recruitment, training and accreditation processes; the criteria for appraising the performance of the various actors, etc.

16.1.6 Stop piling up actions

A safety culture change process cannot be underpinned by a classical accumulation of action plans imposed by top management on the assumption that "all things are equal". It must be underpinned by a shared view of the strengths and weaknesses of the current situation, a shared ambition (the changes in practices sought), and agreement on the way forward, the actors involved and the intermediate stages.

16.1.7 Elaborate your own model

Of course, any safety culture change process draws on available knowledge and methods. But it should never import a "target model" developed successfully in a different context. A safety culture cannot be "bought" externally. It is within each entity (company or site, for example) that the strengths and weaknesses of the organisation's existing safety culture – the results of its history – must be identified and that the practices to strive for and the way to achieve them must be defined. For this, the people in charge need to clarify the balance they would eventually like to achieve between rule-based safety and managed safety.

On the other hand, interactions with other companies that have started their own change process can be useful, not to borrow their chosen solutions, but to help anticipate difficulties and draw inspiration from certain methods.

16.1.8 Expect obstacles and encourage adjustments

Although the safety culture change process must target clearly identified objectives (changes in practices across the board, for example), we cannot assume that the entire future configuration can be designed from the outset and that it is then just a matter of building it brick by brick to achieve an end result that matches the initial plan. The organisational fabric is constantly shifting: tensions and resistance will appear; certain aspects of the context will change. The collective approach must be capable of detecting any obstacles or changes in situation over the long term, in order to keep the key objectives on track while managing any necessary adjustments and negotiations.

16.1.9 Mutual commitment

It is impossible to imagine a change in safety culture if top management's attitude is: *"there is nothing to change on our end; it's the operational staff and front-line managers who need to change" or "we know what is right for safety, they don't; so we will tell them and make them fall into line."*

The previous chapters showed that:

- it is the behaviour of management that most influences that of the other actors;
- industrial safety is the result of subtle interactions between rule-based safety – anticipated by the organisation – and managed safety – included in the work practices of individuals and groups.

If it wishes to transform the practices that contribute to safety, **top management must demonstrate its own commitment clearly:**

- by acknowledging that it does not have all available knowledge and that different forms of knowledge and experience are necessary;
- by considering the human cost of certain desirable practices for those working at the sharp end of operations;
- by making the transformation of certain managerial practices visible;
- by allocating the resources necessary to ensure the success of the process.

16.1.10 Build trust: the importance of consistency

One important ingredient of the safety culture is the level of trust which the various actors have in their respective commitments with regard to safety. Trust is the conviction that there will be no nasty surprises; it is focused on the future but based on past experience. Trust does not eliminate differences in roles and interests: it makes it possible to assume that commitments will be kept and therefore to adjust one's behaviour without having to constantly come up with a "plan B" in case they are not. Once it is established, it significantly reduces the cost of each individual's action.

Trust is long and difficult to build, and a single unfortunate event can damage it – sometimes, this can be something as simple as misinterpreting a situation due to poorly managed communication.

Example

A misunderstanding

Following an assessment of its safety, a company hires several external contractor companies to perform a considerable amount of work in order to get its facilities up to standard. After a period of intense activity, the employees suddenly notice a drop in the volume of work being performed. They interpret this as disengagement on the part of top management. But in fact, top management had identified that the high number of contractors working simultaneously was generating risks, so they decided to schedule the work over a longer period of time. But they did not tell the staff about this change in strategy!

Consistency between stated intentions, actions, and communication about these is a key part of a safety culture transformation. Any difficulties encountered should not be covered up using placating communication. Instead, they should be made explicit and everyone should be involved in finding solutions.

16.1.11 Introduce only the changes that are necessary

No organisation can withstand sudden and radical changes to its espoused values, the vocabulary used, its top management, its organisation chart, its organisational practices, its evaluation criteria, etc. without sustaining some degree of damage. This is especially true in the field of industrial safety. A radical change is no doubt necessary, but it should obey the medical precept "*primum non nocere*" – first, do no harm: not every aspect of the previous situation was bad; despite its limitations it ensured a fair level of safety. The necessary organisational transformations must **draw on the strengths of the previous situation**, fit in as naturally as possible with what exists already, respect the vocabulary and history of the actors, and show the importance of everyone's contributions. Although the employees need to realise that the organisation's survival and development are at risk if it does not change, they should not feel personally threatened by the transformation.

16.1.12 Get the perspective of an external party that can provide positive criticism without being complaisant

One of the major difficulties of a safety culture change process is the importance of the implicit assumptions which are shared within the organisation and have a profound influence on behaviours yet are not described anywhere. It is very difficult for internal actors to perceive them and discuss them[1]. That is why, for companies wanting to change their safety culture, it can be beneficial to seek the perspective of an external party that is knowledgeable about human and organisational factors and leading change, understands the other constraints the actors have to manage, but can also be clear and honest about the subtle obstacles that might hinder the process.

16.2 Different stages

The gradual transformation of a safety culture thus involves the following stages.

16.2.1 Acknowledging that a change is needed

The initial realisation that a change is needed may be the consequence of undesirable events (an accident, social tensions), external requirements (regulations, regulatory authorities), warnings from employee representatives, a routine internal or external evaluation that yields unexpected results, the arrival of a new manager influenced by a different culture, etc.

1. This phenomenon is well known in the scientific world: it is very difficult for researchers who are proponents of theories that stem from different paradigms to hold discussions, because the theories are evident but the underlying paradigms on which they are structured are hidden.

Before starting a transformation process by pouncing on "solutions", it is important to take a good **look at the strengths and weaknesses of the current organisation** revealed by the assessment. Underestimating current weaknesses can prevent the initiation of the change process.

Top management must also start to identify the actors, the social and occupational groups and the opinion leaders without whose involvement a transformation will not be possible.

Key point

Steering the process

The change initiators can start to put together a "steering group"[2] that will assist them throughout the process. It must at least include:

- the highest ranking decision-maker within the entity concerned (site director, regional director, etc.);
- sound knowledge of external constraints (regulations, requirements of regulatory authorities);
- sound knowledge of technical processes and procedures;
- sound knowledge of the reality of operations and of the decisions that need to be made daily by front-line management;
- sound knowledge of the people concerned, of demographic changes and of career management;
- sensitivity to social interactions and to relations with employee representative bodies, or even with clients or local residents if these need to be involved in the process;
- a commitment to ensuring that the group lasts in the long term even if some of its members move on.

