Images of safety in construction work - a multiple configuration of cultures
Stefan Christoffer Gottlieb, Anne Richter, Elsebet Frydendal Pedersen and Lise Nørnberg
Department of Civil Engineering – Construction Management, Technical University of Denmark

Abstract
The social partners in the construction industry in Denmark have during recent years agreed to focus on a reduction of the too high accident rates within this sector. Thus, the scene is set to generate deeper understandings on how risks and accident prevention are conceived and handled at construction sites, and to gain experiences of appropriate measures aiming at “bending the curve” downwards. In ongoing research we have focussed on safety culture, conceptualised as a specific aspect of organisational culture, referring to an interpretive, symbolic framework. In depth ethnographic methods have been applied in a preliminary case study at a construction site in Copenhagen. This study illustrates the existence of a multiple configuration of differentiated and ambiguous safety cultures, which put barriers to effectively prevention of occupational accidents. The conclusion is that applying action research, oriented towards the creation and re-creation of safety cultures from a learning perspective is useful, aiming at good practices. This research is on going.

Key words: Organisational and safety culture, interpretivism, risks, occupational accidents, construction industry.

Introduction
Despite of efforts to enforce the Danish Work Environment Act and empowering a number of institutions, the rate of occupational accidents within construction has not been reduced during recent decades (Richter & Frydendal Pedersen, 2002). Furthermore, accident rates are markedly higher in this sector, compared to the labour market as a whole. Although some initiatives to prevent accidents have been taken all along in construction enterprises, the situation calls for new approaches. This implicates generating up-dated knowledge on possible barriers to recognize risks and to act on them in the construction industry.

At present, there exists a general agreement on the limitation of understanding accidents from a merely technical or human error perspective (Kamp & Koch, 1998; Hale & Hovden, 1998). During the 1990’ies, growing attention has been given to organisational issues as well as to the organisations’ own understanding of accidents and motivation to act (Kjellen & Hovden, 1993). Having thoroughly investigated 6 companies, Kjellen and Hovden (ibid) observed, that despite of an explicit goal to open up the companies’ ability to conduct broad investigations on accidents and prevention, the attention of involved actors was, nevertheless, narrowed down. This was explained as existing “filters”, reflecting that actors conceive accidents and risks in specific ways, thus becoming blind towards certain issues. This pictures a growing interest in the impact of safety culture (Turner, 1991; Pidgeon, 1998), on the success of accident prevention. During recent research projects we have taken up this line in a quest to develop the concept of safety culture, theoretically and empirically. In this, we have observed, that a safety culture approach could be one of several prerequisites of changing work procedures and conditions in a safer direction.

This paper outlines an understanding of safety culture to be applied in an effort to improve accident prevention, and is structured as follows: Initially we draw on a theoretical conceptualization of organisational culture (Alvesson, 2001), seeing safety culture as a focused aspect of an organization’s culture. It is argued, that attention to safety culture could contribute to a deeper understanding of management’s and workers’ interpretations and actions on safety matters. This re-
quires an ethnographic approach to the field. From here, we present results of a preliminary study on organisational and safety cultures at a building site in Copenhagen (Christensen 2001). This included analysis of cultures among three crafts and site management, where at least two different safety cultures were found. These cultures contained more or less strong perceptions on the need to act on risks and, subsequently, constitute possibilities as well as barriers to handle prevention. Since culture is not static, a central question is, how cultural elements are communicated within the construction industry and, furthermore, how new preventively oriented strategies of accident prevention could be developed? These issues are in focus in an ongoing action research in small and medium sized construction enterprises and at trade school.

Organisational culture

During the past two decades culture has gained an increasingly larger role in the understanding of organisations revealing new perspectives on work, individuals and management. Two main paradigms have dominated the study of organisational culture. Functionalism (Schein, 1992) and interpretivism (including symbolism, Geertz, 1993; Parker, 2000; Alvesson, 2001; Martin, 2002). The approach adopted in the study below draws on symbolism where culture is understood as “…a shared and learned world of experiences, meanings, values and understandings which inform people and which are expressed, reproduced and communicated partly in symbolic form” (Alvesson, 1993). Metaphorically speaking culture is seen as something an organisation is in the symbolic interpretive perspective.

