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SAFETY CULTURE AS A WAY OF RESPONSIVE REGULATION: PROPOSAL FOR A NUCLEAR SAFETY CULTURE OVERSIGHT MODEL

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Abstract
Despite a substantial body of literature dealing with the relation between safety culture and safety operations, little is a said concerning the safety culture oversight by a regulatory body. With a focus on a safety culture observations process, this paper takes up the challenge of finding a way to link safety culture and safety regulation. The lack of a common theoretical and methodological framework concerning safety culture constitutes certainly a barrier to the development of assessment tools. The aim of this article is to propose a model for a safety culture oversight. From a regulatory body perspective, we suggest that three fundamental cultural mechanisms must be addressed: the level of consensus about safety values; the degree of consistency between underlying assumptions of social groups; and the fitness of frames of reference regarding the specific risks of an installation.

Keywords
safety culture, safety culture assessment, regulatory body oversight, responsive regulation

1.Introduction

Traced back to the Chernobyl Accident analysis (INSAG-1), the concept of safety culture is regarded as a central phenomenon influencing behaviours and values within high-risk organisations. There is a wide belief that culture has a strong and deep impact on individuals' standard of behaviours, professional groups' practices and organisational performance. Exerting a considerable influence, safety culture is then considered as a major element of a safety management system (Grote and Kunzler, 2000).

Safety culture has therefore generated a great attention in recent years. A growing interest in the concept has been witnessed in the nuclear field but also in high-risk activities as air traffic control (Ek *et al.*, 2007; Gordon *et al.*, 2007), maintenance (Farrington-Darby *et al.*, 2005; McDonald *et al.*, 2000), offshore drilling (Naevestad, 2008; Haukelid, 2008), construction (Choudhry, 2007; Gherardi *et al.*, 1998) or shipping (Havold, 2010). As mentioned, the attractiveness of culture for safety matters is obviously linked to the assumed relation between safety culture and safety operations (Morrow *et al.*, 2014).

For an author such as Guldenmund (2000), *"organisational culture is a relatively stable, multidimensional, holistic construct shared by (groups of) organisational members that supplies a frame of reference and which gives meaning to and/or is typically revealed in certain practices"*. From a safety perspective, culture could be defined as the deeply rooted and shared interpretations, assumptions and beliefs guiding behaviours towards risks: critical to success or failure in high-risk organisations, safety culture could therefore be a cause of blindness but, in the same token, enables people to be sensitive to early warning signals. For instance, in Turner's model of accident (1978), frames of reference through which hazards are perceived and managed constitute the core of "failures of foresight". That means that an organisation can go into a "cultural denial" regarding safety issues that fall outside a legitimated frame. Following this line of thought, the High Reliability Organisations (HRO) theory suggests, in turn, that this kind of structure is characterized by an organisation-wide preoccupation with failures and a reluctance to simplify interpretations: enacting

people capabilities to become alert, to be aware of signals and to react, culture is one of the critical factors, if not the main source, explaining the high safety performance level of HRO (Weick, 1987; Klein *et al.*, 1995; Bierly and Spender, 1995).

In contrast, there is little common understanding of the concept definition (Guldenmund, 2000; Cooper, 2000) and, consequently, it should be stressed a lack of agreement concerning the assessment methods or practices to be implemented (Hopkins, 2006; Mkrtchyan and Turcanu, 2012). There are several ongoing debates about safety culture issues: what are the distinctions between safety climate and safety culture? What are the links between culture and safety culture? How safety culture affects individual behaviour? Can it be managed or controlled? Can culture be measured? In short, unresolved debates persist.

The concept is also actively contested. Some authors suggested that safety culture presents the risk of avoiding technical issues or downplaying the importance of technology design (Rollenhagen, 2010). Likewise it is pointed out that safety culture discards deeper organizational analyses taking into account interactions between culture, technology and structure (Naevestad, 2009), power relations (Antonsen, 2009a) or actual meanings behind observable behaviours (Guldenmund, 2010). Moreover, a universal vision of safety culture could have a negative impact when implemented in a particular national culture without adaptation (Chikudade, 2009).