16.2.2 Sharing the vision of the strengths and weaknesses of the current organisation

The description of the current safety culture must be widely disseminated and discussed, in order to arrive at a shared diagnosis that lays the groundwork for an agreement on the need to introduce changes. Depending on the size of the entity in question, it may not be possible to involve all personnel in these discussions, but it is important to ensure that the employee representatives within the health and safety committee and a sufficiently broad sample of the different categories of managers, operational staff and contractor companies are involved.

16.2.3 Thinking in terms of "ambition"

Usually, a safety culture assessment reveals numerous points that are likely to pose a problem, and this often leads to the elaboration of a corrective plan made up of multiple disparate actions. Due to a lack of coherence and support over time, these regularly run out of steam.

An in-depth analysis should therefore be performed to identify the strengths of the current safety culture and **the organisational traits that most negatively influence** the management of industrial safety. The process involves leveraging the former to try to change the latter. All aspects are linked, but the most critical traits – those that will produce a knock-on effect when changed – need to be identified.

The goal of the change will have to be clearly identified. Some companies will identify that the main problem they need to address is employee silence due to managerial practices with regard to blame, for example. Others will identify that there is significant room for improvement in the relationship between client and contractor companies, or in the interactions between engineering and operational staff, when changes are being made or new projects started. Or that the main problem to address is a list of rules so endless that deviation is becoming the norm. Or that retirements are badly managed and the arrival of new recruits introduces weaknesses in the organisation, etc.

Only a few essential points should be chosen as the focus of sustained effort over a long period of time. And actually, it is rather likely that actions to change these will have a positive knock-on effect on other aspects.

2. This is what we call it, but it is important for the term chosen to fit in with the company culture.

What future?

Key point

At this stage, we might ask ourselves: "If we were to project ourselves a few years ahead and observe our organisation as it is in the future, **what are the main visible changes we would like to see in the organisation and in work practices?**"

Initially, this forward-looking work can be undertaken by the steering group and the executive committee, but it should quickly be shared and adjusted with the other actors mentioned previously.

16.2.4 Defining the programme

If the current safety culture situation is unsatisfactory, there are reasons for this (certain characteristics of the organisation's technical structure and certain practices, particularly managerial ones). The safety culture cannot be changed unless the environment in which it developed is changed. This is a continuous, iterative process, the first stages of which are described here.

After having defined the changes in practices that we consider desirable (strategic objectives), to build the programme we must identify the **first levers for action** that will make it possible to change **certain deep-rooted determinants** of the current situation (operational objectives). The levers are not all immediately available to the executive committee or to the steering group which it put together to steer this change.

For example, it is futile to hope to directly and immediately influence the behaviour of individuals who are not reporting information to their superiors. The question is: "*How can changes to the organisational structure and managerial practices encourage the practices we wish to promote? What do we have to change on our end to encourage other changes?*"

This work will result in a programme to change the organisational determinants identified as the main obstacles to certain safety-promoting practices. At this stage, the devil is in the details and attention must be paid to the reality of situations.

Sticking points

Example

It is futile, for example, to state that management needs to be more present at the sharp end of operations to contribute to safety if:

- the requirement to enter data into performance dashboards keeps managers stuck behind their computer;
- the training and professional background of certain managers make it difficult for them to discuss technical details with operational staff;
- the performance reviews of managers focus only on productive performance and not on their contributions to industrial safety;
- managers lack support to deal with any issues reported by operational staff which fall outside the scope of their decision-making authority;
- etc.

The steering group that elaborates the programme must therefore expose it to the objections and contributions of the various actors, since they know the reality at the sharp end of operations. This work will yield a programme that is limited, yet relevant, realistic and shared.

Some examples of operational objectives are described in Appendix B.

This type of programme has a cost in terms of internal and external work time and interactions, communication and, possibly, investments. It will require appropriate resourcing.

16.2.5 Managing different time frames

Different time frames can apply to the different transformation actions envisaged:

- **quick wins** on points that are relatively easy to deal with, provide a quick benefit to various actors (for example, the improvement of dangerous working conditions), and demonstrate that a process of positive change has begun;
- **symbolic actions** which are more difficult to implement but tackle a significant problem pointed out long ago. These are the ones that have the greatest impact on staff;
- **perception correction actions**, which aim to correct misunderstandings or fight rumours;
- **actions to reinforce the entity's strong points** in order to maintain or develop the practices that already ensure a good level of safety;
- **substantive actions**, including the integration of human and organisational factors, that can be initiated rather quickly but require different stages and will produce effects gradually.

It is important for the established programme to combine these different timeframes in order for the transformation process to be visible both quickly and over the long term.

16.2.6 Programme deployment

The steering group should manage the deployment of the organisational transformation programme like a project – just as it would a technical investment. Indeed, political will needs to be maintained and feasibility with regard to the reality at the sharp end of operations must be ensured.

Action implementation must be planned, detailed at the operational level (for example, new positions or new interfaces, procedure modifications, new tools, new premises), supported and adjusted, closely monitored, and evaluated. Good communication about the programme is a must (the language used is adapted to the audience, transformations are regularly checked against objectives, contributing actors are given recognition, concrete effects are described through testimonials from the sharp end, difficulties are disclosed, next steps are outlined). "Victories" are celebrated. Any difficulties encountered are identified, analysed and dealt with. Periodic progress reports are prepared and discussed by the executive committee and the occupational health & safety committee.

Any accident that occurs despite the efforts undertaken can jeopardise the initiated process. To support the development of the safety culture, it is important for any analysis of such an accident and any ensuing measures/actions to be aligned with the process under way.

16.3 The life of the safety culture

After a few years, significant transformations will have been achieved, perhaps not in the exact form that was originally planned, but certainly in the desired direction. The internal and external environment will also have changed; certain actors will have left and others will have arrived. A new assessment of the safety culture can be useful to measure how far the organisation has come, identify any new issues that may have appeared, and keep moving forward while giving priority to new objectives.

Nevertheless, the progress already made, the trust that has been established, and the interactions that have developed should make it easier to mobilise actors for the new phase.

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A

Some attributes of an integrated safety culture

The following elements are traits of the organisation which are known to encourage the organisational culture's contribution to safety (p.75). Many of them are presented in more detail in other documents in the *Cahiers de la sécurité industrielle* collection. This long list and figure A.1, which summarises it, shows the large number of practices, at all levels of the organisation, that contribute to forging the safety culture.

