

APPROACHING SAFETY IN THE SWEDISH AND DANISH CONSTRUCTION INDUSTRY: PROFESSIONALS' PERCEPTIONS OF SAFETY CULTURE DIFFERENCES

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ABSTRACT

Background: Persistent high accident rates in the construction industry motivate research to improve the understanding of underlying factors affecting safety behaviour and safety outcomes. The Scandinavian countries of Sweden and Denmark are culturally similar but with a considerable difference in accidents rates, especially in construction, and as such offer an opportunity to explore organizational and managerial issues related to safety outcomes.

Methods: Semi-structured interviews were carried out with five construction managers and four construction workers in Danish and Swedish construction industry. The transcripts were analysed using semantic thematic analysis.

Results: Seven safety related themes were distinguished, conveying safety culture differences between Swedish and Danish construction industry concerning: participatory or directive management; challenge or obey; compliance or non-compliance; cooperation or conflict; caution or cockiness; planning management; and employment security. Interconnections between the thematic areas revealed patterns of interaction between managers and employees, interpreted as process models of participatory and directive safety cultures.

Conclusion: This study identifies seven factors perceived by the professionals as related to lower occupational accident rates in the construction industry. Engaging in participatory management, promoting long-term planning and long-term tenures, encouraging cooperation, cautiousness and compliance to rules as well as challenging authorities, were described as connected to successful safety management. These factors may guide further research in the field, as well as safety managers and officials engaged in decreasing accident rates in the construction industry in Scandinavia and elsewhere.

1. INTRODUCTION

Hämäläinen and colleagues (1) estimated the global number of fatal occupational accidents in 2003 to reach 360 000. The construction industry is one of the worst affected occupational sectors; among European construction workers 4.8% reported one or more accidental injuries in 2007 (2).

Traditionally, occupational safety has been managed through physical barriers and implementation of rules and regulations (3). Such measures will, however, be effective only if rules and barriers are not circumvented. Safety behaviours in terms of compliance can be expected to be influenced by attitudes and social behavioural norms, but also by organizational factors, encouraging or restricting the ability to comply (4). A high level of safety may also be considered dependent not only on safety compliant behaviours, but also on participative behaviour, where employees take own initiatives to identify hazards, and improve workplace safety (5). Social norms that encourage both types of safety behaviour therefore appear as important for safety outcomes. Safety climate research indicate the central role of managers and the quality of leadership behaviour for the development of social norms encouraging safe behaviour at the workplace (6-8), and in a longitudinal study Tholén and colleagues (9) showed that psychosocial climate and safety climate were antecedents of safety behaviour in the construction industry. In a meta-analysis of occupational safety Christian and colleagues (10) further strengthened such results and concluded that situation-related factors, involving safety climate and leadership; and worker-related factors, involving personality characteristics and attitudes, predict safety outcomes. Safety attitudes, norms and behaviours may also be expected to be grounded in the organizational or professional cultures. Alvesson (11) defined organizational culture 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” (11, p6). Schein (12) suggested that the core of the culture is a set of shared and tacit basic assumptions. These basic assumptions underlie group members’ values, cognitions and behaviours (12). Studying managers’ and workers’ conceptions of safety leadership and capturing aspects of organizational culture that may influence safety, i.e. safety culture, therefore appears important for extending the understanding of factors or processes that may explain safety outcomes. Such understanding may be used to more effectively improve workplace safety.

Sweden and Denmark have much in common regarding factors that may be of importance for organizational management. Similarities include geographical proximity, language resemblances, common historical background, similar social welfare systems, wage equalities and trade unionism (13, 14). In cross-cultural research, describing cultural differences between nations, Sweden and Denmark are regularly clustered together with other Scandinavian countries (15-17). In the GLOBE-project (16, 18) the culture of the countries of Nordic Europe were described as characterized by high levels of future orientation, gender egalitarianism, institutional collectivism and uncertainty avoidance, as well as low levels of power distance and in-group collectivism. Cultural similarities also include organizational phenomena, such as understandings of hierarchies, decision-making processes, interpersonal relations and attitudes towards conflict and confrontation (14). The preferred organizational management style in Sweden and Denmark can be described as value-based, team-oriented and participative (16).

Regarding Sweden and Denmark as part of the same cultural cluster, one would expect to find similarities also regarding important organizational factors like occupational safety. Surprisingly, however, the number of fatal occupational accidents in Denmark is 33% higher than in Sweden (19). Tómasson and colleagues (19) concluded that the construction sector had one of the highest differences in occupational safety between the two countries, reaching 40% more fatal accidents in Denmark. There are indications that the difference may be even larger. Four times more accidents were measured amongst the Danish compared to the Swedish constructions workers on the Öresund Bridge and Tunnel Project carried out between the years of 1993 and 2000 (20).

Even if organizational management in Sweden and Denmark has many similarities, a qualitative research study on Scandinavian management encompassing the brewing industry, the furniture industry, the confectionery industry and the shipbuilding industry, found several indications of differences between the two countries (14). These differences comprised longer decision-making processes in Sweden, as well as behaviours and attitudes indicating stronger rule orientation and a higher degree of conflict avoidance in Sweden.

A cross-cultural approach to safety research offers the possibility to develop the knowledge of phenomena affecting safety behaviour and safety outcomes. An explorative study of situation-related factors and worker-related factors in the construction industry in Sweden and Denmark, with similarities, but a clear difference in accident rates, can enrich the knowledge about factors influencing safety behaviour and safety outcomes in the construction industry.