Safety culture is viewed as a specific aspect of the organisational culture. Drawing on Alvesson (ibid.) we define safety culture as shared and learned experiences, meanings, values and understandings, which inform and guide people with regards to actions involving risk, accidents and prevention, and which are expressed reproduced and communicated partly in a symbolic form. In this perspective safety culture is seen as a “product” of social interaction between employees (and management) in a given organisation and outside influences e.g. legislation and regulations. Safety culture studies thus have to be carried out in a specific context, a view also supported by Alvesson (2001) and Guldenmund (2000).

The conceptual framework

In our understanding of safety culture we furthermore draw on Martin (1992), introducing the concepts of integration, differentiation and ambiguity as well as Alvesson’s notion of the multiple configuration. This theoretical framework, especially the multiple configuration as basis for the study, has proven to be well suited to capture or handle the complexity in the cultural patterns traditionally found in organisations in the construction industry (Christensen, 2001).

As will be seen in the following section on “Safety culture on a Danish construction site” there are numerous controversies on safety between different groups employed at the studied site. Other empiric studies conducted in Denmark go to underline this existence of cultural differentiation within organisations (Dyrberg et al, 1998). In this paper the three perspectives differentiation, integration and ambiguity are used to analyse the safety cultures at a Danish construction site.

Integration

Within the integration perspective culture is viewed as shared or common understandings in an organisation. According to Schein (1992) one finds little variation within a cultural unit and Alvesson (2002) notes that culture within this perspective can be seen as social glue binding the members of the organisation together. Culture contributes to the avoidance of fragmentation, conflict and tension and promotes consensus, harmony and community. The focus of a given
study is in other words to look for shared symbols and manifestations across an organisational unit.

Within this perspective it’s rarely recognised whether several cultures co-exist within an organisational unit, due to the deliberant search for crosscutting or homogenous manifestations and symbols. However, if several cultures are found, it’s usually considered as a sign of weakness by those scholars who see a close tie between the integrationist perspective and the rationalistic managerial ideals of top-down control and change of culture towards a uniform entity (Alvesson, 2002; Richter and Koch, 2001).

**Differentiation**

The focus of the differentiation perspective is, that an organisation consists of several subcultures each possessing different experiences, values and understandings, which assign meaning to acts involving risk, accidents and prevention. These subcultures are either seen as product of (local and global) social structures such as professions (trades) and departments in a given organisation (Guldenmund, 2000) or they are seen as products of local everyday work practices or communities (Richter and Koch, 2001; Alvesson, 1993). The local cultures often transgress the social structures otherwise found in the organisation, as they derive from the daily work interaction.

**Ambiguity**

The point of reference for the ambiguity perspective is, that there is a lack of consensus and clarity in an organisation’s cultural manifestations, which on the contrary basically is characterised by disorder and incongruity. Alvesson (2002) supports the view that individuals in an organisation can orient themselves differently towards a given object at different times. However at the same time he has observed, that ambiguity can originate from social structures and practices rather than being cultural phenomena.

Alvesson elaborates further on the concept of ambiguity introducing what is called bounded ambiguity, in which local cultures do not necessarily establish clarity and consensus among broad groups of people, but instead offer guidelines for coping with instances of ambiguity (Alvesson, 2002, p.166). Bounded ambiguity thus refers to broadly shaped rules and meanings (the so-called meta-meanings), which orients the individuals towards a common goal. Bounded ambiguity implies that the members in an organisation try to develop a common understanding across their differences, without which the organisation can’t exist. The bounded ambiguity takes on many forms. From a safety perspective it can be a joint lifelong effort to preserve ones own ability to work and minimize the long-term attritive influences in the daily work practices (Richter and Koch, 2001; Ullmark, 1986).

**The multiple configuration**

Parker (2000) and Alvesson (2002) point to general consensus that a multiplicity of cultural orientations in organisations need to be considered, implying a mix of broadly shared meanings, group-distinct meanings and ambiguity. Alvesson (2002, p. 164) notes that “[t]he challenge is to consider the frequently simultaneously existence of (a) relative clarity and common orientations associated with a degree of shared meanings across the organization, (b) diversity, conflict and multitude of overlapping group identifications, and (c) ambiguity and fragmentation on different levels.”

