Koch C.

From Crew to Country?

Local and National Construction Safety Cultures in Denmark

Abstract

Accidents in construction have evoked over time a range of prevention methods and efforts. This paper adds to the growing body of qualitative studies of safety culture, appreciating that also in construction, the cultural explanations are of crucial importance. It is suggested to use a combined theoretical and ethnographic framework involving the integration, differentiation, ambiguity and multiple configuration elements of safety cultures. The primary case analyzed is a carpenter's crew of 28 men doing renovation work, who belong to a firm with 100 employees. The analysis finds an overarching common integrative culture of pride of work, which overlaps with differentiation of four cultures: "mastering", "framework and rules", "drawing board and plan" and "ties that bind". And finally, it finds ambiguous perceptions of possibilities for prevention and risk, which differ according to time, place and actor. Second juxtaposing the cultures found in four other ethnographic studies carried out in Denmark enables reflection over possible grander cultures in play. Although these studies find 25 different safety cultures, a national pattern seems to be prevalent of a constellation of reactive and proactive safety cultures.

Introduction

Occupational accidents continue to be the primary occupational health and safety issue in the construction industry. It is even a societal problem, with a range of economic and social implications. And small and medium sized enterprise (SME) contexts contribute heavily to the problem (Sørensen et al. 2007). It appears contestable to claim that accident prevention strategies have improved unambiguously if measured by accident performance. Nevertheless, it can be claimed that more advanced strategies are orchestrated with more classical methods (Howarth & Watson 2008, Lingard & Rowlinson 2005). This is also mirrored in the area discussed in this article, SMEs, where a number of strategies and approaches are being developed and tried out (Champoux & Brun 2003, Hasle et al. 2009, 2010, Tait & Walker 2000, Walker & Tait 2004), also in construction (Lingaard & Holmes 2001, Lingard & Rowlinson 2005). Amongst the efforts proposed for large enterprises, but less for SMEs, analyzing and improving safety culture and safety climate has also proliferated in construction over the last 10-15 years (Glendon 2008a, Lingard et al. 2010).

Cultures, organizational cultures and safety cultures are produced by a multitude of actors, which also leads to differentiation and fragmentation (Alvesson 2003, Martin 2002). Safety cultures are here understood as shared meaning, and are viewed as a set of symbols, metaphors, myths and rituals (Alvesson 2003, Martin 2002). Rather than being tied up with the structures of organizations, they are expressed in everyday work and cut across organizational boundaries (Alvesson 2003, Martin 2002). In a construction setting, this leads first to a focus on crews, which should be viewed as important creators of shared meaning (Lingard et al. 2010), and thereby safety culture. Second, it also leads to an appreciation of a multitude of

possible culture producers such as project managers, company owners and managers, designers, equipment supplier, trade unions and authorities (Lingard et al. 2010), and thereby more units of analysis.

This contribution adds to a small, but growing body of qualitative studies of safety culture on the construction site (Baarts 2010, Gherardi et al. 1998). It commences by focusing on a carpenter's crew doing renovation work. The crew is part of a small to medium-sized company with roughly 100 employees. By covering an SME and also discussing safety culture in an extra-organizational domain (see below), this article contributes to two of the paucities pointed out by Glendon (2008b). In his review of safety cultures generally, Glendon documents that only 21 out of the 203 articles reviewed operate on more general levels than single organization studies (ibid:184); and only two deal with small and medium-sized enterprises (ibid:181, exceptions for construction include Holmes 1998, Wadick 2007). This article also proposes a third way between ethnographical studies of single local and unique safety cultures (Antonsen 2009, Author study, Haukelied 2008) and studies that propose a national variable as decisive for safety (Håvold 2007, Mohamed et al. 2009).

The paper aims, first, to understand accidents and their prevention as part of cultural orientations on the construction site. The second aim is to carry out a cross-case analysis of ten enterprise/case studies. The first aim is met through mobilizing symbolic integrationist ethnography, theory on culture in organizations that sees culture through integrative, differentiative and ambiguous interpretations (Alvesson 2003, Martin 2002). Safety cultures are studied as shared, differentiated or ambiguous meaning assigned to four main features: risk perception, work accidents, prevention, and health and safety activities. These meanings are expressed in everyday work and are first developed within the studied crew, even though they are also ex-

pected to cut across organizational boundaries. Here, a unique local culture appears to be found.

The second aim is to carry out a cross-case analysis of safety cultures in search of possible contributions of grander cultures. This is done by drawing on five further ethnographic studies, using the same method as the study presented first. The ethnographic studies represent ten enterprise cases and 25 cultures found with the differentiation perspective, all in a Danish context. They cover a period of eight years, and also encompass other sectors than construction. While the studies first appear to be mapping unique constellations of local cultures, this subsequent second analysis compares across the studies carried out, raising the question of possible cross-organizational cultures, or even national cultures being in play.

The paper is structured as follows. The theoretical frame covering the basic concepts of the safety culture framework is presented. Then, following the framework dimensions. the case of the crew at the medium-sized carpenter firm is presented and analysed. After this single case analysis, a broader multiple case analysis is carried out. The paper ends by discussing the results and the implication for prevention strategies. This discussion revolves around Nævestad's (2008) point that multiple safety cultures are an advantage for the organization's ability to handle risks, counter to most scholars who claims that one unitary safety culture should be preferred (e.g. Guldenmund 2000, 2008).