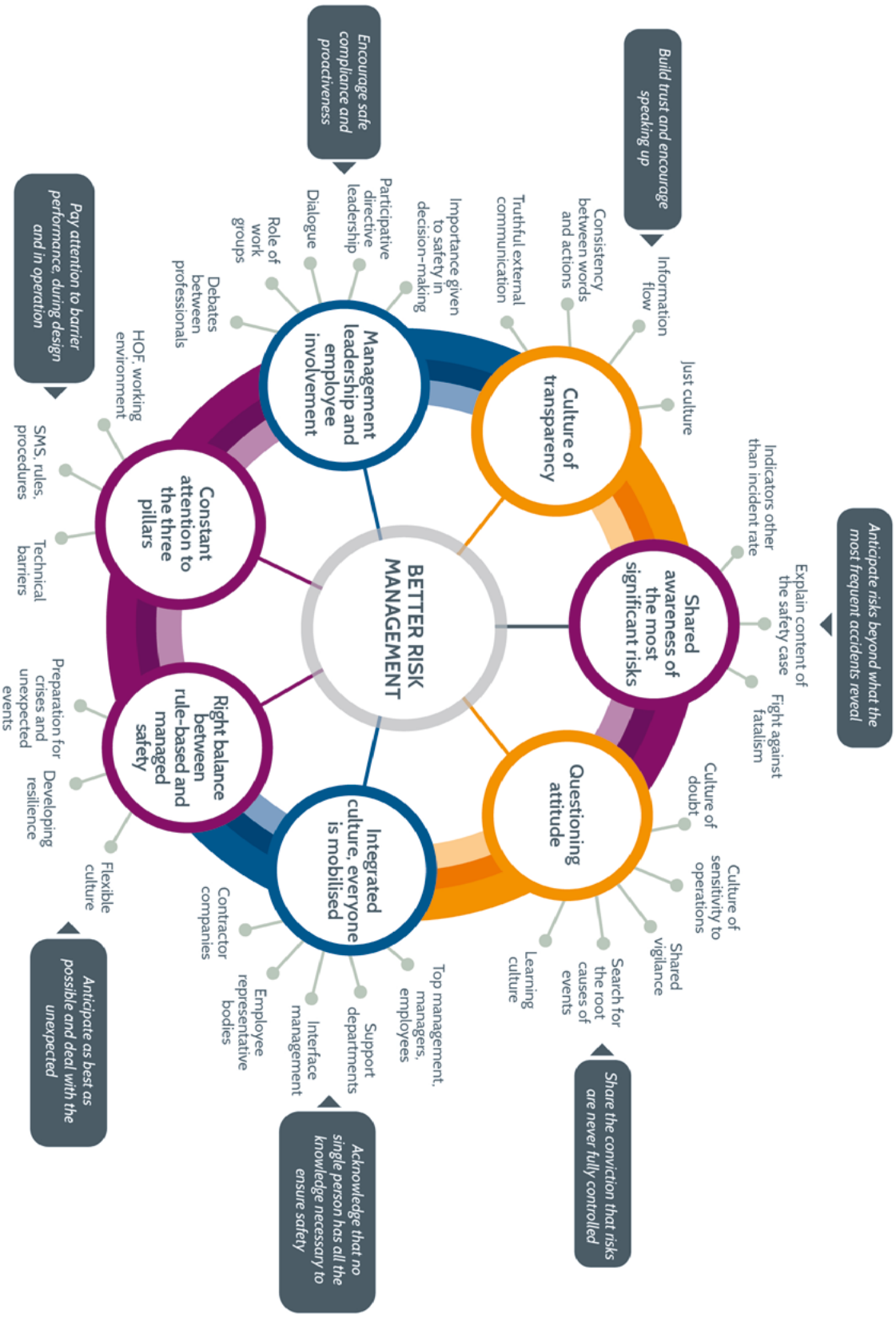

FIG. A.1 - *The attributes of an integrated safety culture*

A.1. Shared awareness of the most significant risks

When it comes to safety, **preventing the most significant risks is a priority** shared by all actors. The possibility of a scenario occurring is not ruled out just because its probability is low.

A.1.1 During the preliminary studies

- Preliminary risk analyses involve process and HSE experts and people with knowledge of operations, in order to ensure that as broad a range of accident scenarios as possible is covered and that these take into account the reality at the sharp end of operations.
- These studies are re-examined before any significant changes are made to the facilities, its operating conditions, or the organisation.
- The main results of these studies are communicated in an understandable form to all actors who contribute to safety.
- Senior executives and management encourage discussions about risks in order to ensure collective awareness. If the danger is likely to extend beyond the perimeter of the facilities, the stakeholders concerned are involved.

A.1.2 Over time

- Employees are regularly reminded of major risks in order to fight against fatalism ("if a serious accident does occur, it won't be due to a stroke of bad luck").
- The organisation doesn't only monitor the incident rate, as this is a poor indicator of industrial safety. It has KPIs concerning major accident hazards and the precursors of serious accidents (such as high-potential incidents) which are independent of the occupational safety indicator system (for example, the number of leaks or fire outbreaks).

A.2 A questioning culture

A.2.1 A culture of doubt: a humble organisation

The organisation ensures constant collective vigilance is maintained, even after many years without a serious accident. It fights against self-satisfaction ("*the situation is under control*") and oversimplifications ("*just follow procedures*"). It encourages doubt ("*we've never been this close to the next accident*"), the reporting of issues and incidents, and a questioning attitude.

A.2.2 An organisation that is sensitive to operations

Reality is never truly as anticipated:

- The actors within the organisation are aware that, irrespective of the quality of the preparation, the technical barriers and the procedures, there can always be differences between what was planned and what actually happens. Most of these differences are managed safely by initiatives on the part of actors at the sharp end. Others can be sources of risk. And we know that problematic differences can be identified at the sharp end of operations yet not communicated "upward" if an employee silence phenomenon exists (see p. 81).
- The organisation therefore does not assume that the reality matches what was planned and anticipated. It multiplies the means to detect and collectively analyse situations that were not satisfactorily anticipated. Some of these means are mentioned further on in this document when discussing upward information flow (p. 99) and management leadership (p. 103).
- Safety inspection visits should not be the only way for management to be present at the sharp end. The regular and commonplace presence of management at the front-line of operations contributes to their knowledge of the reality in the field and encourages discussions with the team about any difficulties encountered and their resolution.
- The organisation is open to the perspectives of external parties that can shed light on the reality of daily operations.