This article presents an interview study with experienced construction industry managers and workers, with experience of working in different Scandinavian countries (mainly Sweden and Denmark). The aim was to capture

and describe their conceptions of cultural phenomena that are embedded in construction industry, that are important for a high level of occupational safety in this type of industry, and which, from the informants' perspective, differ between Danish and Swedish construction projects. Such comparative approach may illuminate aspects that could help explain the difference in accident outcomes between the two countries and thus indicate essential preconditions for high occupational safety performance.

2. METHODS

Apart from Spangenberg and colleagues (20), few studies on the differences between Sweden and Denmark regarding safety management in the construction industry have been made. Due to the lack of comparative studies between countries, and the inherent multifactor complexity of safety in construction (21), the methodological approach of the present study was explorative and inductive. The research was informed by the phenomenological basic assumption, described e.g. by McWilliams (22), that a research phenomenon like safety is not objective, but constituted of subjective understandings of safety as safety is conceived by significant experiencing subjects, i.e. construction managers and workers. Safety culture is created and recreated through the everyday interactional behaviours of managers and workers in the construction industry; individual managers and workers can be described as central safety culture producing units. To capture the descriptions of the behavioural interactions in the construction industry from the perspective of central safety culture producing units, qualitative interviews were performed with Swedish and Danish construction managers and workers.

2.1. Informants

Nine informants with experience of working in the construction industry in more than one Scandinavian country were interviewed. Four of the informants were Swedish and five of the informants were Danish. This design allowed a thorough in-depth analysis of the experiences and perceptions of the informants. Using the selection principle of maximal variation (23), informants were recruited through employers and workers organizations in both countries and through personal contacts. The accumulated experience of the informants covered small, medium size and large companies; different sizes of construction sites; different professions and trades; different age groups; both genders; and professionals with and without managerial positions.

2.2. Procedure

The interviews concerned perceived differences between Swedish and Danish construction industry regarding structural and organizational factors, as well as leadership and workers' attitudes and behaviours, which, according to the informants, influence safety behaviour and safety outcomes. Before each interview the background of the study and the aim – to investigate differences between Sweden and Denmark in how safety is managed and performed in construction industry – was explained to the informant. The interview guide was semi-structured and each interview began with open questions encouraging the informants to talk freely about their experience of working in the Swedish and Danish construction industry. The interview guide was designed to capture the informants' experiences and perceptions of 1) safety related traits, attitudes and behaviours of constructions workers; 2) safety related traits, attitudes and behaviours of construction managers; and 3) safety related organizational, structural and legal issues that in the experience of the informant differed between Sweden and Denmark. Sample questions from each aspect are: 1) "What characterizes a respected construction worker in Denmark/Sweden?"; 2) "What characterizes a respected construction manager in Denmark/Sweden?"; and 3) "How does laws, rules and procedures affect safety practice and management in Denmark/Sweden?".

The interviews were performed at a location chosen by each informant, spanning from the premises of a company, a company headquarter, a construction site, a union office, and the premises of a vocational college. The Danish informants were interviewed in Denmark by a Danish-speaking researcher and the Swedish informants were interviewed in Sweden by a Swedish-speaking researcher. Both a Swedish and a Danish researcher were present during all but two interviews, and were able to pose complementary questions after the main interview procedure. The duration of each interview was one to one and a half hours.

2.3. Data analysis

A semantic thematic analysis (24) of the transcripts was done using NVivo 10 software. First, the transcripts were read carefully by all authors. Thereafter all meaningful units of text relevant to the research topic were identified. The first interview transcript was analysed separately by two researchers and subsequently discussed, to open up for differences in understandings and interpretations of the text, to establish a common understanding in the coding and to ensure a full coverage of the meaningful units of text. Thereafter, the first author analysed all interviews by categorizing all relevant units of text in analytic themes and providing themes with provisional definitions. Subsequently, the data were systematically reviewed, discussed, and revised together by the first and second author, to ensure that suitable titles and definitions of each theme were formulated and data

to support each theme were identified. The final thematic structure was reviewed and discussed by all three authors. Recognizing that the number of informants is low, and hence that reaching saturation in the data analysis may be elusive, as a final step the last two interviews were reanalysed to ensure that no theme was grounded solely on data from these two interviews. This final step in the data analysis indicated that while the last two informants contributed to the richness of detail of the findings the main features of the findings had reached saturation after the first seven interviews.

3. RESULTS

The analysis of the interviews resulted in a categorization of the data in seven themes. Through the following section the analysis of each theme is presented according to a recurrent structure: firstly, a short definition of the theme; secondly, descriptions of the impact on safety behaviour and/or safety outcomes of the theme; and thirdly, differences between Swedish and Danish construction industry related to the theme. Lastly, two qualitatively different process models that describe the associations between the themes are presented.

3.1. Participatory or directive management

3.1.1. Participatory management

Participatory management conveyed managerial behaviours aimed at inviting subordinates to participate in problem-solving and decision-making, in the design phase of a project as well as in the everyday interactions at construction sites. In the interviews, participatory management behaviours were described on quite diverse organizational levels, e.g., the way supervisors managed their working groups, as well as the way by which governmental institutions exerted supervision over companies in the construction industry.