However, the purpose of this paper is not to directly address these questions but to explore the safety culture potential for a regulatory body, in particular in the nuclear field. Many researches have been already conducted on safety culture within nuclear installations (Lee, 1998; Lee and Harrison, 2000; Wilpert and Itoigawa, 2001; Harvey, 2002; Findley *et al.*, 2007; Mengolini and Debarberis, 2007; Reiman *et al.*, 2012; Mariscal *et al.*, 2012; Garcia-Herrero *et al.*, 2013; Rollenhagen *et al.*, 2013). Despite this large amount of studies, few of them focused on regulatory bodies strategy needs. In other words, little guidance is provided on how regulatory bodies might provide a safety culture oversight (Sorensen, 2002).

Outlining a model of safety culture observation (SCO) within the Belgian regulatory body[1], we argue that what is at stake for a regulatory body is nothing less than a new way of regulation. Between the compliance-based and the goal-oriented regulation models – the two basic models of regulation according to Wilpert (2008) – safety culture represents an opportunity to open up safety dimensions to be captured. Within a compliance-based regulation, a focus is given on the degree of the licensees compliance towards rules prescription, and, consequently, on potential discrepancies. Within a goal or performance-based orientation, the regulator compares the performance of the licensees regarding criteria defined beforehand: performance indicators, accident precursors or probabilistic risk assessment are considered as variants of this oversight model (Baker, 1994).

The compliance-based regulation is grounded on an analytic perspective focusing on the control of isolated technical components. This traditional regulatory strategy allows a formalism that help to foster greater compliance. Nevertheless this prescriptive approach implies a "by-the-book" enforcement style that could induce an "adversarial legalism" on the part of the licensees. There is a large consensus considering that rigid enforcement is not optimal in order to develop a cooperative climate between inspectors and a licensee (May and Wood, 2003; Hopkins and Hale, 2002) or to promote the continuous improvement of a plant (Marcus, 1988). Rather than seeking requirement adherence, performance-based regulation embodies the notion that regulation should be based on specific outcomes to achieve. Based on outcomes monitoring, this regulatory model grounds therefore on a reactive strategy. As a core disadvantage, this approach tends to focus on well-known risks or familiar issues that could give rise to narrow safety assessments. Besides, it requires a large administrative capacity and significant resources on the part of regulators to be able to assess data.

In addition, compliance-based and goal-oriented regulation models are inadequate

[1] The Belgian regulatory body is composed of the FANC (Federal Agency for Nuclear Control) and its technical subsidiary Bel V. The safety culture observations system presented in this paper have been jointly developed by Bel V and FANC.

methods to deal with human factors issues. More largely, both are unable to reduce the asymmetry of information between regulators and regulated.

Conversely, safety culture enables a holistic and a systemic view of safety. Safety culture cannot be directly regulated but it can be observed in order to develop a cross-cutting perspective of an installation and to engage a licensee in the continuous improvement of its behavioural and organisational capabilities. Extending the field of intervention of a regulatory body and its understanding of a licensee frame of reference, safety culture observations contribute to a more flexible oversight. Then, between the two classical and extreme regulatory body strategies, an alternative could be found through a "Responsive regulation" model (Ayres and Braithwaite, 1992).

2. Defining safety culture

1.1. Safety culture through international documents

As already said, the concept of safety culture was developed in the aftermath of the Chernobyl accident. The concept was first introduced in the IAEA INSAG-1 (1986) and further expanded in INSAG-3 (1988) and INSAG-4 (1991). In the latter document, the term was explicitly defined as *"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"*. This definition represents progress comparing with earlier IAEA definitions to the extent that INSAG-4 highlights an important feature of safety culture, *i.e.* its two fundamental sides: safety culture is both structural (organisational structure, roles and responsibilities, documentation, policy statement…) and attitudinal (perceptions, social norms, way of thinking, and patterns of behaviour).