Acknowledgements

Method

The symbolic interactionist ethnographic approach is characterized by an open set of concepts used by the ethnographer in the fieldwork (Geertz, 1993). As a frame for this approach, a review of safety culture studies was covered through the use of multiple sources, a literature study of organization culture and safety culture (author reference) and special issues (Baram & Schoebel 2007, Glendon 2008, Hale 2000). Glendon's (2008b) review of 203 articles encompasses 20 from construction. Guldenmunds (2000, 2010) works are also comprehensive. The approach used here is to conceptualize safety culture as shared, differentiated or ambiguous meaning assigned to four main features: risk perception, work accidents, prevention, and health and safety activities. In this manner, the basic conceptualization is in line with ethnographic study of cultures, and it is operational (in line with research resource limitations) and merely one perspective on organizational life (Alvesson 2003, Hopkins 2006). It is delimited from analysing the organizational culture as such, but does map aspects that overlap with the organizational culture (for an organizational culture analysis of construction, see Coffey 2010).

The empirical work used here was carried out in five separate studies published from 1999-2005 covering ten organizations. The case of the carpenter mentioned above is one. The background and content of the cases (in alphabetical order) are as follows:

- Dyhrberg (2004) is a long-term ethnographic study (Dyhrberg's doctoral thesis) of a precast concrete element production unit, funded by the Danish work environment fund.

- Engberg (2000) is an ethnographic study, carried out as part of a master's thesis, of a plastic component manufacturer (LEGO).

- Kamp (2003) is a study of two small contractors, one a carpenter and the other a bricklayer. It is part of a research project and an ethnographic study and funded by the Danish work environment fund.

- Richter (2001) is an ethnographic study (and more) examining three manufacturing enterprises, funded by a research effort embedded in HSE Denmark.

- Richter and Pedersen (2004) is an ethnographic study (and more) examining three construction enterprises. It is funded by a research effort embedded in HSE Denmark. In addition to safety culture on site, the project also studied learning and education as safety culture producers, following apprentices at school and at work.

Common for all the empirical work is that it looks for and listens to symbols, be they verbal, physical or bodily, through emic participation (Martin 2002). Verbal symbols include metaphors, myths and narratives, as well as meaning and interpretations regarding central aspects of safety on site. Secondarily, actions expressed in a ritual format were followed – for example, at safety meetings. The approach was, on the one hand, to exercise empathy with the field, and on the other, to create sufficient distance to it (Alvesson 2003). In this way, it was sought to capture and question elements of everyday understandings and practices that had been normalized or had become routine. The fieldwork also comprised semi-structured interviews (Heyl 2001), retrospective analysis of a sample of accidents, and observation of accident analyses processes carried out by local actors. This was supplemented by written documentation

such as accident reports, accident statistics, and referendums and communications with the Working Environment Authority.

A common idea behind the studies was to look for a root metaphor for each of the identified cultures under the differentiation perspective (Alvesson 2002, Smircich 1983). As concluded below, this intention led rather to naming the cultures according to our interpretation of their central features, whereas root metaphors proved difficult to find. "Mastering", for example, is a descriptive device for the characteristic of a safety culture in which the shared meaning is that risks can be mastered.

More specifically, in the empirical work of the Richter and Pedersen (2004) study, the enterprises were chosen in collaboration with the Danish construction association for employers (Dansk Byggeri), which provided a list of eight companies, of which led three SMEs agreed to participate. All three employed predominantly skilled workers, as is common among Danish craft contractors. Their employment fluctuated, but was roughly at 200, 100 and 20 employees, respectively. The study encompassed five building sites employing 66 persons, including nine apprentices.

The carpenter crew case from one of the sites is chosen, because it well illustrates the safety cultures found in the studies of the three contractors. The study of the carpenters' safety culture encompassed following work from morning to afternoon every day over a total of approximately ten days for a longer period. This was supplemented by semi-structured interviews carried out with masters, quantity surveyors, foremen and other central persons. On this basis, analytical work was carried out following the analytical strategy described above, but reporting here on systems of meaning.

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The *limits* of a purely qualitative approach can of course be discussed, and it is challenged below. By focusing on one crew and one company, other project and site aspects of the cultures are left out; and similarly, when it comes to the broader set of actors attached to the building project. It should also be noted that it was not attempted to link accident rates with the safety cultures discussed. Along with Brooks (2008) and Cooper (2000), it is contended that the accident rate is a non-simple indicator of safety culture.

It should also be mentioned that although several of the studies here were subsequently used as basis for interventions trying to improve the safety culture, this aspect is only mentioned in the final conclusion. A further limitation of this present set of studies is that they do not study multinational presence at the workplace (Jaselski et al 2008), something increasingly common at workplaces in Denmark by 2012.

The paper builds on previous work, especially that of (author ref) and (author ref). Translations of quotes are made by the authors.

Organizational culture and safety culture

Organizational culture studies have been proliferated for around thirty years now, if we consider Peters and Waterman (1982) to be seminal. Organizational culture is usually used to denote the shift away from national cultures and corporate culture toward a more micro-oriented perspective on organizations. This trend has been dominated by two main paradigms: functionalism (Schein 1992 a.o.) and interpretivism (including symbolism, Geertz 1993 a.o.) (see

also Parker 2000, Alvesson 2003, Martin 2002 for reviews). These paradigms are however rarely dealt with in an entirely distinct manner (Martin 2002, Parker 2000). The symbolic approach perceives of organizations "as constructed by people and reproduced by the networks of symbols and meanings that people share and make shared action possible" (Burrell & Morgan 1979). Focus is on symbols, which can be expressed verbally, physically and through actions. Another central concept is that of a root metaphor characterizing the culture. Our position is similar to Alvesson (2003), Antonsen (2009), Guldenmund (2000, 2008, 2010) and Haukelied (2008), who all observe that culture studies have to be related to the specific setting, the organizational context.