A.2.3 Shared vigilance

- Vigilance is shared by all operational staff at all times.
- Comments made by one employee to another about a practice that doesn't seem very safe are considered normal and are accepted, irrespective of either employee's rank.
- Refusing to perform an operation when the safety conditions are not ideal is looked upon favourably at all levels (as long as a greater risk does not result from the refusal).

A.2.4 Root cause analysis

- Undesirable events are analysed not to identify a guilty party or a department that is "more to blame than another", but rather to understand and address the organisational weaknesses that led to them[1]. Refer also to the "A just culture" section on p. 100.
- The main aim of an undesirable event analysis is to prevent a similar event from re-occurring. If the analysis stops short at the most immediate causes, it will not enable the prevention of a similar event. On the other hand, if the analysis leads to the identification of the technical and organisational "root causes", addressing these will help to prevent other accidents with the same mechanisms. For example, if the analysis reveals an outdated procedure and ensuing action is restricted to correcting this, the effect will be limited. If the analysis shows a failure in the process for updating procedures, correcting this process will have a much broader effect.
- The technical and organisational root causes are addressed (without focusing on the people involved). In parallel, but separately, management will take appropriate measures with the people involved: support, training, or possibly giving recognition or applying disciplinary actions (see figure below).

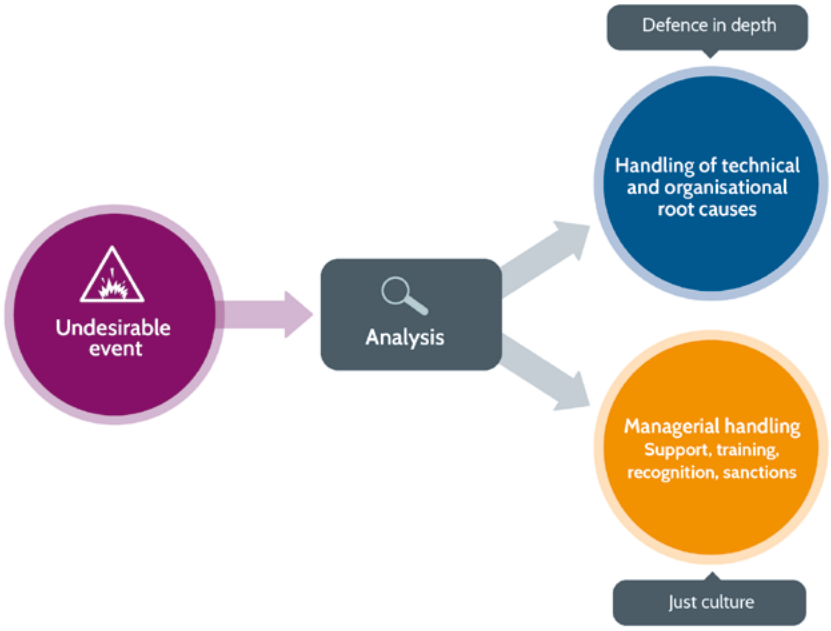

FIG. A.2 - *The two-pronged handling of an undesirable event*

1. See Promé-Visinoni, M. (2014). *FHOS: l'analyse approfondie d'évènement.* Issue 2014-04 of the *Cahiers de la Sécurité Industrielle.*

A.2.5 A learning culture

The organisation encourages double-loop learning and continuous improvement.

It **learns about the reality of operations** and the appropriateness of any actions implemented thanks to its operational experience feedback (learning from incidents) process. It adapts its systems, procedures, training programmes etc., based on lessons learned.

But it must also **learn about its capacity for learning** by encouraging operational experience feedback about operational experience feedback[2] or, in other words, by identifying the factors that encourage or hinder the upward flow of information and the implementation of effective preventive measures. It strives to constantly encourage all actors to contribute to operational experience feedback.

A.3 A culture of transparency

A.3.1 Consistency between words and actions

- The organisation's safety-related communication is aligned with the concrete actions of management and the organisational allocation of resources.
- All echelons of management recognise that the regulatory authorities contribute to and guarantee safety. They practise and encourage transparency when dealing with these authorities.
- No member of the organisation is ever pressured to make a decision, keep silent about a situation, or perform an act that compromises safety.

A.3.2 Dangerous situations and undesirable events are reported and analysed

- Employees are encouraged to report dangerous situations and "high-potential" incidents; the procedure for doing so is simple. If necessary, there are reporting processes in place to protect the anonymity of the people involved. When the workers reporting an issue provide their names, they are involved in analysing the issue and quickly finding solutions. Team discussions are organised. When an issue or incident is reported, any resulting lessons and corrective actions are communicated to the team in question or even more broadly.
- The analysis of dangerous situations involves different departments to benefit from a variety of skills and points of view.
- The health and safety committee and front-line managers are seen as actors that contribute to the knowledge of and handling of dangerous situations.
- Contractor companies and their subcontractors are involved in detecting and analysing dangerous situations.
- When an unanticipated situation was managed with no incidence on safety because the team took a good initiative, this collective win is celebrated. The event is collectively analysed and the methods used to manage it are leveraged and disseminated.
- Each echelon of management has a duty to intervene in dangerous situations which their subordinates are unable to handle alone, and to escalate to the most appropriate decision-makers any situations that fall outside the scope of their decision-making authority. Progress made in handling the issue is monitored and communicated.

A.3.3 Operational experience feedback is available

The results of internal operational experience feedback, as well as lessons learned in other companies operating in the same sector, are available and disseminated or easily accessible, so that they may be utilised by the managers of other units, designers, trainers, employee representatives, etc.

2. See Marsden, E. (2014). *Quelques bonnes questions à se poser sur son dispositif de REX - Recueil d'aide à la réflexion.* Issue 2014-01 of the *Cahiers de la Sécurité Industrielle.*

A.3.4 A just culture

Error is an inevitable part of any human activity (Reason, 2000, 2013)[3]. Certain characteristics of working environments can increase the probability of an error. Technical and organisational processes and systems must on the contrary be designed to reduce the probability and the consequences of an error.

Definitions

Error, violation, sabotage, fault, responsibility[4]

An **error** is a situation where a sequence of actions fails to achieve its objectives. **An error is never deliberate**.

A **violation** is a deliberate deviation from a rule. Not all violations are necessarily reprehensible: there are certain situations where it wasn't possible to follow all the rules because, for example, they were conflicting.