The informants described how participatory management substantially improved occupational safety in the construction industry. In the words of one informant:

“Participatory management: that I am invited to voice suggestions and to participate in decision-making. This generates much faster [safety] improvements.” (Swedish manager 2)

The reasoning of the informants were that changes that are practice-driven also generated practical changes in contrast to changes that were implemented from management without prior involvement by the people that were supposed to act out the changes in practice. Swedish and Danish informants alike described participatory management as an essential aspect of occupational safety:

“They [the workers] come around and find solutions to [safety] problems: so the gems of gold are clearly present. And we must take advantage of that fact. It is foolish not to take advantage of the knowledge that the workers hold.” (Danish manager 3)

Participatory management was thus perceived as highly valued in the construction industry in both countries but when it came to managerial practices, differences were noted. Participatory management behaviours were perceived to be more widespread in the Swedish construction industry than in the Danish. One informant exemplified this by explaining how Swedish construction managers regularly involved workers in problem-solving and decision-making using, e.g., information-sharing and collective analysis of drawings during the construction design phase, in ways that Danish construction managers, in his opinion, fail to do:

“There [in Sweden] everybody gets involved: “let’s do it like this, we did like this on another bridge and that worked very well”; that’s brainstorming. The Danes were not particularly interested in receiving any drawings because they have never been invited to look at any. I think they have never been given that responsibility. So their attitude was: “If anything goes wrong: you’re the manager, so you’re the one they’ll hang.” (Swedish worker 2)

Swedish informants referred to the Act of Codetermination, stating that participatory management is enforced by law in Sweden. This, they stated, implies a mandatory responsibility for Swedish construction managers, to involve workers in the decision-making processes, which enhances participatory management in the Swedish construction industry. One of the informants described the impact of the Act of Codetermination in the following way:

“We must be involved at the earliest possible stage, both when it comes to working environment, risk assessment, and all those things, and that’s according to the Act of Codetermination.” (Swedish worker 1)

The informants also described practice of participatory safety management in Danish construction industry. One informant exemplified this by describing a specific safety management intervention in one major Danish construction corporation called “*participation in the design phase*” (Danish manager 3), an intervention designed solely to involve construction worker in participatory safety meetings during the construction design phase.

3.1.2. Directive management

Directive management involved telling people what to do and to inform them about how and/or when to do it. As with participative management, informants described directive management behaviours by construction supervisors managing specific work groups, as well as by governmental institutions exerting control over construction companies. Directive management sometimes took the form of authoritarian leadership where no room for discretion on the behalf of the workers was offered.

Directive management were perceived to have a two-fold impact on safety. On the one hand, directive management was used to communicate safety rules and regulations downwards in the organization. Clear one-way communication of safety instructions, coupled with strongly enforced consequences when instructions were not followed, was explained as an effective way to enhance safety behaviour. In the words of one Danish manager:

“It is a matter of ensuring [safety] instructions. Instructing the workers, that’s in my opinion a top priority. They must be instructed in the best possible manner. And if you don’t follow procedures accordingly... ..there must be consequences.” (Danish manager 2)

On the other hand, directive management gave rise to a practice of “*turning a deaf ear*” (Danish manager 1). One implication of this practice was that when the manager that gave the instruction was no longer present, the instruction was no longer followed, or in the words of the informants: “*when we [the managers] turns our backs on them [the workers], they do as they see fit*” (Danish manager 1). This indicated that the effect of directive management on safety behaviour was reliant on the presence of the supervising party.

Directive management also affected the extent to which workers came with suggestions on how to improve safety and voice their own safety solutions:

“If you tell me:”Fetch a 10 meter ladder and use it along this wall here”, [I said]:”Ok, but if we instead fetch an aerial platform, the work will take much less time and it will be much safer for me”. They [the Danes] would never dare to voice such an opinion, that’s my experience.” (Swedish worker 2)

The informants reported that directive safety management behaviours were more widespread in the Danish construction industry than in the Swedish. Directive management was not limited to the behaviour of individual managers. Difference between the Swedish and the Danish context was also reported to occur at the institutional level of governmental supervision. The Danish Work Environment Authority was described to undertake more inspections at construction sites than their Swedish counterpart, and that the use of directive or authoritarian inspection management was more commonplace in the Danish construction industry. In the words of one informant: “*They breathe more heavily down our necks... ..[and] have cracked the whip and forced us to take it [safety directions] in*” (Danish manager 3). Informants described that the Danish Work Environment Authority regularly intervened by imposing fines on companies and shutting down construction sites not complying with safety regulations, interventions used less frequently in the Swedish construction industry:

“The [Swedish] Work Environment Authority visited the construction site, but they are not as strict as they are at home... .. If it had happened in Denmark, they would have shut down the whole construction site.” (Danish worker 1)

Informants indicated that directive management was also practiced in the Swedish construction industry, but the general picture in the interviews was that Swedish construction managers were reluctant, and sometimes even incapable, to give orders. One informant described what happens when Swedish managers venture out to work in other European countries:

“Many Swedish managers, who lead according to the Swedish Model, if they would leave to go to work in the Czech Republic, and monitor, control and give orders, I don’t think they would handle it.” (Swedish manager 2)

3.2. Challenge or obey

Workers’ reactions on managerial behaviours were a recurrent theme in the interviews. This theme was related to the theme of participatory and directive management but focused exclusively on subordinate responses to managerial behaviours. The workers’ reactions were categorized into two opposing behavioural responses:

challenge or obey. Challenge referred to openly questioning managerial directives and voicing opposing views. Obey referred to letting managerial directives pass unchallenged and conform to orders.

In the interviews, obedience was found to be linked to a form of indifference towards the work and the company as such, as the following informant described:

"Nobody wants to fall down and get injured, of course, but they [the Danes] appeared not to care at all... ... they were only there to get their pay check and if they were told to go a certain way, they did what they were told and went that way." (Swedish worker 2)

Challenging orders, when appropriate, was on the other hand referred to as a way of improving safety behaviour and safety outcomes. One example of augmented safety performance due to challenging managerial instructions was offered by one informant, who questioned an instruction to repeatedly use a ladder, and instead suggested the use of an aerial platform, generating a safer working condition.