In addition this document draws out three main levels of safety culture: the policy, the managerial and the individual levels. For instance, regarding the individual level, a questioning attitude, a rigorous and prudent approach and communication are considered as the basis of sound safety culture.

Following these IAEA publications, several other documents have been published in order to enhance safety culture through key issues to be observed (INSAG-15, 2002), surveys or self-assessment methods to be implemented (TECDOC-1321, 2002; TECDOC-1329, 2002) or the identification of safety culture development stages (SRS-11, 1998). More recently, the GS-R-3 (2006) and the GS-G-3.1 (2006) standards draw out the five main characteristics describing safety culture[2]. Each of these characteristics is supported by a series of attributes..

Despite some attempts in different IAEA documents, regulatory perspective has not been taken into account until a recently released document (TECDOC-1707, 2013). This document outlines a safety culture oversight process (or SCOP), compares the potential approaches (among others, self-assessment reviews, on-site inspections, interviews or observations) and highlights the need for establishing a common understanding and a continuous dialogue between a regulator and a licensee. In the same line of thought, a safety culture observations process has been implemented within the Belgian regulatory body.

1.2. Overview of a process

Regulators can require licensees to show proof of their efforts to establish and maintain a high level of safety culture. As presented in this paper, a regulatory body could also develop a system of data gathering and analysis aiming at a better understanding of a licensee safety culture. In a nutshell, the SCO process, implemented since 2010 within the Belgian regulatory body, is based on field observations provided by inspectors or safety analysts during any contact with a licensee (inspections, meetings, phone calls…). These observations are recorded within an observation (excel) sheet aimed at describing factual and contextual issues[3]. These observations are then linked

[2] We can also note the INPO position (INPO 12-012, rev.1, 2013) – adopted by WANO (WANO GL 2006-02, 2006) – concerning the safety culture key dimensions: Everyone is personally responsible for nuclear safety; Leaders demonstrate commitment to safety; Trust permeates the organization; Decision-making reflects safety first; Nuclear technology is recognized as special and unique; A questioning attitude is cultivated; Organizational learning is embraced; Nuclear safety undergoes constant examination.

[3] The observation sheet gives a homogenous framework to introduce information about the facility, the type of

to safety culture attributes based on IAEA standard (see table 1).

Table 1: Oversight approaches

	COMPLIANCE-BASED	GOAL-ORIENTED	RESPONSIVE
RELATION TO REGULATES	Prescriptive	Reactive	Proactive
METHODOLOGICAL APPROACH	Analytic	Performative or probalistic	Holistic and systemic
RB EXPECTATIONS	Adherence	Achievement	Mindfulness and improvement
OVERSIGHT FOCUS	Level of rule compliance and discrepancies	Methods and ouputs monitoring	Frames of reference

However, it should be stressed that the purpose of the process is not to give a comprehensive view of a licensee safety culture but to address findings that must require attention or action on the part of a licensee. In other words, gathering safety culture observations aims at identifying cultural, organisational or behavioural issues in order to feed a regulatory response to potential problems. Safety culture observations are then fully integrated in routine inspection activities and must be seen as input of the overall oversight process.

Operationally speaking, a "Safety Culture Coordinator" (SCC) is in charge of the observation analyses and reporting. In case of a significant safety (culture) problem, a direct reporting to the licensee is considered. On a regular basis, the SCC provides a series of reports (see table 2). These reports aim at identifying early signs of safety problems and recording recurrent observations. As a result of this, it could be decided to analyse a plant's performance more in detail in order to understand the underlying causes of a problem or to focus inspections on specific aspects. On an annual basis, a detailed report is released and a synthesis is presented and discussed with the licensee. The objective of this discussion is to be sure that the licensee understands the regulator concerns.