Sabotage means deliberately interfering with the facilities or equipment with the intent to harm.

The words **fault** and **responsibility** are part of the disciplinary or legal lexicon, and not that of analysis and prevention. These concepts should not be used during the analysis process. It is only afterwards, once the event mechanisms have been elucidated, that disciplinary or legal bodies, or management, may decide on whether someone is at fault.

But many organisations continue to regard errors as unacceptable, to confuse error and violation, and to apply various forms of sanctions (summons, reprimands, warnings, blame, loss of promotion, removal of accreditation, termination) to all unwanted behaviours. The reactions of different managers to a same behaviour can be unpredictable and vary widely depending on their personal style, their experience, their desire to keep the peace, the orders received from top management, the actual consequences of the act in question (disciplinary action is taken if the behaviour had negative consequences but goes unpunished if it did not), etc.

But the forms of recognition, whether positive (compliments, rewards) or negative (reprimands, sanctions) which actors have witnessed until now will determine how much **trust** they place in management, as well as the behaviour they will adopt if faced with a dangerous situation. If the manager is in the habit of taking heed of reported issues (including errors) and taking positive action in response to them, he/she will contribute to the upward flow of information. If the manager has rejected or, worse, given out sanctions for reported issues, or if he/she encouraged risk-taking to ensure productivity, it is rather unlikely that sharp-end workers will feel operational experience feedback is welcome.

When an organisation's employees are unable to anticipate what management's reaction will be or can only anticipate a negative reaction, this sterilises the upward flow of information. Any errors made will be hidden where possible, and problematic situations will not be reported. **The blocking of operational experience feedback due to the anticipation of a negative reaction on the part of management can exist even if actual sanctions are very limited.** A minor ill-perceived reprimand can lead a worker to concealing any future deviations to which they have contributed or which they might have witnessed. Likewise, the "no accidents this year" criterion during the yearly performance review is counterproductive because it implies that the responsibility for an accident lies with the worker who is the victim of it.

And yet, in certain rare cases, if certain conditions are in place, a sanction can be perceived as fair by both the party concerned and their colleagues (for example, it is likely that disciplinary action for smoking in an area that is known by all as an ATEX zone will be considered justified by everyone).

A "just culture" aims to eliminate the fear of blame by ensuring that everyone is clear on the boundary between acceptable and unacceptable behaviour. The right to make (unintentional) mistakes is recognised. **The organisation formalises and implements a systematic process of questioning** which, when an undesirable event has occurred, enables them to distinguish between error, unavoidable or unjustified violation, and sabotage. It clarifies the process for awarding positive or negative sanctions and the associated guarantees, negotiates its formulation with employee representatives, confirms that all echelons of management are familiar with the process, and ensures that no sanctions are delivered outside of it. Each employee is then able to anticipate the organisation's response and this establishes trust.

3. For a detailed discussion on human error, see Daniellou, F., Simard, M., Boissières, I. (2010). *The Human and Organisational Factors of Safety: State of the Art.* Issue 2011-01 of the *Cahiers de la Sécurité Industrielle*, chapter 7.
4. Same reference.

A just culture positively recognises initiatives that contribute to safety (reporting of issues, contributions to continuous improvement, support given to colleagues experiencing difficulties…). The forms of recognition are not necessarily pecuniary: one form might be disseminating information about a good practice; another could be assigning the worker a particular duty or approving an interesting training course, etc.

A.3.5 Truthful external communication

When dealing with local resident associations, local/regional authorities and the media, the company practises truthful communication: safety-related information is communicated in a sincere and understandable manner. All concerns are heard, and external prevention measures are co-constructed[5].

A.4 An integrated culture: everyone is mobilised

A.4.1 A large number of actors contributing to safety

- Top management recognises that in order to get workers to make a necessary commitment to safety they must first demonstrate their own commitment.
- The organisation acknowledges that no single person holds all of the information necessary to ensure safety. The process and HSE experts, support departments, operational staff, management – including front-line –, employee representative bodies (health and safety committee), and contractor companies all have knowledge and information that is essential to ensuring safety and needs to be gathered, compared and integrated.
- Safety is not just the responsibility of HSE and operational staff; it must be taken into account in the decisions of all departments (procurement, industrial policy, engineering, real estate, human resources, etc.).
- The organisation identifies the difficulties which the organisation chart introduces at the interface between departments and encourages the cross-departmental cooperation necessary at the sharp end, particularly with regard to the analysis and handling of information relating to risky situations and accidents.

A.4.2 The HSE department

- The HSE department provides management, teams, and employee representatives with support in implementing the safety policy and handling risky situations.
- The HSE specialists have sound knowledge of the sharp end of operations and ensure that recommended safety measures are realistic.
- HSE specialists are encouraged to have contact with external safety professionals and academic experts.

A.4.3 Human resources, training, skills management

HR policies take safety into account (onboarding of new managers and sharp-end workers, employee retention to avoid excessive turnover…). In particular, forward-planning of the age pyramid and of jobs and skills helps to avoid the effects of entire generations arriving or leaving *en masse*, since this compromises knowledge transfer.

The organisation ensures that the individual and collective skills needed to manage risky situations are acquired and developed.

Safety is valued as an aspect of professionalism:

- All staff perceive safety as an integral part of work practices and professionalism rather than as an "extra layer" that is added to the skill set of each occupation.

5. See Kamaté, C. (2016). *Participation citoyenne et risques industriels: quelques pistes pour engager une démarche*, Numéro 2016-03 of the *Cahiers de la sécurité industrielle*, and all of FonCSI's publications on the topic of concertation, https://www.foncsi.org/fr/publications/thematiques/concertation

- When they are necessary, formal practices to avoid errors (pre-job briefing, risk analysis, preliminary observation, self-checking, repeating (read-back) critical messages, verifying with a third party if in doubt, cross-checking, debriefing, reporting dangerous situations), are valued as dimensions of professionalism. The corresponding resources – including time – are available.
- Safety practices are an integral part of all vocational and on-the-job training, even if the training is conducted by simulation or in a risk-free situation.
- Training and accreditations for the use of special systems and equipment (safe driving certificates, scaffolding…) are adapted to the activity (and not just compliant with regulations). Sufficient time is set aside after certification for learning to continue via a buddy system.
- Having a third party check that a task was completed properly is not perceived as a lack of trust, but rather as a component of collective skill and vigilance.