Over-all, the informants described Swedish construction managers and workers as more prone to challenge orders and Danish workers to obey authorities:

"What I experienced a lot with the Swedish work teams, and the foremen of the work teams – yes, I will speak my mind – was that they knew well enough what to do, and they didn't want us to tell them anything. That was their attitude. A Danish worker can grumble, but he does more or less what he's told... ...so for a Danish foreman to manage a Swedish work team, that would be a real challenge [laughter]!" (Danish manager 2)

One aspect of obedience that was addressed by the informants was behaviours and attitudes in respect to formal hierarchies. Danish construction workers were described to be more inclined to respect formal hierarchies and status:

"We cannot address a subcontractor directly; we must go through the official channels. Therefore the process [of implementing safety changes] can be slow." (Danish manager 2)

The Swedish construction workers were described as more resistant to conform to formal hierarchies, e.g., reluctant to let formal hierarchies prevent them from speaking directly with top management, as a way of handling safety issues more proficiently:

"Then I just called the manager, the top guy, and said: "You need to talk to the site manager here, because..." And after no more than two seconds, he called. And thereby that [safety] issue was resolved." (Swedish worker 2)

3.3. Compliance or non-compliance

Compliance or non-compliance referred to behavioural responses to rules, regulations and plans, and how such behaviour affected safety outcomes. The analysis indicated ambiguity regarding the effect that compliance or non-compliance had on safety outcomes. High compliance was not always understood to increase safety. On the contrary, some informants reported that rules and regulations sometimes had little practical relevance for safety at work. As stated in one of the interviews *"some things are not so dangerous, it is ok. But the Work Environment Authority sees it differently"* (Danish worker 1). This attitude was related to a perception of the working environment as generally safe, i.e. *"safety is usually in order"* (Danish worker 1).

Another aspect was the experience that rules and regulations that are enforced in their own right became detached from actual safety practice. One informant described a situation where the rule about eye protection was perceived to loose relevance to safety:

"They wore eye protection that did not fit them, and they wore it just because they should. Then we started to talk about eye protection again, about having the right eye protection at the right time. The accidents went down again... ... "I put on the eye protection, not just because you say so, but because I understand how good it is for my eyes"... ...In the beginning when we enforced it, people protested and said: "they mist up, they are scratched, they reflect the light, they do not work...". Then you can't just say: "Put it on!" That does not work in Sweden." (Swedish manager 2)

The informants conveyed the message that rules, regulations and plans did not in themselves result in safe practice, but assisted a safe practice if they were in concordance with workers' experience.

Danish construction workers were perceived as less inclined to follow plans for safety and security than Swedish construction workers. From the point of view of the Danes, this disinclination was interpreted as

independence, but also as not caring about work, or simply sloppiness. Danish informants reported to have difficulties following rules and regulations that were perceived to have little impact on safety outcomes. But as already noted, this also was true for Swedish workers, as the example with the eye protection showed. Seen from the point of view of the Danes, Swedish construction workers and managers were more sensible in relation to rules and regulations, as the following quote illustrates:

“They [the Swedes] take their time. We were changing bulbs: a Dane would stand on a ladder in an awkward position for two minutes, as long as it takes; a Swede would take time to build a scaffold. They are more sensible.” (Danish worker 1)

Thus, both Swedish and Danish construction workers and managers had difficulties following rules and plans that, in their experience, were unrelated to safety practice. However, the informants described Swedish construction managers and workers to be more inclined to regard rules and regulations as sensible, as the example with the bulb indicates. Swedish construction managers and workers were described by informants to be more prone both to formulate and to comply with rules. One informant described this as an essential aspect of the Swedish safety culture:

“There are so many rules [in Sweden], you must have a license to operate an aerial platform, and then there is this thing with waste management. And so things are perceived differently, and so you become stricter with your own safety. I think that if only the management commits to it [safety], it reverberates out to the employees. We know Sweden to be a country of rules, so things are in order there. It’s always safer to work in Sweden, that’s how it is. That’s an approach that reverberates. That’s safety culture.” (Danish worker 2)

3.4. Cooperation or conflict

The theme of cooperation or conflict involved informants’ descriptions concerning the quality of the collaboration between managers and workers, and between different working groups and different companies. Cooperation was defined as cooperative attitudes and behaviours; conflict as the reverse.

Cooperation was understood to improved safety behaviour. One Swedish construction manager described how safety improvements were best achieved by *“the manager and the safety representative together, when they agree on something, changes take place”* (Swedish manager 1). On the other hand, conflicts over logistics and organization of the work reduced safety behaviour. Lack of cooperation between working groups/companies or between management and workers was explained to cause *“us and them-thinking”*:

“[Conflicts] result in a lot more “us and them-thinking”. This affects [safety behaviour] a lot... ..I don’t think they [conflicting parties] are able to put as much effort into safety issues, and the safety of the group, and the safety of everybody.” (Swedish manager 2)

The informants depicted the Danish construction industry as more prone to conflict, demonstrated, e.g., by the more frequent occurrence of open disagreements between companies and trade unions. Danish construction workers and unions were described to handle disagreements by using strikes, and the Swedes to handle disagreements through consensus-seeking negotiations. One informant illustrated this difference in the following statement:

“The mentality [of the Danes] is clearly tougher; they go out on strikes, than the Swedes. We [the Swedes] are so “let’s negotiate a little”, more careful, we seek common solutions¹.” (Swedish worker 2)

One Danish construction manager described Danish construction workers as more *“rebellious”* (Danish manager 3), and disinclined to settle for less than they opt for. Trade unions were readily involved when workers and managers disagreed on safety issues:

“If I don’t come through to management, then I call the trade union and the trade union call the management and says: “now you listen to us!”” (Danish worker 2)

The theme of cooperation or conflict also recurred on other levels in the construction industry. Conflicts were described by Danish informants to occur also between different groups of workers within the Danish construction industry, as one informant described his experiences:

¹ The informant used the Swedish expression *“landet lagom”*, meaning roughly *“the country of moderation”*, to explain the national cultural aspect of this behaviour.