From a methodological perspective, observations focus on facts – *i.e.* information based on real occurrences: behaviours, statements, discrepancies… – and take into account the context. The first objective is therefore to answer to the "What happened?" question. An observable fact could be either organizational (a resource mismatch, a backlog, a staffing problem…) or behavioural (a statement concerning cooperation or communication, a lack of verification or communication, a relevant decision, a disregard for rules…). Secondly, an observation has also to be enhanced with answers to some other generic questions (who, where, when…) in order to describe the workplace situation as far as possible: the operation or activity, the people involved (function, department, organisation…), the problem to be solved, the document really used or not, the management role, the communicational context (one way communication, participation…), work conditions (stress, workload…), etc.

However, observing safety culture is not a natural approach for engineers. Guidance and coaching are needed to provide them an appropriate framework.

2. Observing safety culture

2.1. The two main approaches of culture

Culture could be presented either in terms of observable behaviours ("The way we do things around here") or either as a system of meanings, a shared understanding within a given organization ("How we grasp the world"). These different approaches, respectively called "functionalist" and "interpretive" (Glendon and Stanton, 2000; Richter and Koch, 2004; Naevestad, 2009), are the two main perspectives defining what culture is and how to collect data. After a short description of these two approaches, the next point will consider the multi-layers feature of culture.

From a functionalist perspective, culture is something the organisation *has*. Safety culture is then a set of behaviours, attributes, processes or policies assuring that safety is an overriding priority. Considered as an ideal to which organisations should aspire, (a good) safety

intervention during which the observations has been made (inspection, meeting, etc), the topic (matter of inspection/discussion) or the date of observation and possibly the reference report. More fundamentally, a safety culture observation also implies the description of the context, the identification of safety culture attributes, an appreciation (positive or negative) and an argumentation developing the reasons why the observed fact is linked to safety culture.

Table 2: Safety culture dimensions and attributes

SAFETY CULTURE DIMENSIONS		ATTRIBUTES
A. Safety is a clearly recognized value	A1.	The high priority given to safety is demonstrated in communication and decision making and reflected in documentation
	A2.	A proactive and long term approach to safety issues is shown in decision making
	A3.	Safety conscious behaviour is socially accepted and supported
	A4.	Safety is a primary consideration in the allocation of resources
B. Leadership for safety is clear	B1.	Commitment to safety is evident at all levels of management including corporate management
	B2.	There is visible leadership showing the involvement of management in safety related activities
	B3.	Management seeks the active involvement of individuals in improving safety
	B4.	Relationships between management and individuals are built on trust
C. Accountability for safety is clear	C1.	Roles, responsibilities and accountability for safety are well defined and clearly understood
	C2.	There is a high level of compliance with rules and procedures
	C3.	Ownership for safety is evident for all individuals and reflected in work environment and plant conditions
	C4.	An appropriate relationship with the regulator ensures that the accountability for safety remains with the licensee
D. Safety is integrated into all activities	D1.	Consideration of all types of safety including nuclear, radiological, industrial, environmental and physical safety is evident
	D2.	Processes from implementation to review ensure that an adequate level of safety is maintained
	D3.	Safe working conditions exist with regard to time pressures, workload and stress
	D4.	Cooperation and teamwork ensure that an adequate level of safety is maintained
	D5.	Factors affecting human performance are considered
E. Safety is learning driven	E1.	A questioning attitude prevails at all organizational levels
	E2.	Open reporting of deviations and errors is established and supported
	E3.	Operating experience (both internal and external to the facility) contribute to continuous improvement
	E4.	Internal and external assessments, including self-assessments contribute to continuous improvement
	E5.	Safety performance indicators are tracked, trended, evaluated and acted upon
	E6.	There is systematic development of individual competences including leadership

This table lists the attributes used in the process described in the paper. Similar examples of attributes structure can be found in the guidelines established by the Bulgarian (2011) and the Romanian (2010) regulatory bodies and supported by the IAEA (Tronea, 2014).

culture is established when a set of features are implemented. In one hand, this ideal should be manipulated to serve the organisation. In the other hand, it implies that the management plays a major role as initiators of a safety culture shape. Reason (1997), for instance, asserts that managers contribute to safety culture through punish and reward practices, *i.e.* a "just culture"[4].