Safety culture is viewed as a focused aspect of the organizational culture, and is thus part of a perspective on the organization. Safety culture can be defined as the shared and learned meanings, experiences and interpretations of work and safety – expressed partially symbolically – that guide people's actions in relation to risks, accidents and prevention. Safety culture is shaped by people in the structures and social relations within and outside the organization. In the development of organizational culture theory, as in safety culture, controversies continue about the way to conceptualize and analyse culture (Martin 2002, Haukelied 2008). Rather than too easily taking a one-sided position in these debates, Meyerson and Martin's (1987) suggestion of a three-perspective analysis is followed, especially with the extension Alvesson (2003) offers by synthesising the perspectives into the concept of multiple configuration (Haukelied 2008). This allows the scholar to handle quite complex cultural patterns, and avoids falling into the monolithic trap of waiting for a unitary concept to emerge (see Guldenmund 2000, 2010, Glendon 2008a, 2008b). This paper thus demonstrates how differentiation, integration and ambiguity can be useful for understanding safety culture in construction.

Integration

The integration perspective underlines that culture is the shared understandings in a given organization. There is a consistency across cultural manifestations (Meyerson & Martin 1987). Schein is probably the most significant scholar within this perspective, for as he notes, "One finds little variation within a cultural unit" (Schein 1992: 22). At a later stage, Schein delimits this more clearly into "organizational unit "(Hale 2004). Culture is thus an integrative mechanism, labelled as the social glue between its members (Schein 1992, Alvesson 2003). In Schein's version, the common basic assumptions are the consistently shared element. Some representatives of the integration perspective clearly link it with managerial prerogatives, and attempts at top-down control and change of the culture. Within this position, it is rarely recognised that several cultures are in play. If so, it is interpreted as a signal of weakness, or one culture is assigned the dominant role, whereas others are represented as subcultures. As Parker (2000) argues, it is often a matter of perspective as to what is subordinated and what is superior. The International Atomic Energy Commission, the Confederation of British Industry, and others have developed similar integrative perceptions of safety culture. Thus, CBI (1990) defines safety culture as "the ideas and beliefs that all members of the organization share about risk, accidents and ill health".

Two reviews of studies on safety culture and climate during the past two decades (Guldenmund 2010, Glendon 2008) conclude that fragmentation of concepts exists in safety culture research. Glendon argues that continuing terminological confusion should not be a barrier (Glendon 2008: 249), whereas Guldenmund claims that there is a need to clarify conceptions and definitions. He suggests a "Schein-ian" conceptualisation of safety culture. Shared basic assumptions about safety are a direct reflection of Schein's categories. The shared basic as-

sumptions cover, among other things, "what is safe and what is not". Referring to Schein, the basic assumptions are assumed to permeate the whole organization (Guldenmund 2000: 250-52), or at least entire organizational units (Hale 2004). The integrative perspective on culture is in line with many scholars of safety climate or safety culture, according to Guldenmund (2010) and Glendon (2008) and, for example, Dedobbeleer and Beland (1991).

Differentiation

This perspective focuses on the lack of consensus between interpretations, experiences and assignments of meaning in organizations. Researchers within this perspective have often paid considerable attention to non-leader-centred sources of culture (Parker 2000). These research-ers differ, however, in their analyses of units of differentiation by which to characterize the field. Several authors' analyses see culture as a product of such social structures as countries, enterprises, departments, professions and groups (Guldenmund 2000:223). These different groups and cultures coexist in the organization being studied. Moreover, it is often argued that some cultures are superior to others, the "others" being seen as subcultures. In a study of three organizational cultures, Parker (2000:188) presents three types of overlapping divisions: spa-tial/functional (different buildings and departments), generational, and occupation-al/professional. Other studies, like Alvesson's, focus on the everyday work practice producing local cultures, cutting across social structures and advocating a more cautious approach in the interpretation of differentiation in cultural manifestations; they argue for an analysis that dis-criminates social structural differences from cultural.

Some quantitative studies on safety culture/climate have additionally developed a conception of co-existing subcultures, where differentiation is along the lines of plants in multinationals

or hierarchical levels within an organization. The overall challenge in these studies was to identify a unifying, superior safety culture, measured by, among other things, commitment of management, safety behaviour among the workforce, and accident rates. One qualitative study on safety culture in construction (Gherardi et al. 1998, 2002), however, found ambiguity and differentiation along the lines of professional background and work tasks, when analysing meanings given to accident causes and preventive issues among communities of practice of engineers and site managers at a construction firm. Other studies observed differentiation between plants within a multinational corporation, and suggest further studies at the macro level – for example, between capital-intensive versus labour-intensive industries. Some find evidence of a range of fragmented subcultures, differentiating according to seniority, occupation, age etc. Therefore, they suggest research involving more detailed qualitative techniques on how groups form and interact in order to share their own view of risk and safety, rather than relying on quantitative survey-type instruments. Furthermore, Pidgeon and Leary (2000) and Walker (2010) emphasize the need to be sensitive to existing subcultures. As Pidgeon notes, being aware of the tacit understandings of everyday practice and the various interpretations of hazards is valuable in dealing with unnoticed risks. Such analyses may reveal a diversity of perspectives and interpretations of safety problems. Differentiation, from his viewpoint, is primarily related to social structure and to power relations, which may influence processes of sense making and construct different versions of reality.

