

Safety culture: Yet another buzzword to hide our confusion?

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1 Introduction

“Safety culture” is a hot topic in safety work, but also one which creates confusion.¹ The objective of this paper is to discuss some possible interpretations of the term “safety culture” from a practical point of view. We seek an understanding of “safety culture” which can be instrumental in accident prevention. We are thus less concerned about the researchers’ need for a rigorously defined concept in this paper.

Much safety work during the last twenty years has focused on preventing minor accidents. As a consequence, many companies have achieved excellent lost time incident (LTI) rates. However, low LTI rates provide no guarantee that the organisation is robust against *organisational accidents*, i.e. accidents where several organisational units are involved and several defences have failed (Reason, 1997; Hopkins, 2000). We will therefore pay particular attention to how work on safety culture can help an organisation build robustness against organisational accidents.

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2 “Safety culture” – a tool for building empty explanations?

When we analyse accidents with the privilege of hindsight, we often identify human actions that contributed to the undesired outcome. The term “contributed” here implies that a different action might have led to a less undesirable outcome. Such observations have often led to claims that “human error” or “risky behaviour” is the cause of 70 or even 80 or 90 per cent of all accidents.

We will not discuss the validity of these claims here. The interesting point is what implications are drawn from such claims. A common line of reasoning seems to go as follows: We need to find the cause of “human error” and “risky behaviour” in order to eliminate these problems. During the eighties, “inappropriate attitudes” were frequently identified as the cause of “human error” and

¹ It is outside the scope of the present paper to review theory and research on safety culture. The reader is referred to the special edition of Safety Science on Safety Culture (Vol. 34, 2000), e.g. the review by Guldenmund (2000), and to Haukelid (2000). The special edition of Safety Science emphasises psychological approaches, whereas Haukelid writes from a social anthropology point of view.

“risky behaviour”. During recent years, “inappropriate safety culture” seems to have taken over as the most common diagnosis. It is not at all clear that this change in labelling represents a change in the ways we think about the problem. The medicine seems to be roughly the same in both cases: Various brands of campaigns to change the inappropriate attitudes or the inappropriate culture. Neither is it clear that these terms explain anything at all. “Poor attitudes” and “poor safety culture” seems to be inferred from the “human errors” and “risky behaviours” that they are supposed to explain. This is re-labelling, not identification of causal mechanisms.

This problem of empty explanations has hampered psychology – and in particular common-sense psychology – during most of the previous century (see, e.g., Krasner and Ullman, 1973, for a discussion). Aggressive behaviour has been explained by an aggressive personality, social behaviour by a social instinct, self-realising behaviour by a self-realisation motive and so on.

From a practical point of view, a focus on attitudes leads to another problem. Efforts to change behaviour by changing attitudes are often ineffective. Behaviour in a specific situation is influenced by many situational factors, which often overrule the impact of attitudes (Hale and Glendon, 1987). Even if one succeeds in changing attitudes, one may thus fail to change behaviour.

3 Can we build safety culture through behavioural training?

If attitude campaigns are ineffective, can we build a safety culture by changing individual behaviours directly? During the eighties, several researchers tried to change specific behaviours, such as the use of personal protective equipment, through systematic feedback.² Some of these approaches explicitly referred to behavioural modification techniques based on principles used to train animals. The attempts to change behaviour were successful in some, but not all cases. During the nineties, some consultancy firms have marketed “safety culture packages” which focus on individual behavioural training.

Approaches which focus on individual behaviour may have a place in safety work. For instance, speed controls and sanctioning systems do have an impact on traffic safety³. However, it is not clear that this impact also applies to organisational accidents, which are caused by the interaction of several persons, usually belonging to different organisational units. Because organisational accidents involve interaction between several persons, their prevention has to address interaction rather than individual behaviour.

A second limitation of behavioural modification approaches is that they require us to define a fixed target behaviour. However, we should not expect people to do a job in the same way each time. Rather, we tend to experiment with different ways to perform a task, and this experimentation enables us to adapt to changing contingencies (Rasmussen, 1997). Traditional behavioural modification techniques thus have limited applicability in the context of highly dynamic production systems.

4 Does safety require a uniform organisational culture?

Managers and consultants often claim that the safety culture should be homogenous throughout the organisation. The practical implication is often that managers or even external consultants “specify” or “prescribe” the safety culture that the organisation should have.

