Safety culture and reasons for risk-taking at a large steel-manufacturing company: Investigating the worker perspective

Hasse Nordlöf, Birgitta Wiitavaara, Ulrika Winblad, Katarina Wijk, Ragnar Westerling

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ABSTRACT

Workers in the steel-manufacturing industry face many safety risks due to the nature of the job. How well safety procedures and regulations are followed within an organization is considered to be influenced by the reigning culture of the organization. The aim of this study was to investigate and describe safety culture and risk-taking at a large steel-manufacturing company in Sweden by exploring workers’ experiences and perceptions of safety and risks. Ten focus group interviews were conducted with a total of 66 workers. In the interviews, the situation of safety at work was discussed in a semi-structured manner. The material was analyzed inductively using qualitative content analysis. The analysis resulted in a thorough description of safety culture and risk-taking at the company, based on the following five main categories: 1. Acceptance of risks, one simply has to accept the safety risks of the work environment, 2. Individual responsibility for safety, the responsibility for safe procedures rests to the largest extent on the individual, 3. Trade-off between productivity and safety, these are conflicting entities, wanting to produce as well as wanting to work safely, 4. Importance of communication, it is needed for safety actions to be effective, and 5. State-of-the-day and external conditions, an interference between these factors affect risk-taking. In sociotechnical systems theory it is acknowledged that there are interactions between social and technical factors in organizations. The findings of this study are interpreted to be in line with a sociotechnical understanding of safety culture and risk-taking.

1. Introduction

Steel manufacturing is an industry where safe working procedures are important, as workers face many risks due to the nature of the job. The work environment is often hot and noisy, and work tasks regularly heavy and demanding on the body, and there is always present risk for crushing injuries and burns. Figures from Sweden show that metalworkers were subjected to the largest number of accidents annually (2006–2010) compared to other occupations (AFA Insurance, 2012). The risk for new cases of long-term sick leave (>90 days) for metalworkers was more than double that of the average worker (AFA Insurance, 2012). Metal-workers also had the largest number of cases of recognized work-related diseases among Swedish occupational groups during 2008 and 2009, with 0.7 cases per 1000 employed (AFA Insurance, 2012). Due to the types of risky workplaces that steel manufactur-
The concept of safety culture has been defined in many ways over the years and there is no established definition (Choudhry et al., 2007; Edwards et al., 2013; Guldenmund, 2010). There is a necessity to return to the roots of culture in order to gain a better understanding of what is meant by safety culture (Antonsen, 2009b; Edwards et al., 2013; Haukelid, 2008; Myers et al., 2014). A known sociological definition is that “culture consists of the values the members of a given group hold, the norms they follow, and the material goods they create” (Giddens, 1989, p. 31). Values are “abstract ideals,” perceptions of what is right and wrong and how things should and should not be (Giddens, 1989, p. 31). Norms are “definite principles or rules which people are expected to observe,” the rules governing social conduct and the behaviors that are accepted or not (Giddens, 1989, p. 31). Values and norms are learned by socialization—humans learning from others in groups; hence culture is learned by socialization. Safety culture can be understood as “an analytical concept, not an empirical entity” (Antonsen, 2009a, p. 243), meaning that safety culture is a label that represents the relationship between culture and safety, and not a separate entity on its own. In line with Giddens’s (1989) definition of culture, Mearns and Flin (1999) described safety culture as normative beliefs and fundamental values, assumptions, expectations, philosophies, norms, and rules, with regard to safety at a workplace. Earlier studies on safety culture have applied the concept to organizations in two different ways: (1) by assuming that every organization has a safety culture (and that it therefore can vary in the extent to which it is strong/positive or weak/negative), or (2) by assuming that it is organizations that are really committed to safety that have a safety culture (Hopkins, 2006). This study agrees with the first description, that every organization has a safety culture that may affect safety.