When conducting an organisational culture study it’s therefore necessary to include all three perspectives of differentiation, integration and ambiguity. The multiple configuration offers a synthesized perspective on cultures in which organisations can be understood as shaping local versions of broader societal developed cultural manifestations. The role of macro cultures, local cul-
tures, possible integration and unity and the mixture and overlapping nature of cultures is combined in this view. Culture in Alvesson’s perspective is thus not static. Organisational culture evolves over time through internal and external influences, which is called cultural traffic. The individuals in a given organisation are assigned new tasks and interact with each other evolving new practices and communities, influencing the assignment of meaning within local cultures.

As the analysis will show, we have adopted an interpretive approach to organisational culture, recognising the possibility of a multiple configuration of safety cultures as the construction site per se can be viewed as an arena where different firms, trades and practices interact on a daily basis.

Methods

Analysing safety culture demands choice of methods that are sensitive enough and able to capture the ambiguity, multiple configurations, understanding of safety etc. As stated before culture is basically about being expressive, conveying subjective meanings of life and situation, however trivial. This presupposes in choice of methods the ability to capture the assignment of meaning to safety issues and the impact of myths, stories, rituals, feelings, fantasies etc. (Alvesson, 2002).

Suitable methods are found within the range of anthropological methods. (Alvesson, 2002; Heyl, 2001; Richter, 2002) A holistic approach to study safety culture, including organisational studies, conducting ethnographic interviews and participant observations on the worksite has been applied in three studies, one reported by Richter and Koch (2002), one pilot study accounted for in this article, and one ongoing to be introduced later on in the article.

The mapping of organisational structures, ethnographic interviews and participatory observations in the field was applied in the pilot-study as a cross-sectional study.

The interviews were designed semi structured, targeted to personal background, qualification, work life, organisation, safety understanding and experiences etc. Managers and work gangs were interviewed in depth. Afterwards, and ongoing in the process, the interviews were written out in its full length and analysed within the frame of “reflective empirical research” as elaborated by Kvale (1996), Heyl (2001) and Alvesson. & Skölberg (1994).

Participant observation was drawn upon to deepen the understanding given in the interviews. The regular presence on the worksite enabled the researcher to give descriptive accounts of the workprocess and activities as well as an account of her/his own experiences while in the field. Notes were taken during the field observation for later to be written as a document to be analysed alongside the interviews (Emerson et al, 2001).

The role of the researcher is modified the aim to be in the range of a passive observer, but the whole process also demands “an extensive knowledge of the social conditions within which people live” (Bourdieu in Heyl, 2001).

Safety cultures on a Danish construction site

This section presents a developed analysis of safety cultures at a Danish construction site based on an ethnographic study of organisational cultures at a building site. The original project was carried out by Svend Christensen (2001) and is further developed by Koch (2002) in an explorative study with focus on safety cultures as a part of the organisational culture.
The site, the teams and the safety issues

The project is a Danish house-building project, which is carried out by one of the dominating contractors on the Danish market. The building contains 178 apartments with an estimated budget of € 25 mill. The project organisation is composed of 52 contracts held by 28 different contractors. As far as the basic construction principles and choice of materials the building can be described as being traditionally designed. However, the surrounding circumstances, i.e. organisation, site layout and production methods, are in focus. Much attention is paid to logistics. The different craft teams are geographically separated from each other, working different places at the site in order not to interfere with each other, and a very tight controlled material flow guides the overall on-site production. The material isn’t stockpiled at the site weeks in advance, but arrives when it’s needed and the premises for starting the production is met.

The concreters gang

The concreters gang consists of 14 members and a foreman. The team is responsible for carrying out a variety of different tasks on the site. Following this a well-defined division of labour exists within the group where the different members carry out the same tasks from project to project. There is one foreman, one crane operator, one ground assistant to the crane operator, two mounters, an apprentice and eight semiskilled workers of which two are on loan from another team. Age wise the concreters gang consists of roughly three groups. Five members which are between 55 and 60 years, four between 24 and 26 year whilst the rest is of middle age. The apprentice is a woman.