A.4.4 The employee representative bodies contribute to safety

- The organisation recognises the role the employee representative bodies (and particularly the health and safety committee) play in ensuring safety and provide them with the necessary resources (time, training…).
- The employee representatives recognise that safety is an area in which collaboration with the company's top management is essential.
- The representative bodies focus on the most significant risks and on the precise analysis of concrete situations in which safety is likely to be jeopardised.
- The representatives and staff of contractor companies are involved in certain ways in the work conducted by the health and safety committee.
- The employee representatives discuss any risky situations they have identified with the most appropriate people in the management team, without waiting for health and safety committee meetings.

A.4.5 Dealings with contractor companies

- The safety indicators include events involving contractors.
- Decisions on whether to outsource an operation, contractor selection, and contractor agreements all take the safety element into account[6].
- The quality standard of the logistical services provided to contractors by the client (planning, welcome on site, tools, equipment availability) is equivalent to the standard of work expected of them.
- The reporting of risky situations by contractors is valued.
- Reviews of contracted work include an evaluation of the logistical services provided by the client and not just an evaluation of the contractor's performance.

A.5 Management leadership and employee involvement

A.5.1 The importance granted to safety in decisions and compromises

Safety is a visible criterion in all strategic and operational decisions. Nevertheless, the organisation does not claim that safety is the only decision criterion: this would be impossible to uphold and inevitably lead to contradictions between words and actions.

When it is not possible to choose the best solution from a safety perspective – for example, investing to replace defective equipment is not immediately possible –, **compensatory measures** are implemented and explained – for example, a reduction in capacity or increased monitoring and checking.

6. See "Subcontracting" discussion group (2008). *La sous-traitance: guide d'aide à la décision.* Issue 2008-04 of the *Cahiers de la Sécurité Industrielle.*

A.5.2 Management leadership[7]

- Management is a key contributor to the safety culture. The behaviours of managers at all levels, and the importance they grant to safety in their very concrete decisions, are the main factor that determines the behaviours of all other actors with regard to safety.
- Managers don't just set an example by following all the safety rules imposed on the other actors (wearing PPE, for example). Workers constantly observe the ways in which their superiors effectively incorporate safety into their actions and decisions on a daily basis. Any decision interpreted as contrary to safety – and not accompanied by compensatory measures –, any compliment given for productive performance even though liberties were taken with safety, will be perceived as encouragement to prioritise productivity over safety. Furthermore, any decision that is theoretically motivated by safety but demonstrates a lack of knowledge about the reality at the sharp end of operations and is therefore inapplicable, will contribute to a general rejection of safety "as the bosses see it".
- Managers are supported by their own superiors in order to implement a participative/directive (top-down/bottom-up) style combining high standards and a great capacity for listening to workers and taking into account the reality of operations.
- For a manager, safety leadership requires sound knowledge of the risks the company faces and its "safety policy", as well as sound knowledge of the situations in which it is their responsibility to give instructions and find solutions. This leadership is reinforced by their initial training, their onboarding process, continuing professional development, their forms of presence in the field, and the channels they set up to encourage the upward flow and handling of information and discussions about risky situations.
- Managers get particularly involved in the preparation and execution of risky operations and in analysing undesirable events. They encourage collaboration on safety-related matters within their team and with other departments.
- The manager welcomes real-time questions (such as phone calls) from an operational team facing an unexpected situation, as well as issues reported by employee representatives. Any team or worker confronted with a dangerous situation has easy access to both their direct superior and the next-level manager.
- Operation reviews look not only at the outcome (the operation was carried out as planned), but also at any difficulties encountered and the human cost of these.
- Managers are trained in implementing compensatory measures when all of the usual safety criteria are, temporarily, not in place: deciding on a change of schedule or load, paying extra attention to team composition, developing the use of local expertise, increasing supervision, consolidating briefings and debriefings…
- Managers encourage regular discussion among their team members about risky situations and the solutions to implement.
- Managers get involved in finding technical or organisational solutions to any difficulties encountered.
- The organisation ensures that all managers have the skills, authority and resources to take safety into account at their level, and that they have the possibility of escalating to their own superiors any dangerous situations that fall outside the scope of their own decision-making authority.
- Within decision-making bodies, differences of opinion are valued as a prerequisite to making decisions relating to safety.
- Managers are given opportunities to share their difficulties and experiences in promoting safety.
- Participation in the upward flow of information regarding hazardous situations and in the handling of these is a significant part of each actor's performance reviews.

The elements of management leadership which are desirable at each echelon of management are the subject of a *Cahier de la sécurité industrielle*.[8]

7. See the "Leadership in safety" working group (2011). *Leadership in safety, industrial practice*. Issue 2013-06 of the *Cahiers de la sécurité industrielle*.
8. See the "Leadership in safety" working group (2011). *Leadership in safety, industrial practice*. Issue 2013-06 of the *Cahiers de la sécurité industrielle*.

A.5.3 Employee involvement is encouraged

- Participation in the upward flow of information and in the analysis of dangerous situations and high-potential incidents is encouraged by a climate of trust (p. 89).
- The operational teams are involved in safety cases and risk analysis.
- The operational teams are involved early on in any facility design or transformation projects.
- Workers are involved in the drafting of any procedures.

A.5.4 Occupational groups are supported

- The organisation recognises that **certain occupational groups (teams, occupations) can contribute to safety**, by sharing their professional experience, debating practices, maintaining collective vigilance, and checking their members' activities.
- Occupational groups are regularly given the opportunity to discuss difficult or dangerous situations. Warnings and suggestions from these groups are taken into account by management and ensuing measures/actions are communicated.

A.6 Attention is paid to barrier performance during the design process and in daily activities

A.6.1 Process design (technical and organisational) and safety

Safety relies on **technical and organisational barriers**. These are not only designed and implemented as best as possible, they are also maintained and adapted as they age or when changes occur in the environment or in operating conditions.

Change management processes

The processes for managing organisational change or technical projects grant significant importance to safety, particularly by involving sharp-end workers and employee representative bodies[9] early on.

Technical barriers

- The design of technical equipment and facilities takes into account human and organisational factors[10].
- The technical barriers (such as automated systems) that ensure safety are compatible with all production and maintenance operations. When a barrier needs to be deactivated to perform an operation, the decision is approved by someone who is senior to the workers who are going to be performing said operation, and a trace is kept.
- The tools and PPE required to perform an operation safely are available.
- The state of the technical barriers is monitored or the subject of independent inspections; regular maintenance is carried out. Barrier integrity is checked after all maintenance operations.