Ambiguity

Seen from the differentiation perspective, cultural manifestations may seem ambiguous. There is a lack of clarity. Potentially, there are differences in meanings, interpretations of symbols etc., which are incommensurable and irreconcilable (Alvesson 2003). Moreover, in the con-

tinual process of creating and recreating meaning, members of different cultures may orient themselves differently at different times (Parker 2000: 89, Pidgeon and Leary 2000). This perspective acknowledges the uncontrollable uncertainties that provide the texture of contemporary life (Martin 2002); however, Alvesson (and Parker) warns against too easily assigning cultural phenomena to ambiguity, thus pointing out that ambiguity might originate from social structures or social practises (Alvesson 2003). Drawing on Bourdieu, Alvesson (ibid.) introduces social fields to represent a professional grouping with a distinct field of activity and qualifications, with its own rules for success and recognition, and its own structure of positions and economic and symbolic rewards. He thereby seeks to create an analytical dimension, recognising that social structures interact with and co-produce culture. In the empirical studies of safety culture, the focus is on ambiguity of intentions, pointing to three types of governing rationalities: producers' perspective, wage workers' perspective, and safety perspective (Ullmark et al. 1987; see also Baarts 2010). The producers' perspective focuses on the possibilities for a member of the organization to be able to produce a product of quality that is in resonance with her values. Some degree of autonomy in mobilising of one's skills is a central element in this perspective. The wage workers' perspective relates primarily to decent pay, co-determination, and job security. The safety perspective relates to the lifelong preservation of one's own ability to work and cope with emotional aspects of risk in a short- and long-term perspective. Tension between these three rationales creates ambiguity of intentions. Although ambiguity is an important aspect of culture, Alvesson (2003) and others point out that despite this, groups and organizations must develop at least some degree of mutual understanding of how to deal with problems in order to make cooperation possible. He talks about bounded ambiguity. Even if culture does not produce clarity and consensus throughout an organization, it can offer guidelines for coping with ambiguous meanings and how to deal with tricky is-

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sues. Bounded ambiguity may also be seen in switches between different social circumstances, legitimising various ideas and meanings.

Multiple configuration

Whereas the dominant view among culture study scholars is integrationist, few are differentiating, and even fewer attempt to synthesise these approaches (Martin 2002). Parker and Alvesson both try to offer a way of at least juxtaposing the three perspectives. Alvesson stresses level differences; that is, whether cultures are macro cultures – for example, national or local. He suggests that cultures potentially overlap and interact. Parker suggests overlapping, subordinating, subordinated cultures (Parker 2000: 224) when analysing his fieldwork. Alvesson is thinking along the same lines when he introduces the multiple cultural configuration view (Alvesson 2003): It assumes that organizations can be understood as shaping local versions of broader societal and locally developed cultural manifestations in a multitude of ways. People are to different degrees connected with an organization, sub-organizational unit, profession, gender, class, ethnic group, nation etc. This explains his observations of cultural overlap in an organizational setting, which is rarely tightly connected to the social structures of the organization. Alvesson's central argument for introducing multiple configuration is to combine the insights of the above-mentioned approaches. Thus, he recognizes the role of grander cultures, local cultures and possible integration and unity, but their mixture and overlapping character is a central observation. Pidgeon and Leary (2000) have observed, in line with Alvesson, that different people and organizations are only able to hold a partial, and often different and changing interpretation of a situation. Orders may be ambiguous, responsibilities only vaguely defined, goals may shift and subsequently draw attention away from existing risks. Furthermore, processes of defining risks or reporting errors can be undermined, if the possibility of

differentiated understandings is not recognized. These meaning-giving processes are socially negotiated.

The Carpenter: Accidents? – Everyone has a story!

"The apprentice and I were about to lever a 200 kg wooden beam with a manual pulley. Between the 2nd-3rd floors, the beam suddenly fell to the ground and made a deep crater in the asphal due to the breaking of the wheel of the pulley. This is what happens, but we were lucky. Bugger, we were this close to dying! We were shocked and went to the hut to recover over a coke. – The boss got himself a pulley with remote control" (Carpenter, Richter & Pedersen 2004).

One does not find the same type of denial of risk at a construction site as in the manufacturing industry (Richter 2001). At the carpenter's, everyone has a story of occupational accidents. Everyone has felt it on their own body. The enterprise studied has about 100 employees and 100 years of existence, and was part of Richter and Pedersen's 2004 study. Changes of ownership had occurred but throughout its existence, sons had taken over from their fathers. Employment fluctuates according to the contract portfolio, and on the site studied, around 40% were (newly) employed for this job. The crew comprised 28 persons, including some apprentices, and was participating in the renovation of an old building. The enterprise acted as trade contractor. The version of the case presented here is in an abbreviated form that follows the three main analytical perspectives of integration, differentiation, and ambiguity, leading to the multiple configuration of cultures in the enterprise.

The integrative perspective: work values and risk

There are two integrative elements in the common safety culture – the work values and the perception of risk.

The *work values* are related to professional pride, autonomy and companionship at work. Professional pride is widespread among these construction craftsmen. Skilful employees are a competitive parameter for the carpenter contractor. And skilled people are respected by their colleagues. This is also seen in relation to apprentices. Professional pride is also closely connected to autonomy. The competent craftsman knows what is needed, and no one except the closest colleagues can intervene, even though the crew sometimes has lively discussions about drawings and design:

"All this gypsum is just fun! – The design is the most exciting side of our trade. Here, you have to think for yourself and try and figure out how to make things – and we are usually able to do so. As long as nobody else intervenes too much, which is however sometimes necessary" (carpenter, Richter & Pedersen 2004).

The relationship among colleagues, the companionship and collaboration, is also assigned weight. It relies on strong interdependence among the members of the crew. This applies to both piece work and work paid by the hour, and also involves alignment of the workload:

"When I hire new people, I put the most emphasis on whether they can collaborate, think independently and work. That is also most satisfactory for the crew. If some are freewheeling, it destroys the collaboration; they are independent of each other. Professional skills are a matter of course" (Master, Richter & Pedersen 2004).

Diverse dimensions of work values are highlighted, although all members stress the communal effort, because this has an important influence on wages and workload. In the perspective of some, the central factor is consciousness as wage workers. Others put more emphasis on the feeling of companionship and an orientation toward collaboration in relation to the enterprise

as a whole. In the latter case, the enterprise is viewed as provider of work and employment. These work values colour the safety cultures.