Work is fairly standardised and the workday are split into 21-23 cycles revolving around mounting of the pre-cast concrete elements. Each of the team members has specific duties to carry out in the process. The well-defined division of labour results in little need for conversation during work. The piece-rate is not of paramount to the team. It’s the crane that sets the work-tempo. As a team-member puts it “there’s no reason to be worn out ahead of time.” This perspective however conflicts with the general safety perception in the team, which is characterised by what could be called calculated risk-taking. The mounters often work direct underneath elements hanging from the crane wires. An incident where one of the young workers, instead of climbing to safety on the deck below him, chooses to balance five meters on top of a beam to reach a ladder was met with a witty remark, not to hit “the white car” parked below. This remark conveys an additional, equivocal message in that the Danish Labour Inspection Authority is believed to use white cars (Koch, 2002).

The bricklayers gang

The bricklayer gang has 12 members. The foreman participates in the work on equal terms with the eight other bricklayers. A further three semiskilled workers make up the rest of the gang. As with the concreters gang a well-defined division of labour exists within this gang between the bricklayers and the semiskilled workers. The gang’s composition is different from the concreters gang. The members are age-wise evenly distributed between early thirties to late fifties with exception of one semiskilled worker reaching retirement age.

The work sequences are relatively short and characterised by monotonous and repetitive motions. Furthermore the tempo is high due to the piece-rate system. Each bricklayer in the gang has to lay approximately 500 bricks a day in order to assure an internally agreed minimum salary.

The gang has a relaxed attitude towards safety. By tradition helmet is not worn by the majority of the bricklayers whilst working, even though the safety regulation at site clearly prescribes the use of helmets. Consequently, they only work as long as no work is done above them. Safety shoes, however, are used as the gang by experience has found them to be useful to prevent stepping on
nails. More examples on the relaxed safety-attitude in the team can be found. The foreman seldom takes part in safety meetings with the site management and no safety-representative has been chosen, as it would interfere with the gang’s shared interest and responsibility in maintaining a high piece-rate.

**The carpenters gang**

In comparison to the bricklayers and the concreters gang the carpenters’ work cycles are longer involving more varied tasks and a less defined division of labour between the gang members. The gang consists of 6 skilled workers of which one is foreman. The foreman is furthermore in charge of the other carpenter gangs at the site. The gang is close knit. Three members are relatives and another has been in apprenticeship to one of them.

The carpenters are proud of their work and show great enthusiasm whilst working. They point to the fact that they to some extent have freedom of choice and methods in the daily work, which is perceived as being very satisfactory. The work is carried out in a swift fashion in order to achieve a high piece-rate. Safety is secondary to production albeit the work involves several elements of risk related to working on the roof, with heavy elements and power tools such as the circular saw.

**The site management team**

The site management team consists of eight members, the project manager, three contract managers, an accounting manager, a quality manager, a trainee and a secretary. The project manager, the accounting manager and two of the contract managers have worked together on various projects for the past three or four years. The project manager emphasizes that maintaining a good chemistry within the site management team is paramount to achieving a satisfactory result on the project. Whether a project is satisfactory or not can in this understanding be measured in quite a simple way. It’s all about making profit for the company. This agenda drives the actions of the team itself, but also the cooperation with the other actors on site.

Being busy and efficient is an important signal to send both to the subcontractors and workers at site. In this case it is shown very aggressively in small daily routines such as talking on the phone then throwing it back in its holder, or driving a hard bargain with the subcontractors ordering site clean-up at their expense when agreements are not met. As an illustration of making profit as the primary driving force one of the site management members says: “you can be forgiven anything, as long as you make a profit.”

Company policy is to have a high standard on safety, and although the management team has to act as role model in safety issues making this an important priority, its evident that safety only is secondary to production. Safety meetings, which are held bi-weekly, are carried out in a swift almost military fashion sticking closely to the agenda from the previous meetings. There is seldom time to deal with any new questions, as the more important coordination meetings follows half an hour later.

The site management members are carrying safety shoes and helmets whenever they’re on the site, but the obligatory use of safety lines whilst being on the roofs is not respected. Furthermore the site management silently acknowledge the bricklayers lacking use of helmets and several minor daily safety violations. In other words the site management sets an ambiguous frame for safety (Koch, 2001) as opposed to the very strict and focused view on productivity.

**Safety cultures on site – the multiple configuration**

The analysis of the organisational cultures on the site presents clear indications of at least four differentiated cultures represented by the trades and the site management. Due to the limitations
of the empirical study (focus on only one site) it couldn’t be determined whether these cultures can be perceived as craft (global) cultures or firm (local) cultures. Each gang poses a set of internal shared meanings, expressed in common myths and stories as well as in physical acts and symbols i.e. how work is done and perceived.