Within this top-down approach, safety culture can be then engineered. It follows that this perspective favours quantitative methods (questionnaires, measures of perception…) and seeks to identify the general attributes of a strong or good safety culture. Researches within this standpoint, direct attention to safety climate, which can be defined as a "snapshot" (Cox and Flin, 1998), a manifestation of Safety culture. Following the seminal work of Zohar (1980), many authors have therefore attempted to determine factors reflecting safety culture or climate. For instance, Flin *et al.* (2000) identified three cores themes, *i.e.* mana

[4] According to Reason (1997: 195), safety culture is based on four critical subcomponents that create an informed culture: a reporting culture, a just culture, a flexible culture and a learning culture.

Table 3: SCO process map

	Inspectors / Safety Analysts	Safety culture coordinator	Aims	Impacts on oversight process
Each month	Continuous safety culture observations	Observations analysis	• Improve observations (description and classification)	• Potential direct reporting to the licensee
Each quarter		Synthetic report	• Identify early sign of SC issue • RB internal discussion	• In depth analysis • Focus inspections on specific dimensions
Each Year		Detailed report	• Identify persistent sign of SC issues • Discussion with the licensee	• Feeding annual inspections programme • Follow-up of licensee actions
Pluri-annual		Tendency report	• Identify deep-seated SC issues • Discussion with the licensee	• Feeding annual inspections programme • Follow-up of licensee actions