The *common perception of risk and prevention* asserts that risks are involved in the carpenter's work. Even if this is broadly recognised, this does not imply common assignment of meaning as to which situations or conditions involve danger. Here, the differentiated interpretation becomes dominant:

Differentiation perspective: four cultures of safety

Four cultures are manifest when adopting the differentiation perspective: "mastering", "framework and rules", "drawing board and plan" and "ties that bind". They express in various ways the understanding and acting vis a vis risk, accidents, prevention and safety work. Consider "mastering" as an example:

In the "mastering" culture, the perception is that professionalism is part and parcel of avoiding accidents. The position is that *risk* will occur, when one is not concentrated. Risk can be handled by the competent artisan, who through experience from practice knows when and where he is supposed to be careful:

"I try to look out. And then I follow what the others are doing" (apprentice, Richter & Pedersen 2004).
"We are permanently attentive, especially when we work on roofs, scaffolding and ladders—safety is common sense" (carpenter, Richter & Pedersen 2004)

Accidents are explained through lack of thoughtful attention, or maybe through taking a chance, even though the risk is known. An evaluation is thus made:

"The accident happened, when I was working my way down along the gutter on the roof. I just did not notice that I had reached the edge. So I took another step and fell two meters and broke my ankle – that was damn stupid! (carpenter, Richter & Pedersen 2004).

Since it is celebrated that work values involve autonomy, an accident easily becomes the worker's own failure. Accidents are avoided by concentrating and keeping an eye on conditions, which an experienced artisan knows can lead to something going wrong. Thus, *prevention* is best carried out by taking care of yourself and others.

The understanding of *health and safety activities and procedures* lies in a direct prolongation of the above positions. It is not valued by the craftsmen, since they prefer to handle things themselves. This includes the obligatory workplace assessment, regulated by law:

"Workplace assessment might be OK for non-skilled workers. For us, however, it is a waste of time. Our entire personnel are craftsmen yes? They know damn well what it is about. – You cannot tell a skilled worker who has been in the trade for 20 years how he is supposed to act. But according to the law, we have to instruct them, and that's far out" (master, Richter & Pedersen 2004)

The case enterprise study was rich in examples of "looking after yourself and each other". One employee, for example, checked his own work by carefully stepping out on it, even though he was several meters above the ground. The individual employee draws on his own experiences and uses and expands them. The risk is weighed against alternative constraints and extra work. Since the main explanation for accidents is considered to be human error, fur-

ther analysis, reflection, and prevention activities are not encouraged. It is difficult here to get near misses registered.

In the figure below, the same four features – risk perception, work accidents, prevention and health, and safety activities – found in the differentiation perspective are also described for the other cultures, labelled "Framework and rules", "Drawingboard and plan" and "Ties that bind".

Place figure 1 safety cultures found in a differentiation perspective about here

Ambiguity

A small group of actors relate in an ambiguous way to several safety cultures. One craftsman, for example, expresses that organized health and safety activities are unnecessary, since prevention is about being attentive to risks. This can be seen as part of the "mastering" culture. On the other hand, the same employee is critical toward the health and safety representative, who he describes as not sufficiently active. The latter refers to the culture called "Framework and rules". There are more examples in the study. Such apparent contradictions can be seen as mirroring everyday work at the site, which is full of contradictory demands.

The multiple configuration

The integrative culture's work values are important for organizations "sticking together", while the basic common understanding of risk is overshadowed by the different perceptions in the four safety cultures. "Mastering" is together with "Framework and rules" dominant – for example, also in headcount. "Drawingboard and plan" is somewhat weaker. The least influential culture is "Ties that bind". The four safety cultures were found throughout the organization, but with different emphasis. Among the apprentices, "Mastering" is dominant, and to a

limited extent "Ties that bind", whereas the two other cultures are not found here. Among skilled younger artisans, we found all four safety cultures, but with most emphasis on "Framework and rules", and secondly "Mastering". Similarly, among the elderly artisans, but "Drawing board and plan" was not represented. Employers, masters and quantity surveyors were spread across the four cultures, but with "Mastering" as the dominant. The cultures are thus not delimited to levels in the organization or to age of the employer or employees.

Extra-organizational cultures?

Using symbolic interactionism, it has been shown how the carpenter crew and enterprise constitute a unique configuration of safety cultures. In the figure below, the question is raised whether safety cultures of this character cut across the organizations in the five studies, which cover 10 enterprises (Dyhrberg 2004, Engberg 2000, Kamp 2003, Richter 2001, Richter & Pedersen 2004). The studies are slightly different, and the cultures are not described fully here. The differentiation perspective is used to distinguish cultures using the original naming, without more ado (see figure 2).

It has been a premise throughout that symbolic interactionism, combined with limited resources, only allows a study of local manifestations of cultures; but equally that it cannot be ruled out that the grander cultures might be present. Viewed across the studies, the broad picture that emerges is of coexistence between the unique and the more general. The studies found 25 cultures through application of the differentiation perspective, and only one case, the smallest enterprise, exhibited one culture (Kamp 2003, the carpenter). This latter finding, however, contrasts with the case presented above.

Place Figure 2. 25 cultures in a differentiation perspective about here

In the construction sector studies, many organizations share a strong element of a production culture ("Professionalism" and "Mastering", for example), giving priority to production over safety, and simultaneously relatively little assignment of meaning to the enterprise involved as constituting integration and relationship. Also cultural traffic (Alvesson 2003) proliferates, as exemplified in the carpenter case above with many new employees on the site. This underpins a relationship (also culturally) to a profession rather than to the organization. This is at least found in three carpenter enterprise cases studied (Richter & Pedersen 2004) and resonates with the finding that construction is characterized by temporal project organization. Another crosscutting feature is the relation and assignment of meaning to safety rules. It appears to be common that this is characterized by a dichotomy of cultures, where breaking rules and making rules constitute each of them. This goes for Kamp's (2004) "Courage and creativity" versus "Framework and rules".