9. See Daniellou, F. (2013). *Les facteurs humains et organisationnels dans le projet de conception d'un système à risques.* Issue 2013-05 of the *Cahiers de la sécurité industrielle.*
10. Same reference.

Organisational resources

- When a new organisation is being implemented, its ability to deal with different incident scenarios is evaluated (for example, through organisational simulations).
- The transitional measures put in place whilst moving from the existing system to the new organisation (relating to recruitment, training and accreditations, for example) are planned over a sufficient period of time.

A.6.2 The safety management system

Everyone is familiar with the main barriers and their roles.

The rules and procedures:

- The organisation gives careful thought to the essential safety rules that must be followed in all circumstances (**golden or life-saving rules**[11]). It ensures that they can actually be followed at all times, i.e. that the golden rules are appropriate to the broad range of situations which can occur at the sharp end. There is a dual obligation with respect to these rules: the operators performing the operation are obligated to follow them, and they have an obligation to report any circumstances in which the conditions for following these rules are not in place.
- The situations requiring strict adherence to a procedure are stated explicitly (critical tasks, rare operations).
- **Processes and procedures are drafted using a participative approach involving all of the teams concerned.** This process takes into account the collective aspects of carrying out an operation, as well as the human cost associated with performing a task (duration, time pressure, efforts, positions, exposure to other risks…). The goal is to make the task as easy and comfortable to perform as possible. When the measures necessary for performing a task safely complicate the operating procedure, an acceptable solution is worked out with the actors concerned (otherwise it is likely they will often be disregarded).
- Any documentation is regularly updated and readily available.

A.6.3 Taking human and organisational factors into account

- The organisation's main actors understand the concept of organisational accident, the role of human beings as fallible sources of safety, the factors that most influence their behaviour, the impossibility of eliminating discrepancies and errors, and the importance of correcting these[12].
- When working environments are being designed, human factors are taken into account to ensure they are adapted to human characteristics and to the tasks required.
- Situations that generate a high human cost – even if the final performance is satisfactory – are identified and addressed.
- The difficulties which workers perceive as obstacles to "doing their job well" are heard and addressed. The signs relating to psychosocial risks within a team lead to analysing any difficulties in carrying out the work and any conflicts between the objectives and the resources available.

A.7 The right balance between rule-based and managed safety

The organisation thinks carefully about what **the right balance between rule-based safety and managed safety** would be in its particular circumstances. It channels investments into each in a manner consistent with the conclusions reached.

11. See Groupe d'échange "Prévention des accidents graves et des accidents mortels". *Déployer une démarche Règles d'or.* Issue 2017-04 of the *Cahiers de la Sécurité Industrielle.*
12. See Daniellou, F., Simard, M., Boissières, I. (2011). *The Human and Organizational Factors of Safety: State of the Art.* Issue 2011-01 of the *Cahiers de la Sécurité Industrielle.*

A.7.1 What we can anticipate: preparing and checking special operations

- The preparation of planned special operations combines expert skills and operational skills, and includes a risk analysis in conditions that are as close as possible to those in which the operation will be carried out. The necessary resources are allocated to this preparation. During large-scale maintenance operations, the schedule and procedures are updated regularly.
- The conditions for **equipment outages and lockout/tagout for maintenance** are formalised and implemented without exception by plant employees[13].
- For certain risky operations, the result is checked by workers different from those who performed the operation.

A.7.2 Taking all possible precautions to manage the unexpected

- The organisation's ability to deal with unexpected situations successfully in real time is determined by the skills of the operational teams and front-line management.
- These skills can be developed by conducting regular simulations and drills based on complex situations, associated with careful debriefing
- In unusual situations, workers and management know to gather several opinions, including those of "sharp-end experts", even if the latter are not the most senior employees. Technical experts can easily be reached at any time in the event of an unusual situation.

A.7.3 A flexible culture

The organisation plans for changes in decision-making processes during crisis situations. It can reconfigure the chain of command if the situation requires it.

In some companies, given the isolation of certain workers, potential loss of communications and the quick reactions required to maintain safety, it can be necessary, during a crisis, to shift from a rather centralised mode of organisation to a more decentralised one. This means that local management needs to have a broad enough view of what is at stake, the skills and resources to take appropriate safety-related decisions autonomously, and the actors need to have been prepared for this change in organisation.

In other organisations, on the other hand, high-ranking decision-makers (such as a national crisis unit) are mobilised when a crisis arises. The allocation of responsibilities must be regularly tested through simulations.

A.7.4 Crisis preparation

The organisation prepares its response to the crisis scenarios it is capable of imagining, even if these are highly unlikely. Workers are trained and have the necessary resources at their disposal to deal with these configurations that are able to be anticipated. Regular simulations which include external actors (emergency services, local residents, media…) make it possible to test and improve crisis organisation. The lessons learned from this are shared widely.

13. See the "lock out, tag out" discussion group (2013). *Mise/remise à disposition d'équipement: pratiques industrielles de consignations électriques, mécaniques, de fluides et voies de circulation.* Issue 2013-02 of the *Cahiers de la sécurité industrielle.*

B

Examples of operational objectives

This appendix presents **examples** of operational objectives (p. 91) that are likely to be set with a view to improving the safety culture. Its aim is only to illustrate possible actions, which must always be limited in number and adapted to the organisation's specific context.

Give priority to major risks

- move away from safety management based only on the incident rate, by developing indicators relating to industrial safety;
- develop humble communication regarding the permanence of risk and the fact that everyone contributes to its prevention;
- share operational experience feedback regarding serious incidents that have taken place elsewhere;
- base the safety components of managers' "performance reviews" on their actions with regard to industrial safety…

Make visible any changes to the way the executive committee operates

- pay attention to potential differences between the executive committee's perception of safety-related matters and that of other categories of actors;
- acknowledge the possibility of a serious industrial accident and conduct regular safety drills;
- recognise that there needs to be a balance between rule-based safety and managed safety;
- encourage a range of different points of view as a prerequisite to making a decision;
- accept the existence of conflicting priorities and the need for compromises and trade-offs; give up on the idea that all parameters can be optimised simultaneously;
- investigate certain issues based on the reality at the sharp end of operations before making a decision;
- support middle management (see further on);
- encourage a commonplace and humble presence of top-level management at the sharp end of operations (not only in the context of safety inspections)…