² For an overview, see, e.g., Hale and Glendon (1987) or Rundmo (1990).

³ For a discussion in Norwegian of the effect of speed controls, see “Trafikksikkerhetshåndboken”, <http://tsh.toi.no/>

This view does not take into account the possibility that different cultures may be conducive to low risk levels. For instance, in some activities safety may be best served by an action-oriented culture, characterised by rapid and co-ordinated response to critical situations. In other activities, safety may be best served by a culture where people take the time necessary to avoid rash and risky decisions.

The balance between standardisation and diversity is a rather complex issue.⁴ Standardisation is, for instance, indispensable in communication between flight crews and air traffic controllers. In this case, physically separated persons or groups share the task of keeping aircraft on safe trajectories and avoiding conflicts. Non-standard communication may, e.g., create confusion about whether or not a clearance for take-off has been given.⁵ We should, however, also recognise the value of cultural diversity as a source of “collective imagination” in an organisation (Weick, 1987; Westrum, 1993). Weick argues that in order to manage complex technologies, organisations must be able to challenge simplistic views and build complex diagnoses, explanations and strategies. Cultural diversity may be an important asset in this context.

To conclude this section, we suggest that cultural diversity within an organisation is compatible with a low risk level, provided that people are able to communicate and co-operate effectively across the interfaces between different subcultures. Rather than seeking homogenisation, the organisation should encourage *bridging efforts* between subcultures.

5 Commitment and Safety Climate

Several companies conceive of safety culture as individual commitment to safety objectives. The following excerpts from a presentation by an Esso safety adviser is representative of this view (Smith, 1997, cited from Hopkins, 2000:73f):

safety performance has been achieved through an unwavering commitment and dedication from all levels in the organisation to create a safety culture which is genuinely accepted by employees and contractors as one of their primary core personal values ... All injuries are preventable ... A true commitment to safety is developed by promoting safety as a full-time (i.e. 24-hour) effort both on and off the job.

This view deserves serious consideration, since several companies that advocate this view of safety culture have achieved very significant reductions in LTI rates⁶. An important observation is that the effects of these efforts do not always generalise to major hazards. Esso experienced a major explosion at its Longford gas plant in 1998, in spite of the company’s expressed dedication to safety and its excellent LTI record. The public investigation of the Longford explosion revealed a broad range of serious safety problems⁷ (Hopkins, 2000). Such findings are difficult to reconcile

⁴ Bang (1990) distinguishes between an integration paradigm and a diversification paradigm. The first one assuming there is one culture or safety culture in the organisation, the latter claiming there could be several cultures operating at the same time or one major culture and subcultures. This will of course vary from organisation to organisation. The important thing is that managers are aware that different cultures operate. Schein has traditionally been interested in the homogenous culture. In his recent work, Schein focuses on the importance to look at the management, the operator and the design culture (Schein, 1996). Dyhrborg (2000) uses the different cultures in the organisation to make more efficient efforts in reducing work related accidents.

⁵ Such confusion was one of the causes of the collision between two 747 aircraft at Tenerife Airport on March 27, 1977, where 583 persons were killed (Subsecretaria de Aviccion Civil, 1978).

⁶ The LTI rate is defined as the number of lost-time injuries per one million hours of work. A lost-time injury is an injury due to an accident at work, where the injured person does not return to work on the next shift (Kjellén, 2000).

⁷ The problems and deficiencies that contributed to the accident included continuous operation of a plant in alarm mode, poor engineering design, inadequate supervision, poor maintenance priorities, a large maintenance backlog,

with a claim that the company has succeeded in promoting a generalised commitment to safety. A more plausible interpretation is that the company achieves good performance with regard to those aspects of safety that were intensively followed up throughout all management levels. The key factors are thus not attitudes and values, but rather management attention, feedback and sanctions. These factors favoured efforts directed at prevention of minor accidents, but were not operative with regard to safety problems that did not affect the LTI-record. According to Hopkins (2000), the focus on LTI-records contributed to the gas explosion at Longford, because it removed attention from safety problems with little impact to the LTI-records, and thus kept the organisations from drawing the appropriate lessons from their own incidents.