Focusing on cultures in the construction SMEs, Richter and Pedersen's two other carpenter enterprises feature a strong emphasis on "Mastering" and "Framework and rules" and less on "Drawingboard and plan" and "Ties that bind". In the smallest enterprise, organization and communication are not very formalised. Kamp's (2004) study is in prolongation of this as the culture of planning, "Drawingboard and plan", is not found in the 9- and 13-men enterprises. Nevertheless, again the pairing of "Professionalism" and "Framework and rules" proliferates.

Dichotomist cultures are also found in Engberg's (2000) manufacturing cases of "Rugby players" versus "Soldiers of Tordenskiold" (the name Tordenskiold refers to a Danish war hero and his few soldiers, and here to the existence of a small recurrent group of Health and Safety

"activists"), and Dyhrberg's (2004) "Icehockey and boxing" versus "Football". The existence of dichotomic cultural pairs resonates with Alvesson's (2003) discussion, and it cuts across enterprise sizes.

A crosscutting feature is also normative or even legislative cultures; that is, cultures based on and using rules of regulation, and often supported by the members of the safety organization, safety representatives and safety managers. It refers to work environment legislation, yet it does not penetrate the entire organization but remains just one safety culture among several. This applies for Richter and Pedersen's (2004) "Framework and rules", Kamp's (2003) "Framework and rules", and Engberg's (2000) "Soldiers of Tordenskiold".

Finally, it is a differentiating commonality that the safety cultures cut across the organization and do not follow organizational levels or groups. It thus appears that neither different positions in operational production (be it construction or manufacturing), nor more or less managerial responsibility constitutes a particular culture.

Discussion

The carpenter crew case exhibited a specific constellation of cultures on a renovation site. The crew studied and the company involved featured a common work culture of proud craftsmanship. However, when investigating assignment of meaning to risks, accidents, prevention and health and safety activities, four distinct safety cultures emerged. And finally, examples of ambiguity and further fragmentation were also apparent. This diverse pattern occurs within the frames of a site organization comprising one crew and a firm that is a SME. When opening our scope to the broader sample, the enterprises and workplaces investigated show the exist-

ence of multiple configurations of safety cultures, which cut across safety organizations, management, technicians, age groups, craftsmen and apprentices. The organizational safety cultures can be characterized as more or less cynical, ambivalent and normative in their approach to prevention of accidents, a result that resonates with other construction studies (Linhart et al. 2010, Melia et al. 2008, Wadick 2007). They span from the position that accidents are stochastic, to an interpretation of risks as a systematic pattern of events leading to accidents – a position whereby preventive working practices, preventive equipment etc. are installed and tried out in an attempt to enable the organization to avoid accidents and create a proactive safety culture. The cultures are embedded in settings characterized by compromises and ambivalence between (slightly simplified) a production rationale, a wage-worker rationale, and a safety rationale (Ullmark et al. 1986). The sample apparently encompasses unique cultures, such as the "tightrope walkers" (Engberg 2000) and the "machine techniques" (Richter 2001). Although it is tempting to speculate that these have broader bearing, they are unique on the basis of the present material.

On the other hand, it appears from our sample that a grander culture of work environment regulation seems to be active at the studied workplaces. Within the 25 cultures found through the differentiation perspectives, there are recurrent cultures that support themselves on formal rules and legislation ("Framework and rules", "Soldiers of Tordenskjold", "Minesweepers" and more – parallel to Guldenmund's (2008) reactive and proactive cultures). It was characteristic that the types of cultures that were found incorporated the societal or other external assumptions about what management of occupational accidents should be, to some extent centred on the health and safety manager and the safety organization, whereas others were in more or less overt opposition to this culture. Our finding thus differs from that of Wadick (2007), which was that a cultural divide existed between construction workers and the OHS

regulator. We find the divide inside the companies and in the project organization on the construction site. It can be speculated that the density of safety representatives and the strength of unions (Australia versus Denmark) may explain this difference. These relations between proactive and reactive cultures meant that installing the right management in the organization was complicated. As noted in the beginning, the accident problem is unsolved. The existence of local normative cultures can thus be criticized as assuming superiority rather than actually delivering results in terms of reduction of accidents. But also the pursuit of prevention seems to be built into a grander culture. It is however equally important to recall the persistent finding of "pairs" of culture, where compliance with rules coexists with cultures where breaking rules is a constituting factor (see also Walker 2010). Another more positive interpretation follows Nævestad's (2008) argument that multiple safety cultures represent different frames of reference that are instrumental in solving safety issues in everyday work. Thus, from this perspective, the constellations are necessary. In the project context in construction, this is especially prevalent as new constellations of firms have to share safety organization temporarily, and the competition among safety cultures and frames of reference are a recurrent process.

Conclusion

This article has a twofold aim: first, to establish an understanding of safety culture on site as part of the milieu surrounding accidents and their prevention; second, to study a broader sample of cases of safety culture in order to establish a discussion of possible grander safety cultures in play. The first case showed a strong social consensus regarding the trade's professionalism and to some extent the specific topics of health and safety, primarily among the craftsmen and apprentices. The case also showed profound differentiation, which occurred within

the frame of a site organization of a large crew and a firm that is a SME. Moreover, turning to the broader sample, and evaluated across the studies of safety cultures over the years, the societal and enterprise-specific installation and stabilisation of the accident prevention activities represent a truly scattered pattern. Only in one case, the smallest enterprise, was a singular safety culture found, and this remains the exception (Kamp 2003, the carpenter). Some local safety cultures exhibit understandings of production and mastering of techniques as central for production of identity; and this is alien to the idea of thinking about risks and safety in a preventive manner. Such systems of meaning are carried by employees and managers, and are not in real dialogue with the work environment professionals and other proponents of safety when they organize prevention. The two parties operate in universes that barely engage with each other. These results thus divert from studies that claim the existence of national culture's impact on safety (Håvold 2007), in the sense that a much more fragmented and patterned picture of safety cultures are offered, without disregarding the common national element. This result concurs with Mearns and Yule (2009), Mohamed et al. (2009) and Spangenberg et al. (2003).