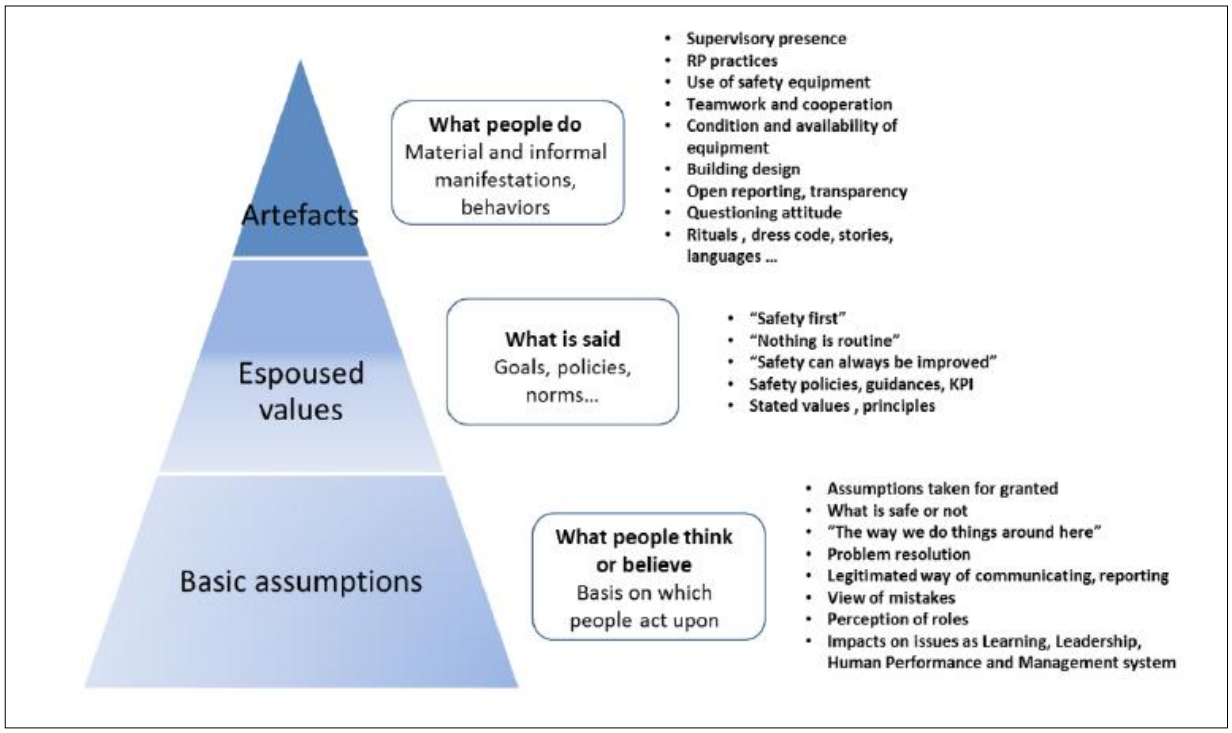

Figure 1: Adapted depiction of Schein's (1985) layered model

gement, safety system, and perceptions of risks, as the main themes of safety climate measurements. In the nuclear field, Lee and Harrisson (2000) have drawn out the effects of safety culture on different organisational issues as team briefings, economic pressure or rule compliance. Harvey *et al.* (2002) identified factors influencing safety culture such as job satisfaction, leadership style and communication, risk taking and awareness, responsibility and commitment, complacency and avoidance of responsibility.

Conversely, from an interpretive perspective, culture is something the organisation *is.* Considered as a shared pattern of meanings constructed within social groupings, safety culture defines beliefs – what is safe or dangerous (Vaughan, 1996) – motivates and legitimizes behaviours through a shared repertoire of positively and negatively-loaded meanings (Reiman and Oedewald, 2004) or enables collective identity (Gherardi *et al.*, 1998). In contrast with the previous perspective, culture is a bottom-up phenomenon emerging through in-

teractions within groups grounded in a specific context of technology (Rochlin, 1999).

This perspective is then reluctant to adopt an instrumental treatment of the concept or to seek for generic features of a good safety culture. Interpretive studies on safety culture focus on thick descriptions of work activities, actor's meanings and occupational culture (Atak and Kingma, 2011; Antonsen, 2009b; Naevestad, 2008; Farrington-Darby *et al.*, 2005; Brooks, 2005). However, except for some scholars (Perin, 2005; Bourrier, 1996), there have been few attempts to adopt this kind of ethnographic approach in the nuclear field.

2.2. Open up inspection practices

As we have seen, standards and guidelines in the field develop different lists of key attributes indicating what a good safety culture is. Many statements as questioning attitude, trust between management and operators or cross-functional teamwork are attributes commonly considered as characteristics of a strong safety culture. Conversely, warning signs of a weak safety culture could be identified such as a lack of systematic approach, insufficient reporting practices or resource mismatch.

However, what is a good or a bad safety culture is not so clear-cut on the workplace. For instance, a statement such as of lack of "compliance with regulations, rules and procedure" is obviously significant but, adopting a safety culture point of view, it is more important to understand why people did not follow the rule: are we facing a bad behaviour or a bad rule issue? If we go further, a question could arise as to know why operators did not comply: does it mean that we are facing an understanding problem (lack of training, knowledge of work process…) or a procedure fitness problem (adaptation of the procedure to a specific task)? Relating to the group level we can raise issues concerning the legitimized level of compliance within a group (department, team, plant…). In terms of management, the questions could be oriented towards the commitment of management or towards a failure in the documentation reviewing process as well. In other words, safety culture observations require a holistic and systemic approach.

In this line of thinking, providing an observation is not only establishing a link between a statement and a dedicated attribute. The important point is to describe what is behind the link and seeking to shed light on the underlying reasons as to why the rules were ignored. That means that observations are not context-free: what is at stake is a deep understanding of the workplace situation.