Fight employee silence and encourage upward information flow

- develop a "just culture" with an explicit, accepted and entity-wide policy for positive recognition and sanctions;
- effectively support and organise the right to stand down and stop work in dangerous situations;
- develop an industrial policy that encourages contractors to contribute to reporting and handling risky situations;
- encourage and organise discussion about risky situations between professionals within the teams;
- ensure that all reported issues are dealt with effectively and that feedback on ensuing measures/actions is given to those who reported the problem (closing the feedback loop);
- make operational experience feedback results available and accessible;
- develop an anonymous whistle-blowing system for the most dangerous situations…

Combat the effects of organisational silos

- ensure that safety becomes a priority for all support functions (procurement, engineering, HR, real estate…);
- facilitate HSE specialists' role of supporting management;
- eliminate competition between different functions and the search for a "guilty department" when something goes wrong;
- encourage collaborations through a better understanding of what other people's jobs entail (via immersions, for example);
- encourage cross-departmental cooperation in safety-related matters (design of safety barriers, operational experience feedback, follow-up actions after incidents…). Enable local collaborations between different relevant functions without having to refer to the first common "boss" in the organisation chart…

Encourage contributions of the health and safety committee to industrial safety

- involve the health and safety committee in all stages of the plant lifecycle;
- enable joint participation of employee and top management representatives in training courses and debates about the human and organisational factors of industrial safety;
- encourage health and safety committee visits focused on industrial safety;
- encourage direct interactions between representatives of the health and safety committee and HSE experts or managers without waiting for the quarterly meeting;
- encourage contractor company representation (for example, a site-specific health and safety committee).

Support safety leadership from management

- encourage manager presence at the sharp end of operations by addressing the reasons that limit it;
- involve local management in the forward planning of age structure, jobs and skills;
- support open listening and the handling of dangerous situations;
- encourage team discussions about risky situations and the formulation of diverse points of view and contradictions;
- ensure transparency with regard to any decisions made by the executive committee which are likely to have an impact on safety, and train management to implement compensatory measures when all "ideal" conditions are not in place;
- ensure each team understands the constraints faced by the other departments with which they work, and enable cross-departmental collaboration;
- ensure that reviews following incidents and interventions (or of internal employees and contractors) focus not only on performance, but also on the human cost generated, in order to correct any deficiencies in effectiveness (the objective was not achieved) and any efficiency issues (the objective was achieved but at a high cost to the people involved and the organisation);
- encourage the identification, analysis and leveraging of beneficial initiatives;
- encourage attention paid to the health of individuals and groups;
- identify and ease time constraints that are incompatible with safety;
- introduce into the onboarding process for new managers an in-depth discovery of the reality at the sharp end of operations and of interfacing departments, and prepare them for regular presence in the field;
- support each manager in developing their role with regard to safety;
- encourage manager training in the human and organisational factors of safety;
- offer each manager as attentive an ear as that expected of them with their own teams;
- set up loops for dealing with questions that fall outside the manager's scope of authority…

Increase employee involvement

- implement participative approaches for design, modification or reorganisation projects;
- make safety meetings more interactive and conducive to discussions and information sharing;
- foster a climate of trust to encourage the upward flow of information;
- encourage discussions about risky situations between professionals;
- promote the existence of safety champions within the teams.

Upgrade technical safety

- ensure that the main technical barriers are identified, known by all, and maintained;
- fix any reported equipment failures promptly;
- involve operational staff and experts in the human and organisational factors of safety in a more participative approach to the design of technical systems and facilities (initial design and modifications);
- identify unsuitable work tools or protection systems using a participative approach, and replace them with others that promote safety;
- ensure that the state of any elements vital to safety is checked by an independent party…

Restoring meaning to the SMS

- shift away from an external justification rationale in order to use the SMS as an internal tool for developing industrial safety;
- eliminate from the SMS any assertions that sound good but do not reflect the reality of operations…

Design better rules to avoid deviation becoming the norm

- develop golden rules that are effectively applicable and carry a dual obligation (p. 105);
- organise participative detection and handling of situations where the rules are not applicable;
- elaborate a policy for determining necessary procedures and their status (critical tasks, rare tasks…);
- distinguish between "reminders" and "mandatory checkpoints" in procedures;
- involve the teams in the drafting of any procedures…

Introduce safety as an integral part of vocational and on-the-job training

- make safety an integral part of professional training, rather than an "extra layer";
- organise training so that trainees are confronted with unusual situations and not just "normal situations", and so that it encourages the collective discussion of observations and solutions;
- encourage the employees who have been there longest to share stories of the risky situations which they have encountered;
- improve the quality of lockout/tagout processes;
- ensure sufficient overlap between retiring experienced employees and new recruits…

Ensure that regulatory authorities understand the transformation process that is under way

- correct any lack of transparency that may have existed in dealings with regulatory authorities in the past and which is incompatible with the safety culture improvements sought;
- help the regulatory authorities understand the balance sought between rule-based safety and managed safety;
- explain to them the transformations that are under way in order to avoid any misunderstandings and orders that could be detrimental to the process.

Prepare for crises together

- conduct crisis drills regularly and involve all of the categories of actors concerned.
- involve the different stakeholders in ensuing debriefings.

List of abbreviations
(for Part One and Part Two)

ATEX:	Explosive atmospheres (derived from the French – ATmosphères EXplosibles)
CSB:	U.S. Chemical Safety and Hazard Investigation Board
PPE:	Personal protective equipment
Eurocontrol:	European intergovernmental organisation for the safety of air navigation (41 members)
HAS:	Haute autorité de santé (French national health authority)
HOF:	Human and organisational factors
HSE (acronym):	Health, safety and environment
HSE or UKHSE (name):	Health and Safety Executive, the body responsible for workplace health, safety and welfare in the UK
IAEA:	International Atomic Energy Agency
INPO:	Institute of Nuclear Power Operations, a non-governmental organisation
INSAG:	International Nuclear Safety Advisory Group
KPI:	Key performance indicator
NASA:	National Aeronautics and Space Administration (USA)
NRC:	Nuclear Regulatory Commission (USA)
OGP, now IOGP:	International Association of Oil and Gas Producers
HR:	Human resources
SMS:	Safety management system
WANO:	The World Association of Nuclear Operators, which unites nuclear plant operators from around the world to encourage interactions on the topics of safety and operational excellence. Membership is voluntary.

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