The implications for prevention work in the working environment are several (see also Antonsen 2009, Behm 2005, Hasle et al. 2009, 2010). On the basis of the presented research here, it is not aimed at, nor possible, to assert the extent or results of preventive activities. Nevertheless, one implication of the present results is that addressing social groups in organizations can be done in a more sensitive way than the usual model of interests, which usually identifies the interests of for example safety organization, site managers, crafts, and shop stewards as central interests to be considered. In contrast, the safety culture analysis usually results in other groupings of actors, which also recommends thinking in other processes when developing prevention and change activities – a result that is parallel to Hasle et al. (2009), who use the company auditor as change agent. Moreover, when focusing on construction, it appears that

projects rather than enterprises are framing the constitution of safety cultures. A much wider implication is that working life is scattered in numerous work cultures with different, but overlapping and ambiguous, understandings of what healthy work is. For the organizers of prevention, the patterns found in the safety culture studies indicate that preventive frames of reference become less ubiquitous and pre-given; and the question of what healthy work is, is becoming even more a question for field work. Healthy work, preventive management and safety cultures are not accidental, but are locally produced. National efforts are also important and appear to have impact, yet they should be designed with a view to these local conditions.

References

Alvesson, M. (2003) *Understanding Organizational Culture*. SAGE. London.

Antonsen, S. (2009) *Safety Culture: Theory, Method and Improvement*. Ashgate: Farnham.

Baarts, C. (2010) Collective Individualism: The informal and emergent dynamics of practicing safety in a high-risk work environment. *Construction Management and Economics* **27**(10), 949-957.

Baram, M. & Schoebel, M. (2007) Editorial safety culture and behavioral change at the workplace. *Safety Science* **45**(6), 631-636

Behm, M., (2005) Linking construction fatalities to the design for construction safety concept. *Safety Science* **43**(8), 589-611.

Brooks B. (2008)The natural selection of organizational and safety culture within a small to medium sized enterprise (SME). *Journal of Safety Research*, **39**(1):73–85.

Burrell, G. & Morgan, G. (1979) *Sociological Paradigms and Organizational Analysis: Elements of the Sociology of Corporate Life*. Heinemann, London.

Champoux, D. & Brun, J.-P. (2003) Occupational health and safety management in small size enterprises: an overview of the situation and avenues for intervention and research. *Safety Science* **41**(4), 301-318.

Coffey, V. (2010) Understanding Organisational Culture in the Construction Industry. Spon Research, New York.

Cooper, M.D. (2000) Towards a model of safety culture. *Safety Science* **36**(2), 111-136.

CBI (1990) *Developing a Safety Culture - Business for Safety*. London Confederation of British Industry (CBI).

Dedobbleer, N. & Beland, F. (1991) A safety climate measure for construction sites. *Journal of Safety Research* **22** (2), 97-103.

Dyhrberg, M. B. (2004) Forebyggelse af arbejdsulykker – Et sikkerhedskulturperspektiv. Lyngby: Institut for Produktion og Ledelse. DTU.

Engberg, H. (2000) Sikkerhedskulturer i en produktionsvirksomhed. Et casestudie i LEGO System A/S, Plastforarbejdningen. Master thesis, Technical University of Denmark, Lyngby.

Geertz, C. (1993) The Interpretation of Cultures. London: Fontana Press.

Gherardi, S., Nicolini, D., Odella, F. (1998) What do you mean by safety? Conflicting perspectives on accident causation and safety management in a construction firm. *Journal of Contingencies and Crisis Management* 6(4), 202-213.

Gherardi, S. & D. Nicolini (2002) Learning the trade: A culture of safety in practice. *Organization.* **9**(2), 191-223.

Glendon, I. (2008a) Safety culture: Snapshot of a developing concept. Editorial. *Journal of Occupational Health and Safety. Australia and New Zealand.* 24(3), 179-189.

Glendon, I. (2008b) Safety culture and safety climate: How far have we come and where could we be heading. *Journal of Occupational Health and Safety. Australia and New Zealand* 24(3), 249-271.

Guldenmund, F. (2000) The nature of safety culture: a review of theory and research. *Safety Science* **34** (1-3), 215-257.

Guldenmund, F. (2008) Safety culture in a Service Company. *Journal of Occupational Health and Safety. Australia and New Zealand* **24**(3), 221-235.

Guldenmund F. (2010) Understanding and exploring safety culture, Boxpress, Oisterwijk.

Hale, A. (2004) Letter to the editor. *Safety Science* **42**(10), 979–983.

Hasle, P., Kines, P., Andersen, L. P. (2009) Small enterprise owners' accident causation, attribution and prevention. *Safety Science*, **47**(1), 9-19.

Hasle P., Bager B., Granerud L. (2010) Small enterprises − Accountants as occupational health and safety intermediaries. Safety Science. 48(3), 404-409.

Haukelied, K. (2008) Theories of (safety) culture revisited — an anthropological approach. *Safety Science*. **46**(3), 413–426.

Heyl, B. (2001) Ethnographic Interviewing. In K. Atkinson et al.: *Handbook of Ethnography*. Sage. London

Holmes, N. (1998) Safe Bosses? Safe Workers? Safety culture in small construction industry businesses. *Safety Science Monitor* 3, Article 12, February.

Hopkins, A. (2006) Studying organizational culture and their effects on safety culture. *Safety Science* **44**(10), 875-899.