"Worst were the workers from Copenhagen. They couldn't stand workers from Jutland, and we couldn't stand workers from Copenhagen, so... ..it was like a war." (Danish worker 1)

This worker referred to differences in opinion regarding what it meant to fulfil a contract and pointed towards regional differences between different groups of workers across Danish construction industry. In the opinion of the informant, construction workers from the capital city of Copenhagen were more inclined to stick to the collective agreement on working hours and to the agreement of working to rule. The informant, not originating from Copenhagen, argued for another approach: *"It's ok to work long hours, as long as you like what you do"* (Danish worker 1). This schism was described to contribute to tensions between different groups of workers.

3.5. Caution or cockiness

Caution referred to a personal capacity of carefully meeting the standards of the work and to be accurate in carrying out ones tasks. It also related to taking pride in doing the job well; as defined by one informant: *"that you do it right and that it will last"* (Swedish worker 1). Cockiness, on the other hand, referred to carelessness or sloppiness in relation to safety procedures and regulations, and to a certain extent in relation to professional standards in general. It related to negligence in order to meet the timeline or piece rate pay. It related also to a way of working that was described as showing off and not being afraid of the dangers of the job.

Caution was understood to promote a safer working environment, because being cautious involved taking time to make precautions, e.g., building a scaffold in order to do the job in a safe manner, instead of *"standing on a chair in an awkward position"*, as one Danish worker (Danish worker 1) described it. Caution about the work as such was also described to be related to caution about safety by taking care to meet both professional and safety standards. The following quote illustrates this:

"Each worker has to be his own safety representative. If he's working somewhere and it feels risky he should leave as quickly as possible." (Swedish worker 1)

Being cocky, on the other hand, was related to a more negative safety outcome, reflected in another quote by the worker just cited above. He said:

"There was a job to be done, but I considered it too dangerous. But they [the Danes] would [do it]." (Swedish worker 1)

Doing a job even if it feels dangerous was, however, not only understood as a sign of carelessness, it was also understood as a way to handle tight time schedules. According to one Danish manager this was a widespread misconception among workers:

"Instead of spending time getting hold of it [an aerial platform], the company having to pay for it and all; [workers say]: "if we just do it like this, it will probably work out." (Danish manager 3)

"Doing it like this" referred to a way of going about safety that was not planned, regulated or safety promoting. Labelling this practice *"solution oriented"* (Danish manager 1) was thus a positive way of framing this practice of sloppiness or cockiness related to safety issues.

Cautiousness was highly valued both in the Swedish and in the Danish construction industry, whereas cockiness appeared to be connected more to Danish construction workers than to Swedish, both according to the understanding of the Danes themselves and according to Swedes experiences of Danish construction industry. In Danish construction, , cockiness was partly understood as an ability to *"find solutions"* (Danish worker 1) and therefore emphasised as a form of flexibility towards safety. One Danish construction manager formulated this as follows:

They [the Swedes] have another culture, I think, when it comes to plans and such things. They are more conscientious about their plans. And concerning this, I think that we [Danes] have a tendency to work in a more unorderly way." (Danish manager 1)

In both countries the issues of caution or cockiness was related to the effort put into meeting time schedules and piece rate work. However, in Swedish construction this was also formulated as carefulness to be on time, *"we [the Swedes] were on time"* (Swedish worker 1), as a way to ensure that they would meet the piece rate pay. In Danish construction, on the other hand, the effort to meet the piece rate pay was understood to be related to sloppiness with safety.

3.6. Planning management

Planning management alluded to projections into the future: time, effort, money or attention, spent on safety management involving future activities or projects. Planning was referred to as an essential aspect of safety management and related to better safety behaviour and safety outcomes:

"There is no doubt, the earlier [in the design phase] you manage safety issues, the better, and incidents on construction sites decline; of this I am certain." (Swedish manager 2)

Planning for safety was described to be an important aspect of the design phase. Communicating the plans to workers and subcontractors at construction sites on a day-to-day basis, e.g., as part of pre-job inspections, was also emphasized as having an important effect on safety outcomes. One informant connected the everyday recollection of safety plans before entering work sites to augmentation of the safety knowledge of construction workers:

"Because the preparations are also important to avoid accidents; it is extremely important to know what you're entering. And if you don't know that properly, you get more accidents, there is no question about that. And I believe that subcontractors and managers are better at that in Sweden." (Danish manager 1)

When it came to planning the experiences of the informants indicated that safety management entered into the planning process earlier and with higher priority in the Swedish construction industry than in the Danish. References were, e.g., recurrently made to a Swedish regulation that clarified the organization of management responsibility concerning safety issues, the so called BAS-P system (Construction Safety Coordinator during the Design Phase):

"In Sweden, safety management is more closely connected to the money bag, at least during the design phase. Their Bas P-system, that's comparable to what we call safety coordinator; we have something of the same but they make much more out of it in Sweden, it's connected to the money bags, which is not the case in Denmark." (Danish manager 1)

The analysis indicated that Swedish safety management put greater effort and confidence into the planning process:

"To my experience the Swedes are highly competent and serious, actually making a plan. It's not a very extensive plan, but exactly pointing out this, and this, and this... .. Here [in Denmark] we have another culture, right, about their plans and stuff. They [the Swedes] rely very much on their plans. And I believe we are more, we tend to work a bit sloppier perhaps... ..meaning that we don't trust the safety plans the same way." (Danish manager 1)

A notable exception to the understanding of the Swedish construction industry as superior in regards to safety planning management was stated to be the Danish use of the 3D planning software BIM (Building Information Modulation), mandatory in all public sector construction projects in Denmark. This software was described to have significant effects on safety management:

"When the software was improved, everybody in the reference group we talked to, all [project managers] that will use [the software]: "Damn, this was a great tool, now we can make better plans on safety and logistics." (Swedish manager 2)

3.7. Employment security

This theme comprised the informants' reports on the importance of the length and terms of employment for engagement in occupational safety and health (OSH) work. Shorter and more insecure terms of employment were perceived to be related to lower safety competence amongst construction managers and workers:

"Due to the fact that the job was very big, we rented arms and legs, to speak in plain terms... ..I was security manager for that project. And it was obvious who came from the organization and had long experience, and who were short-term enlisted. There was no doubt. Because it was natural for them [who came from within the organization] to participate in the OSH work... ..the difference was extreme." (Danish manager 2)

The informants explained that shorter and less secure terms of employment were also related to lower motivation for safety participation, and upon receiving a permanent position at a company the motivation to work for safety development increased:

“I feel greater security and [I] want to put more of my soul into this [safety issues] if I have a permanent position.” (Swedish manager 2)

The benefits for companies to invest in developing workers and managers safety competence were related to the employment conditions. It was remarked that the forms of employment in the Danish construction industry were more malleable, i.e. short term or project tenure, which was understood to decrease managerial inclination to develop safety competence amongst employees, as the following statement illustrates:

Those [workers] being taken care of by the unemployment funds, so to speak, they don't develop the safety-thinking, they don't have access to courses and educations, but are only borrowed in from the labour market for a short time, and no authority has the possibility, nor the inclination, to educate them.” (Swedish manager 1)

Corporations in Danish construction industry, hiring short term employment, were described by the informants not to “offer any education” (Danish worker 2), it was up to the workers themselves to sign up for occupational health and safety courses offered by their union. The informants’ described that short term employment contracts were more prevalent in Denmark than in Sweden:

“One week notice. So the conditions are rather different... .. He [the manager] could just turn up one morning and [say]: “Get lost, you can pack your things and sod off!” Those were the term, that's the way it was.” (Swedish worker 2)

Short term tenure was described as a part of the Danish labour market policies, designed to increase the flexibility of the labour force. The Swedish labour market policies were described as quite opposite, with permanent employment as the rule, resulting in a less flexible labour force. One informant illustrated the short term employments by describing how his group of workers moved from one corporation to another on a regular basis, either because they were dismissed or because they wanted to work under different conditions, to increase salaries, or sought to get hired by a coveted corporation.

“So after a while, we were all sacked from corporation X. That was in May. It was a so called collective dismissal, and that meant that it had effect after 30 days. And that is unusual. I don't know how it is in Sweden, but we have usually 2-3 days of warning here, and then you are out. It depends on seniority, but if you have been there less than one year, you have 2 days, else you have 3.” (Danish worker 2)

3.8. Process models of participatory and directive management

The informants described experiences of causal relations between managerial behaviours and subordinate responses, as well as perceptions of managerial responses to structural and worker-related factors. The analysis of these experiences, perceptions and understandings can be illustrated in two process models describing associations between the themes (Fig. 1). Participatory management interactions were described as more positively connected to safety behaviour and outcome, whereas directive management interactions were described as more negative in this respect. Participatory management interactions were highly valued and practiced in the Swedish as well as in the Danish construction industry, although perceived as more common in Sweden. Directive management interactions were also experienced in both Swedish and Danish construction industry, but were considered more common in Danish construction.

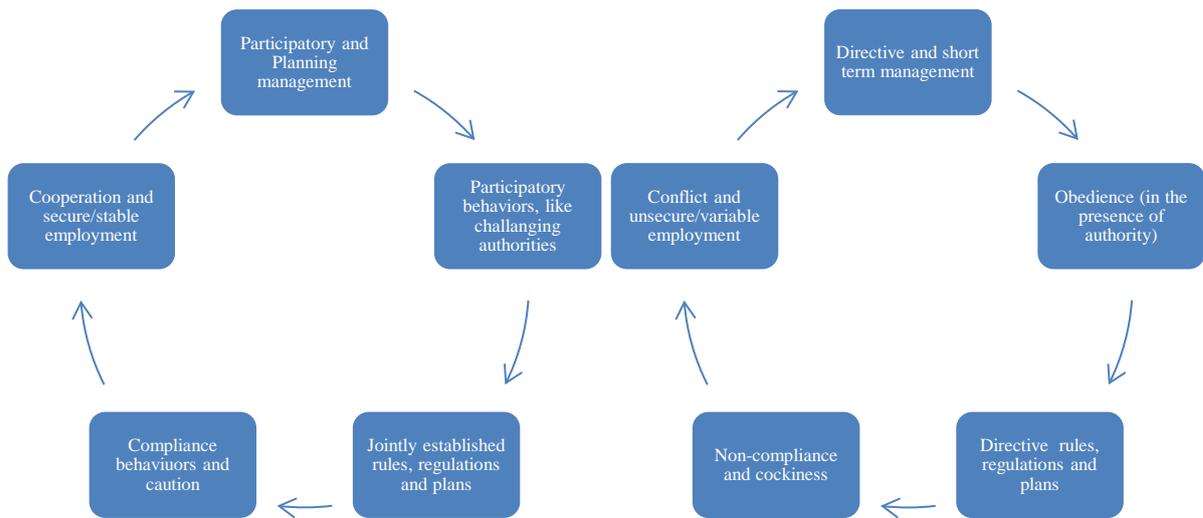


Fig. 1. Process models of participatory and directive management, respectively.