From a general point-of-view there are signs of at least two different crosscutting safety cultures at the site. One is characterized by calculated risk-taking manifested in the concreters team by balancing on walls (the white car example) and working direct under hanging elements and in the bricklayers gang, refusing to use helmets while on site and the apparent lack of interest in attending safety meetings. The other site safety culture can be seen as more cautious exemplified by the site management team who has to act as role models and wear safety equipment on site.

From the presentation of the four groups it’s apparent, that there are evidence of further differentiation or at least ambiguity on safety issues within the different teams. This is seen in the bricklayers gang where only a few use helmets while the majority doesn’t. The local ambiguity is furthermore seen in the concreters gang, where risk-taking is a clearly accepted element in the daily work, but the members on the other hand are aware of the risk of long-term attrition due to high tempo monotonous and repetitive work combined with heavy lifts and acts accordingly.

There is little evidence of integrative elements in the safety cultures at the site. The safety meetings can be seen as a ritual revolving around the assignment of meaning to safety, thus taking on the function of integrating the different actors working on the site, although the commitment in and benefit of the meetings are highly questionable. The site management is playing an active part to promote the differentiation and ambiguity at the site, through violating their own safety regulations and placing considerations for production ahead of safety regulations.

The site is thus a playground for multiple cultures overlapping each other across teams and organisational structures. Within these multiple cultures there are several ambiguous meaning systems pointing towards an understanding of the site as a multiple configuration constituted by the many different professional/craft cultures and various firm policies and practices (local cultures). Due to the limitations of the pilot study, which was conducted over a period of two month with a passive participant role in of each the teams for a week supplemented with a series of qualitative interviews at site, no evidence of cultural traffic or dynamic cultural repositioning (Alvesson, 2002) within the teams can be found.

Concluding remarks – The road ahead
Several important lessons can be drawn from the pilot study as has been described. Firstly the study itself can be criticized for being too superficial, partly due to time spend on site being too short, and not overcoming the resistance toward the researcher. The researcher found it troublesome to conduct the study as intended due to a widespread mistrust towards him and what the study might reveal. The passive observant role in the gangs taken on by the researcher proved to be main barrier. It was not well accepted by the gangs’ members, that the researcher had to have a place in the gang without participating in the work practices.

The pilot study, however, confirmed the relevance of using the safety culture approach, being able to highlight the ambiguity, the multiple configurations and understanding of safety. We have met at least two differentiated safety cultures, tainted by ambiguity. Elements of a safety-oriented culture were present in the management team as well as within the gangs. This was manifested in perceptions on the need to use personal safety equipment. On the other hand, we encountered a safety culture, which, although recognizing risks, neither expressed a need of protection in practice, nor of joining the safety organisation on the site. We argue, that recognizing risks (e.g.
through formally addressing safety issues at meetings) can be seen as an integrative element across the cultures, whereas interpretations on needs of prevention and actions taken are differentiated and ambiguous.

The case furthermore illustrates, that ambiguity and lack of action on safety, not merely is to be understood from a safety culture frame of reference. The rationale of apparent ambiguity could be issues of economy and productivity, which is perceived as detrimental to safe practices and safety work. This situation appears to lock the possibilities of preventing accidents. The challenge is cultural change, which, in this case, could take outset in the integrated understandings of risks and, from here set differentiated interpretations on how to handle them on the agenda. We see this as a learning process, involving the actors, embedding different, and perhaps ambiguous, safety cultures.

Thus, we are presently engaged in an action research, seeking at one hand to gain a deeper understanding of safety cultures, and at the other to introduce and develop mutual learning processes on safety matters together with communities of practice within a defined trade within the construction industry. Three phases have been planned. The method battery, similar to the pilot study, is used in the first phase to establish a specific understanding of safety culture. In the second phase change agents and activities are being introduced in the form of participative action method focusing on empowerment of the individuals and in the attempts to change the multiple configurations registered in a more safe direction. By choosing these participatory methods we hope to tear down some of the barriers between the researchers and the construction workers and demystify the research agenda in order to overcome the potential resistance encountered in the pilot study. In the third phase the interviews and the participatory observations are being repeated as a means of evaluating the changes in the safety culture (Heyl, 2001; Richter, 2002).

References