Howarth, T & Watson, P. (2008) *Construction Safety Management.* Chichester: Wiley-Blackwell.

Håvold, J.I. (2007) National cultures and safety orientation: A study of seafarers working for Norwegian shipping companies. *Work & Stress*, **21**(2), 173–195.

Kamp A. (2003) *Sikkerhedskultur og forebyggelse af arbejdsulykker i små byggevirksomheder. Forskningsrapport*. BYG. DTU, Lyngby.

Lingard, H. & Holmes, N. (2001) Understandings of occupational health and safety risk control in small business construction firms: barriers to implementing technological controls. *Construction Management and Economics* **19**(2), 217-226.

Lingard, H. C., Cooke, T. Blismas, N. (2010) Properties of group safety climate in construction: the development and evaluation of a typology. *Construction Management and Economics* **28**(10), 1099-1112.

Lingard, H. & Rowlinson, S.M. (2005) *Occupational health and safety in construction project management.* Spon Press. London

Martin, J. (2002) *Organizational Culture: Mapping the Terrain*. London: Sage.

Mearns, K. & Yule, S. (2009) The role of national culture in determining safety performance: Challenges for the global oil and gas industry. *Safety Science* 47(2), 777-785.

Meliá, J.L., Mearns, K., Silva, S.A., Lima, M.L. (2008) Safety climate responses and the perceived risk of accidents in the construction industry. *Safety Science* **46**(6), 949-958.

Meyerson, D. & Martin, J. (1987) Cultural change: An integration of three different views. *Journal of Management Studies* **24**(6), 623-647.

Mohamed, S., Alia, T.H., Tam, W. (2009) National culture and safe work behaviour of construction workers in Pakistan. *Safety Science* **47**(1), 29-35.

Nævestad T.-O. (2008) Safety culture preconditions for organizational learning in high risk organizations. *Journal of Contingencies and Crisis Management*. **16**(3), 154-163.

Nævestad, T.-O. (2009) Mapping research on culture and safety in high-risk organizations: Arguments for a sociotechnical understanding of safety culture. *Journal of Contingencies and Crisis Management* **17**(2), 126-136.

Parker, M. (2000) Organizational culture and identity. London: Sage.

Peters, T. & Waterman, R., (1982) In Search of Excellence. Harper & Row, New York.

Pidgeon, N. & Leary, M. (2000) Man-made disasters: why technology and organizations (sometimes) fail. *Safety Science* **34**(1-3), 15–30.

Richter, A. (2001) Nye ledelsesformer, sikkerhedskultur og forebyggelse af ulykker. TUD, Lyngby.

Richter A. & Pedersen E.F. (2004) "Arbejdsulykker! Alle har en historie" Om sikkerhedskultur og læring i tømrerbranchen. BYG•DTU Rapport (R-090). Lyngby

Schein, E.H. (1992) Organizational Culture and Leadership, 2nd ed. Jossey Bass, San Francisco.

Spangenberg S., C. Baarts, J. Dyreborg, L. Jensen, P. Kines, K. L. Mikkelsen (2003) Factors contributing to the differences in work related injury rates between Danish and Swedish construction workers. *Safety Science*. **41**(6), 517-530.

Summerton J. & Berner B. (eds) (2002) *Constructing Risk and Safety in Technological Practice*. Routledge, London.

Sørensen O. H., Hasle P, Bach E. (2007)Working in small enterprises – Is there a special risk? *Safety Science*, **45**(10), 1044-1059

Tait, R. & Walker, D. (2000) Marketing health and safety management expertise to small enterprises. *Safety Science*, **36**(2), 95-110.

Ullmark, P., Steen, J., Holmgreen, A. (1986) *Det Matnyttige Arbetet*. Tidens forlag. Stockholm.

Wadick, P. (2007) Safety culture among subcontractors in the NSM housing industry. *Journal of Occupational Health and Safety –Australia and New Zealand* **23**(2), 143-152.

Walker G. W. (2010) A safety counterculture challenge to a "safety climate" Safety Science **48**(3), 333–341

Walker, D. & Tait, R. (2004) Health and safety management in small enterprises: an effective low cost approach. *Safety Science*, 42(1), 69-83.

Figure 1. Safety cultures found in a differentiation perspective:

	Mastering	**Frames and rules**	**Drawingboard and plan**	**Ties that bind**
Risk	Can be handled by the competent craftsman	Unacceptable, but reduced if conditions are ok	Unacceptable and difficult to handle in pressed situations	Atypical; other conditions are more important
Accidents	Due to human error	Due to lack of action regarding inappropriate or illegal conditions	Due to incalculable conditions and distance between contractors and other players	Casual or singular events
Prevention	Taking care of yourself and others	Put your foot down, act and demand improvements	Via own planning, good design, cooperation and coordination on site	No special opinion: rules are unrealistic for use in practise

Health and Safety activities	Of less importance; people manage on their own	The formal system should be used; combine personal and common effort	The formal system should be used early and systematically; everyone should contribute	Waste of time

Figure 2. 25 cultures in a differentiation perspective

Study	Enterprise	Cultures found in the differentiation perspective
Richter & Pedersen (2004)	Three Carpenter Contractors	Mastering Framework and rules Drawingboard and plan Ties that bind
Kamp (2003)	Carpenter	Professionalism
	Bricklayer	Professionalism Framework and rules Courage and creativity
Dyhrberg (2004)	Precast Concrete element manufacturer	Icehockey Boxing Football Trainers
Richter (2001)	Packaging manufacturer	Producers The social Teaching master

| | Rubber goods manufacturer | Machine technique

Daredevil

Policeman

Public democracy |
| --- | --- | --- |
| | Beverages manufacturer | Rugby

Lonely fight for safety

Trench |
| Engberg (2000) | Plastics manufacturer | Rugby players

Mine sweepers

Tightrope walkers |