As a case in point, we can relate a fictitious, and a little bit caricatured, example of observation describing the fact (§1) and, afterwards, the organisational and behavioural context (§2):

(§1) *"During a routine inspection in the main control room of the unit 5 (28/02/2014), it has been observed a discrepancy between the level of the tank ICS C07 (Intermediate Cooling System) indicating 86% and the X-DOC-15 procedure referencing a Technical Specifications criterion of 56% < N < 80% (TS 16.XXX).*

At the current status of the observation, we can notice that a simple focus on this fact as described could lead an inspector to identify a compliance issue. We are then facing a classical inspection statement driven by a compliance-based approach. However, safety culture observations imply to go further.

(§2) *The observation has been made at the beginning of the morning shift in the control room. The unit operated at full power. Questioned about the tank level, the operator in charge stated that he was not aware of this indication: "I rarely take this level into account. It's not in my procedure. We do not check it systematically". Rapidly, the chief operator opened the Technical Specifications and stated that the tank maximum level was not reported in the TS. Only the minimum level was reported."*

Taking stock of this example, it seems that various directions could be followed. On the one hand the operator did not show ownership or a questioning attitude concerning the check of the tank level. On the other hand, playing his supervisory role (maybe a bit late), the chief operator showed his involvement. Therefore, linking an observation to an attribute must not be considered as an end but as a starting point to further questions. As a challenge, observing safety culture contribute to diversify the classical approach of inspection.

3. Assessing safety culture observations

3.1. Culture as multi-layered phenomenon

A way to go deeper in the safety culture assessment could be found in the well-known model of Schein (1985) based on "artefacts, espoused values and underlying assumptions". According to Schein, culture can be defined as *"a pattern of basic assumptions – invented, discovered or developed by a given group as it learns to cope with its problem of external adaptation (how to survive) and integration (how to stay together) – that has worked well enough to be considered valid and, therefore is to be taught to new members as the correct way to perceive, think, and feel in relation to those problems"*. Culture and safety culture are then considered as what a group has learned throughout its own history in solving its problems of external survival and internal integration.

The question is not so much to know if an organisation *has* – that is to say something that can be manipulated – or *is* a culture – an emergent property of a group. What is at stake is to understand the embeddedness of behaviours (what people do), values (what is said) and basic assumptions (what people think or believe). A representation of Schein's (1985) layered model is described below.

Using the iceberg metaphor, culture shows visible and invisible sides. First, "Artefacts" are material representations as safety guidance pocket books, charters, workspace or reserved car parking and other manifestations that include behaviours, rituals, dress code or the manner in which people interact. Second, "Espoused values" are defined as values adopted and supported by an organisation through general statements – such as "Safety first" or concerning teamwork, decision-making or reporting. Third, according to the Schein model, the deepest layer of culture is the underlying assumptions, *i.e.* the taken-for-granted and unconscious beliefs that determine perceptions and behaviours. These shared assumptions are implicitly understood within an organisation, often unquestioned and deeply grounded on practices that resulted from a learning process.

Bearing this in mind, safety culture observations must take into account visible artefacts (physical elements and behaviours), espoused values (stated values guiding principles) and invisible basic assumptions (basis on which people act upon). Obviously, the implicit and invisible dimensions are complex and cannot be observed directly. To use this iceberg analogy, cultural aspects are mainly submerged. Therefore safety culture could only be observed through artefacts and espoused values. Out of the safety culture observations, clues about deepest layers can be drawn out. As a challenge, the closer we can observe submerged layers the deeper we can explore safety culture.

3.2. Cultural mechanisms to be addressed

From a regulatory perspective, we suggest that three fundamental cultural mechanisms must be addressed: the level of consensus about safety values, *i.e.* the alignment between what is said and what is done or thought; the degree of consistency between underlying assumptions of social groups; and the fitness of a licensee frame of reference regarding the specific risks of an installation. These main mechanisms echoes the works of Martin (1992) suggesting that the most complete understanding of culture must incorporate three distinct approaches of culture: integration, differentiation and fragmentation.