Our point is not to dismiss commitment as irrelevant to safety, but rather to get a better grasp of what commitment is and what it is not. Commitment is not something inside the head of people, but rather a dynamic result of processes in the organisation, such as involvement, attention and feedback. Commitment to one aspect of safety (e.g. prevention of lost time incidents) does not automatically generalise to other aspects of safety (e.g. the prevention of major accidents). Firstly, people tend to adapt to the way they are followed up. A focus on LTI rates thus induce people to concentrate their efforts on preventing lost time incidents. Moreover, the causal mechanisms related to minor and major accidents are significantly different. Minor accidents are often caused by a single technical failure or erroneous action, such as the choice of an unsafe work procedure. In contrast, major accidents in well defended systems are usually *organisational accidents* (Perrow, 1984; Reason, 1997). They are caused by an unexpected combination of several failures, and they usually involve several organisational units. In this context, the notion of safety culture needs to be expanded. It is not enough to focus on individual behaviour. We need to capture *patterns of interaction* which have a bearing on the risk of major accidents. This implies that we need to focus on collectives, and we need to capture more than one attribute of interaction patterns.

Many researchers have distinguished between “safety climate” and “safety culture” (Guldenmund, 2000). “Safety culture” is commonly conceived as more stable than “safety climate”. We suggest that it may make sense to use the term “safety climate” as synonymous with “commitment” as discussed here. This implies that “safety climate” expresses the degree to which safety issues are attended to at all levels of the organisation, e.g. to what extent safety issues are discussed, followed up, to what extent safety-related action and performance is rewarded or sanctioned, and also to what extent resources are allocated to safety purposes. It also follows that a favourable climate with regard to one aspect of safety (e.g. lost time incidents) does not necessarily generalise to other safety aspects (e.g. major accident risk).

6 Organisational culture viewed as characteristic patterns of interaction

We suggest that the “safety culture” concept should be used to characterise *recurrent patterns of interaction that have an impact on risk*. A statement about the safety culture in an organisation is not a statement about things in people’s heads, but rather about how they usually interact – what they say and do to each other, and what responses they get. We use the term “interaction” to indicate that we are particularly interested in the way actions performed by different individuals, groups and organisational units interconnect. Culture is not just a simple aggregate of individual behaviours. It refers to the collective practices of groups and organisations.

inadequate operator training and procedures, a failure to perform HazOp analysis of the plant, a failure to identify hazard related to the way three gas plants were interconnected, and an absence of vital competence (engineers) at the plant (Hopkins, 2000).

We do not imply that safety culture *explains* behaviour. In this respect our perspective may be contrasted to Schein's conception of organisational culture. Schein (1992:12) defined organisational culture as

A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems.

Schein seems to consider the observable interaction patterns a surface phenomenon. According to his definition, "basic assumptions" form the kernel of culture, and this kernel is related to actions through an intermediate layer of perception, thinking and emotions.

We suggest that the distinction between "basic assumptions" and behaviour is at best abstract and at worst misleading, since basic assumptions probably have to be derived from a retrospective analysis of behaviour.⁸ Our basic assumptions are manifested by our interactions, by what we do to each other. Culture is thus inseparable from human interaction. We find it problematic to conceive of "basic assumptions" as something totally separate from action. However, if basic assumptions are ingrained in patterns of interaction, then they can hardly serve as a causal explanation of a recurrent pattern of interaction.

We suggest that cultures are maintained by interaction. Stability occurs when a given pattern of interaction is reinforced by its being applied and by the consequences of its application. This implies that cultures can be rather vulnerable when external change interrupts the patterns of interaction that maintains a given culture.⁹

An implication of this position is that influencing the safety culture means influencing certain recurrent patterns of interaction. Changing people's attitudes without substantially changing their interaction patterns does not change the safety culture.

The use of *symbols* should be considered an integral part of the interaction comprised by "safety culture". If the manager forgets or ignores to use a seat belt, this can be a harmful symbol and believed to be lack of commitment to safety.

7 The problematic relationship between risk and "safety culture"

We have now discussed how the term "culture" may be understood. The next issue is how to associate culture and safety. Is it possible to identify those aspects of an organisational culture that have a strong impact on the risk level? A part of this issue is *who* should define the contents of "safety culture". Is it a task for researchers, or should it be done by insiders in the organisation?