The two processes illustrate associations between the themes in circular processes of managerial-subordinate interactions. The participatory management process to the left, illustrates interactions contributing to a safety culture associated with higher safety performance, while the directive management process to the right, illustrates interactions contributing to a safety culture associated with lower safety performance.

4. DISCUSSION

In previous research safety behaviour has been categorized into safety compliance behaviour and safety participation behaviour, both connected to safety outcomes (5, 10). It has been suggested that safety compliance is enhanced by transactional leadership, involving contingent reward, monitoring, and correcting unsafe behaviour; while safety participation is primarily promoted by transformational leadership, involving inspirational motivation, intellectual stimulation and individualized consideration (25, 26). These findings correspond well to the findings in the present study, where directive management was found to promote conformity, and participatory management to encourage workers to voice suggestions for safety improvements. However, the effects of directive management, and management by enforcing rules, regulations and plans, on safety compliance behaviour, were found to be more complex. Directive management was indeed found to augment safety behaviour when management communicated clear expectations and delivered reliable consequences. This corresponds to previous research by Zohar (27) stating that management by contingent reward, including communicating clear expectations and delivering rewards when expectations are met, has positive influence on safety outcomes. But instructions enforced from above, without participatory influence from below, were in our study found to result in unanchored directives and subordinates less likely to comply with rules and directives. Directive management response to non-compliance may be the implementation of even stricter directives, tighter rules, and augmented consequences for non-compliance behaviour. This may result in improved safety compliance, but of a type that may be better described as obedience, and dependent on the presence of a supervising authority. According to theory of social exchange (28, 29), advising another party entails a social reward, which creates a mutually understood obligation that this social reward will be reciprocated at some later stage. Ordering another, on the other hand, uses up such obligations by discharging them through obedience (29, p131). An authoritarian response to non-compliance with further safety directives may thus decrease the perceived obligation to comply with rules as a means of reciprocating a social reward.

A participatory leadership style, on the other hand, implies a social reward that intrinsically motivate employees to reciprocate, presumably both by complying with rules and exposing participative safety behaviour. Participatory management implies inviting subordinates to problem-solving and decision-making. Such management may also encourage more persistent behaviours since it is likely to improve workers effort investment and confidence in the decision-making process (30). Involving workers may also increase the

possibilities for identifying and resolving organizational constraints that will otherwise hinder performance of desired compliant behaviour (4). The latter was illuminated in the present study, where primarily Swedish construction managers and workers held forth the importance of a holistic perspective on the work, e.g. through collective analysis of drawings before commencing the construction work, whereby constraints to working safely may be identified and voiced. The positive impact of participatory management on safety behaviour is supported by previous research stating that participative decision-making, as one facet of empowering leadership, has shown positive effects on safety performance (31, 32) as well as performance at large (33-35).

The finding of the present study, that participatory management is prevalent in the Scandinavian construction industry, parallels findings from previous research (16). Our study indicates, however, that participatory management is more widespread in the Swedish construction industry than in the Danish. This may explain previous findings that decision-making processes take longer time in Sweden (14). Participatory management is often described as time-consuming, but a qualitative study on Swedish management behaviours stated, that when subordinates are subjected to participatory leadership and invited to take responsibility, they internalize company goals and become more empowered. Consequently the decision-making process becomes more efficient and, when this has become an established manner of working, embraced by all levels, decision-making also becomes faster (36). Participatory management in terms of inviting subordinates to participate also in the design phase, may thus increase initial time expenditure in construction projects, but also increase both safety and efficiency during the construction phase.

The suggested practice of more participatory than directive management in the Swedish construction industry compared to the Danish may also explain the higher tendency of Swedes to comply with rules, regulations and plans, found in this and other studies (14). Jointly established rules, regulations and plans can be internalized more readily and this would increase intrinsic compliance motivation (37). Rules, regulations and plans that are enforced through directive management may be less anchored and hence perceived as less justified. Directive management may thus induce compliance motivation to be more extrinsic. It is well documented in motivational research that intrinsic motivation strengthens behavioural intentions to a higher extent, and consequently has a stronger influence on behaviour, than extrinsic motivation (37, 38).

The cross-cultural approach of this study shed some light on possible cultural differences between Swedish and Danish construction industry, which may help to further extend the understanding of safety compliance behaviour. Safety research generally concludes that compliance enhances occupational safety (10, 39). However, our findings revealed that workers sometimes find that rules contradict their own professional safety practice, and may therefore consider non-compliance to better ensure a high level of safety. Such reasoning has previously been identified to constitute part of safety culture practice in the Danish construction industry (40, 41). Creating such personal safety practices can be understood as subordinate response to management refraining from involving workers in problem-solving and decision-making processes. It can also, however, be understood as a flexible safety culture, in which highly competent managers and workers disregard rules to generate improvised solutions based on their own experience and qualified judgement. Such flexibility may positively influence safety (42, p196).