The integration perspective emphasizes the clarity, unity and the extent of safety espoused values. In other words, culture could be defined through the level of consensus concerning a set of values unifying people and reflected in practices and management systems. Safety culture assessment is centred on what is shared – or not – by all members of an organisation regarding the way to lead, learn or behave. As depicted below, safety culture observations are assessed through four key safety dimensions. For each of these dimensions, observed safety culture strengths and weaknesses are yearly discussed with licensees. For instance, driven by the SCO, statements concerning the ability of field managers to establish an open communication or the questioning attitude of operators could be drawn out. These statements constitute potential direct and operational messages to be taken into account by a licensee.

Differentiation is founded on the notion that each organisation is composed of overlapping subcultures, each holding different cultural tenets. Therefore, the differentiation perspective describes organisations as co-existing cul-

tural groups, sometimes in harmony, sometimes in conflict or rivalry (Cameron and Quinn, 2006). More precisely, consensus exists but only within the boundaries of a specific group. Adopting a social group perspective, what is at stake is to assess the ability of groups to share a common definition of problems and to develop a mutual understanding concerning the legitimacy or the relevance of a procedure or a work process. As an illustration, differences between departments (Dougherty, 1992) or occupational groups (McDonald *et al.*, 2000) could lead to misunderstandings concerning objectives to reach or technical practices to perform.

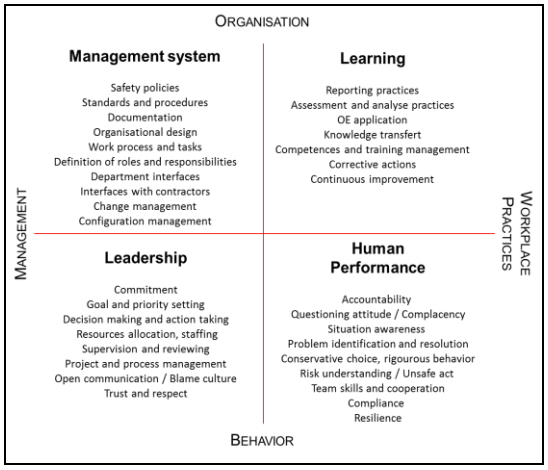

Figure 2: Key safety dimensions for SC assessment

The fragmentation perspective focuses on the multiplicity, ambiguity and inconsistencies of meanings. From this standpoint, (safety) issues emerge and are modified in an ongoing social construction. It follows that there are many diverse interpretations of a situation, an event or a safety issue. Adopting a cross-cutting perspective, this approach illustrates contrast of perceptions and contradictions about what is safe or dangerous. As examples, statements relating to the depth of an event investigation or competing viewpoints concerning a defence in depth system could be drawn out.

Therefore, safety culture could be addressed through three critical and interrelated questions:

- In terms of integration: how deep espoused safety values are shared and reflected in practices or management system?
- In terms of differentiation: to which extent social groups are able to develop a mutual understanding?
- In terms of fragmentation: how far the diverse meanings socially constructed within an organisation fit the risks?

4. Conclusion

The aim of this article was to present safety culture observations as a useful framework for assessing and reporting deep cultural factors that impact safety. The implemented process does not seek to provide a comprehensive picture of a licensee safety culture but to address findings that require attention. Obviously, observations give information about a particular moment and a specific location. In addition, as a new practice, inspectors have to quit their technical "comfort zone" and develop new competences. Safety culture observations practices are therefore a challenge that must be supported by training and field coaching.

Despite these limits, the process is useful to capture workplace issues. Identifying organisational and behavioural blind-spots, safety culture observations contribute to open up the organisational black box. More fundamentally, the process calls for a shift in perspective. Driven by a holistic and systemic approach, safety culture oversight allows a regulatory body to develop a more responsive attitude, a regulation style responding to the reference framework of a particular licensee.

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