It is not an easy task to demonstrate that certain aspects of organisational culture have a strong impact on the risk level, or to demonstrate that other aspects do not have a significant impact. Moreover, it is not obvious that the same set of cultural characteristics is conducive to a low risk level across all organisations. For instance, Perrow (1984) claimed that organisations that control

⁸ We base this claim on Argyris and Schön's (1996:13) discussion on the relationship between espoused theory and theory-in-use. There are often considerable discrepancies between the principles that members of an organisation claim to live by, and the principles that can be derived from what they actually do.

⁹ Schein's definition may be taken to imply that the set of "basic assumptions" is what gives culture its stability. We thus suggest that the three level model implied by Schein (basic assumptions – perception/thinking/emotion – behaviour) may give us the wrong ideas about how to change or maintain a culture. One may be tempted to try to persuade people to change their basic assumptions in order to change their behaviour.

technologies with complex interactions, need decentralised control structures, whereas organisations that control tightly coupled technologies, need centralised control structures. Certain cultural features may be favourable in the context of tightly coupled technologies because they support a centralised control structure (e.g. strict adherence to procedures, respect for formal authority). The same cultural features may prove dysfunctional in the context of interactively complex technologies, where intelligent improvisation may be necessary to handle unexpected situations.

In spite of these problems, it may still be possible to have an informed discussion concerning whether or not a proposed set of criteria to delimit “safety culture” may be reasonable or useful. One may base arguments on findings from accident investigations, or from studies of organisations which display very favourable safety records. Based on such argument, we propose that the following aspects of organisational culture may fruitfully be incorporated into a notion of safety culture:

1. How does the organisation react to ambiguous danger signals?
2. Is the organisation capable of building organisational redundancy, provided that the instrumental preconditions for such redundancy are present?
3. How does the organisation handle conflicting objectives when safety is involved?
4. How are safety critical tasks handled across organisational borders?

We will briefly consider each of the aspects:

7.1 How does the organisation react to ambiguous danger signals?

This focus is intended to capture an information handling perspective on organisational resilience (Turner and Pidgeon, 1997). Turner noted that the vast majority of major accidents are preceded by warnings in the form of incidents or minor accidents. It is therefore plausible that resilient organisations have a highly developed capacity to capture and react on danger signals. In line with this argument, Westrum (1993) introduced the notion of “Cultures with requisite imagination”. Weick (1987) pointed to the value of cultural diversity as a resource for building alternative and more penetrating interpretations of events and situations.

7.2 Is the organisation capable of building organisational redundancy?

A central idea in research on High Reliability Organisations (e.g., LaPorte and Consolini, 1991) was that organisations can use redundancy as a means to achieve reliable operations. Organisational redundancy is created when individuals ask each other for advice, ask critical questions, spot each others’ erroneous actions or intervene to correct an erroneous action before it leads to an accident. Rosness et al. (2000) argued that organisational redundancy depends on both instrumental and cultural preconditions. The instrumental preconditions concern the personnel’s possibility of direct observation of each others’ work, overlapping competence, and overlapping tasks and responsibilities. The cultural preconditions concern the skill and willingness to exchange information, provide feedback, reconsider decisions made by oneself and others, and to intervene to recover erroneous actions. Based on interviews, observations and incident reports, Rosness et al. (2000) reported that a considerable degree of organisational redundancy was probably achieved in critical operations on a Norwegian offshore production platform.

7.3 How does the organisation handle conflicting objectives when safety is involved?

In the current globalised economy, many organisations face fierce competition combined with tough demands for profitability. Even apparently sheltered organisations may face a serious discrepancy between available resources on one hand, and the output or services expected by clients or the public on the other. Such tensions inevitably trickle down the levels of the

organisation, and may translate into risky decisions. Safety margins may gradually erode under the pressure of productivity demands and economic constraints, so that working practices drift towards unacceptable risk (Rasmussen, 1997). Such drift may be particularly dangerous in complex socio-technical systems, where each actor is unable to foresee how their actions to adapt to conflicting demands will interact with the actions of other actors.

7.4 How are safety critical tasks handled across organisational borders

Many major accidents are triggered by inadequate communication across organisational borders. For instance, inadequate communication between process and maintenance personnel at a hand-over between two shifts was an important causal factor in the Piper Alpha accident. The handling of tasks across organisational borders is likely to become an increasingly important issue due to organisational trends towards outsourcing and virtual organisations, and technological trends towards increasingly large scale, and more integrated systems (Rasmussen and Svedung, 2000).¹⁰

8 Implications for safety management

The immediate practical implication of the position outlined above is negative: We discourage a single-minded focus on staging campaigns to change attitudes in order to change culture in order to change behaviour in order to prevent accidents.