Leadership research has established that management practices are framed by the mutual relationship between managers and subordinates (43). Safety management can therefore be regarded as dependent also on the attitudes, traits and behaviours of the subordinates. The caution or cockiness and the compliance or non-compliance themes of the present study indicated that Swedish construction workers in general may be more conscientious, i.e. orderly and deliberate (44), than their Danish colleagues. Conscientiousness is a personality trait that has been found to vary across countries (45, 46), and to be connected to safety outcomes across occupational branches and settings (10, 47, 48). In cross-cultural studies, conscientiousness has been found to correlate with long-term orientation (49), which corresponds to behaviours described in the planning management and employment security themes of the present study. According to the informants, Swedish construction workers and managers were perceived to be more long-term oriented and more prone to consider long-term consequences of their actions. Previous cross-cultural research supports the proposal of Swedes as more long-term oriented than Danes (15, 16). In Hofstede's research, long-term orientation was the cultural dimension where Sweden and Denmark were most disparate. Conscientiousness has been operationalized as consideration of future consequences and therein found to improve safety behaviour (50). Hale and colleagues (51) concluded that consideration of future consequences and planning is crucial for the prevention of fatal occupational accidents in construction industry.

The findings of the present study indicate that shorter tenure employment is used to a higher extent in the Danish than in the Swedish construction industry, and may have negative effects on workers' safety behaviour and safety outcomes. This is in concordance with research by Spangenberg and colleagues (20). If employees stay

within a company for a prolonged period of time, the managers' inclination to engage in long-term cooperation and involvement with employees, and to use more participatory managerial behaviour, may increase. Managers were stated to invest more resources in developing the safety competence of employees with permanent positions, leaving workers with short-term contracts with less occupational health and safety education. Probst and colleagues (52) found correlations between employment insecurity and higher accident rates.

The present study indicated that conflicts at work may have negative impact on safety outcome. The theme cooperation or conflict indicated that conflict at different levels is understood as an integral part of how the construction industry functions in Denmark. This corresponds to previous research stating that Swedes are more conflict avoidant than Danes (14). Differences in management styles may shed some light on this issue. Directive management, which was considered more common in Danish construction industry, may result in higher tension and increased conflict between management and employees. Participatory management, on the other hand, stimulates cooperation and trust. Building mutual trust has been described as an important aspect of transformational (53-56) as well as empowering (32, 34) leadership. Lack of trust is likely to entail more conflict. Conflict may, in turn, have negative influence on the mutual trust between the conflicting parties, e.g., management and workers. More conflicts may further influence managers to behave less transformational, empowering and participatory, and use more traditional directive or transactional leadership behaviours (56, 57). In the perspective of social exchange theory one may assume that managers inviting employees to participate in problem-solving and decision-making will legitimate the managers' power among the employees. This will create group pressure on employees to comply with managerial instructions (29, p23). A manager, who's leadership is perceived as legitimate will thus to a lesser extent need to be directive.

4.1. Limitations

The findings of this study should be interpreted with some caution. Prior to the interviews the informants were informed that the accident rates differed between the Swedish and the Danish construction industry. The fact that the difference was in favour of the Swedish construction industry was laid out at a late stage of the interviews, but not withheld from the informants if information on occupational accident rates were requested at an earlier stage. This may have influenced the informants to focus more on the virtues of the Swedish construction industry and downplay the merits of the Danish. However, the informants provided nuanced information that contained both beneficial, and less beneficial, descriptions of conditions in both industries. Also, interviewing should, according to Kvale (58), be understood as a two-way process, where knowledge is produced during the interview, not only after it, and since the aim of the research was to better understand why Danish construction industry has higher accident rates, the rates were relevant information that in some of the interviews contributed to the dialogue. Withholding information from the informants may have hampered knowledgeable and qualified propositions from the informants and this may have lessened the understandings of the phenomenon generated in the interviews (59).

Even though sample size should not be considered as essential in qualitative interview research (23, 60), the number of informants in this study was rather low. In order to ensure that the main features of the findings had reached saturation the last two interviews were reanalysed. This analytical step showed that these two interviews did not provide data that influenced the main categories in other ways than providing additional depth and detail.

Interviewing Danes and Swedes on conditions in their respective countries may encourage bias, where each nationality holds forth the merits of the own country, and down-plays those of the other. In the present study this did not seem to be the case, since both nationalities pointed out the same types of merits and downsides in both countries. Overall, the findings from all interviews were largely consistent.

5. CONCLUSIONS

Contextualizing the themes in the process models of participatory and directive management contribute to a theoretical understanding of the interactional processes between managerial behaviours of construction managers and safety behaviours of constructions workers. The findings of this study point towards the importance of the relational rather than the instrumental aspects of safety management.

The findings of this study suggest an explanation to why the effect on safety behaviours of transactional leadership in general and active management-by-exception (MBEA) in particular can be two-fold. Participatory management can be described as a moderating variable between managerial transactional behaviours and workers safety behaviours. Subordinate participation in the formulations of the terms and conditions of the transactions in transactional leadership in general, as well as participating in the organization of monitoring and correcting mistakes in MBEA in particular, can be crucial to what effect these leadership behaviours have on subordinates' safety behaviour. Subordinates experiencing participation in the decision-making and problem-solving processes can be expected to accept and respond well to a mix-in of transactional leadership.

This study identifies seven situation-related and worker-related factors perceived by the professionals as related to lower occupational accident rates in the construction industry. Engaging in participatory management, promoting long-term planning and long-term tenures, encouraging cooperation, cautiousness and compliance to rules as well as challenging authorities, were stated as connected to successful safety management. These findings indicate important aspects that may guide further research in the field, as well as safety managers and officials engaged in decreasing accident rates in the construction industry in Scandinavia and elsewhere.

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