We have argued that culture is a matter of interaction – between persons and groups. To characterise the safety culture in an organisation, we need to observe and reflect on patterns of interaction. For instance: How often do people intervene in order to correct a colleague who is about to commit a dangerous slip or mistake? What reactions do they meet when they intervene? The four aspects of safety culture identified in this paper could serve a starting point for such observation and reflection. However, the organisation should feel free to change and extend our list.

To change safety culture means changing patterns of interaction¹¹. The groups involved need to try out new patterns of interaction and to find confirmation that the new patterns of interaction are workable and compatible with their personal needs. Established principles from organisational improvement in other areas are applicable here. For instance, the goals and means of culture improvement should be developed locally, by the people involved, in order to build commitment. It is necessary to set aside time and resources for follow-up. It is usually wise to seek input from outsiders, since many peculiarities of a culture may be invisible to insiders.

However, safety culture is not only built through spectacular improvement programmes. Proficient managers build and maintain organisational culture through how they carry out their daily work. They compose teams and task forces in ways that help overcome organisational barriers. They encourage whistleblowers. They take a clear stance with regard to dilemmas and goal conflicts relating to safety, and avoid delegating the handling of such dilemmas to the lower levels of organisation.

¹⁰ The meeting of different cultures and subcultures is one of the central topics in the literature on organisational culture (Hofstede, 1991; Schein, 1992).

¹¹ There has been a large debate in anthropology, whether it is possible to intervene in cultures. It seems to be a major dispute between a functional (culture as something you have) view and a symbolic interacting (culture as something you are a part of) point of view. Traditionally, the functional point of view has claimed that there are techniques and ways to measure the actual change in culture. The symbolic interaction paradigm, however, find it more difficult to intervene in organisational culture. Cultures change due to the interactions and the negotiations. But it is more difficult to lead the actual change. The approach to safety culture taken in this paper corresponds to the functional view. This is not to claim that the symbolic interaction view is wrong. However, from our point of view, it is most interesting to focus on the aspects of culture that can be influenced.

Safety culture is also built through the way we report and discuss accidents and other unwanted events. We have to recognise that slips and mistakes do occur, in order to build organisational resilience. We should encourage open-ended discussions on the severity of unwanted events, and even attempts at “crisis maximisation”, to make sure that we do not ignore an important danger signal. Moreover, we should reflect on how we follow up unwanted events. Do we really learn, or do we repeat more or less ritual preventive actions, which have proved ineffective in the past?

A traditional problem regarding organisational culture is that it is often used or perceived by the managers as a tool – something happening under the floor of the board of directors (See for example Alvesson, 1993). Safety culture matters easily become attributions of the other people's behaviour. Similar explanations are seen for attitudes and behaviour (“They have to change their attitudes...”). But it is important to point out that top managers are an important and integral part of the organisational culture in which they interact within.

Safety culture improvement should never be viewed as an inexpensive replacement for other aspects of safety work. Problems such as poor human-machine interfaces, unreliable technology or inadequate operational readiness cannot be compensated by safety culture.

9 Conclusions

We have warned against thinking of safety culture as a sum of individual attitudes towards safety. A culture is associated with a collective (e.g., a group, an organisation or a nation). From a practitioner point of view, *culture* may be defined as *characteristic patterns of interaction* within an organisation or a part of an organisation. *Safety culture* can then be defined as characteristic patterns of interaction which have a strong impact on the risk level.

Based on the literature on organisational accidents and resilient organisations, we suggest that the following aspects of interaction may be incorporated in a notion of safety culture:

1. How does the organisation react to diffuse danger signals?
2. Is the organisation capable of building organisational redundancy, provided that the instrumental preconditions for such redundancy are present?
3. How does the organisation handle conflicting objectives when safety is involved?
4. How are safety critical tasks handled across organisational borders?

Changing safety culture implies changing patterns of interaction. A stable improvement of safety culture thus requires the people involved to interact in new ways, and to experience that the new interaction patterns work in practice and are compatible with their needs. Major change processes related to safety culture should be based on insights from the more general field of organisational development work. However, safety culture is also built in many small steps, through the way managers and employees handle their daily tasks.

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