Some earlier studies on safety in a steel-manufacturing context have focused on behavior, attitudes, climate, or culture, with results indicating that culture can form a basis for unsafe attitudes and behavior (Brown et al., 2000; Canter, 1996; Turtiainen and Vaananen, 2012; Watson et al., 2005). Both negative and positive examples of safety culture are described in previous research. In a study of a coal mining accident it was found that two unfortunate cultural expressions paralyzed the organization’s ability to acknowledge warning signs before the accident occurred. The first was the “belief that it was important to rely on personal experience in assessing the evidence” (Hopkins, 1999, p. 148) and therefore to systematically discount the reports of others, and the second was “a culture of denial, an elaborate system of beliefs which held that ‘it could not happen here’” (Hopkins, 1999, p. 141). In contrast to this, three of the most important cultural expressions for achieving an adequate safety culture have been found to be “looking for errors, not keeping out of sight when difficult situations arise, and resolving conflicts constructively” (García-Herrero et al., 2013, p. 94). Management’s commitment to safety stands out among earlier findings as a key factor associated with positive safety culture, positive employee safety behavior, and positive employee safety attitudes (Biggs et al., 2013; Cox et al., 1998; Fernández-Muñiz et al., 2007). Workers’ belief in the safety values of the management has been linked to predicting worker risk behavior (Watson et al., 2005). The concept of risk is defined as “the possibility that something unpleasant or unwelcome will happen,” and as a verb, risk means to “expose (someone or something valued) to danger, harm, or loss” (Oxford Dictionaries, 2013). Norms shared by employees have been shown to predict perceptions of safety as well as risk behavior (Watson et al., 2005). Other key factors that have been shown to be associated with an organizations’ safety culture are the employee involvement and personal actions for safety (Cox et al., 1998; Fernández-Muñiz et al., 2007); the quality of employee safety training (Cox et al., 1998); and the safety management system (Fernández-Muñiz et al., 2007). It has been shown that workers manifest less ambivalence toward using personal protective equipment when they perceive that there is an atmosphere in the organization that supports safety (Cavazza and Serpe, 2009). It has been shown that it is possible to change a safety culture, as exemplified in an oil-drilling context; however, it takes a long time (Haukelid, 2008).

Safety culture has earlier been studied using three main directions of methodology: perception surveys (questionnaires), ethnography, and assembled material from major accident inquiries (Hopkins, 2006). Relatively few empirical studies on safety culture have, so far, used qualitative methodology (Glendon, 2008; Guldenmund, 2010). A qualitative methodology considered as suitable when investigating cultural values and group norms is focus group interviewing (Hughes and DuMont, 1993; Kitzinger, 1995). Culture is a complex phenomenon to study. With perception surveys (questionnaires) it is possible to study safety culture from one viewpoint; with a qualitative study approach it is possible to do it from another, enabling a more detailed and in-depth description, which can be done inductively. It has been suggested that the concept of safety culture is best suited to be understood in a specific context (Richter and Koch, 2004). The context of the present study is steel manufacturing. As this is a high-risk work environment, there is a need to improve the safety of the work conditions for steelworkers. One way to achieve this is to improve the understanding of safety culture and risk-taking in this context. Safety rules and regulations at the workplace are formalized norms, and officially expressed. To expect compliance with rules is a certain kind of communication—it is a request (Cialdini and Tost, 1998). The more compliant workers are with safety rules, the better the safety culture is thought to be (Simard and Marchand, 1997). This investigation however, focuses on values and norms of safety that are not written down, not officially expressed, informal norms, but which—socially, in any case— influence safety actions and behavior. In a best-case scenario, the formal and informal norms in an organization match up, in that it is specified by the culture that it is important to comply with safety rules and not to violate them. However, regardless of formal or informal, in order for norms to have any effect on behavior they need be communicated between humans—they need to be shared, otherwise they do not exist (Cialdini and Tost, 1998).

The aim of the present study was to investigate and describe safety culture and risk-taking in the steel-manufacturing industry by exploring workers’ experiences and perceptions of safety and risks.

2. Material and methods

2.1. Study design

The present study was designed to be a descriptive focus group interview study, with an inductive and explorative approach. Focus group interviewing was used, as it is a method considered appropriate when aiming to explore cultural values and group norms, by identifying shared knowledge and experiences within groups (Hughes and DuMont, 1993; Kitzinger, 1995). Qualitative content analysis was used in the analysis of data (Graneheim and Lundman, 2004).

2.2. Study context: A steel-manufacturing company

The present study took place at a large steel-manufacturing company in a county in central Sweden. The company exemplifies a typical industrial works community that one finds in many smaller towns in Sweden, where the works has played a central
role for the development of the town over centuries. The company is the main employer of the inhabitants of the town, besides the municipality, and there is often more than one generation of a family working at the company. The local area has a tradition of producing steel that dates back to the 17th century. In earlier times ore was used as raw material, but nowadays scrap metal is used for the steel making. Today the company is part of a corporate group producing steel products in several places around northern Europe, which at the time of the study employed about 4000 people. At the company studied there are about 1000 employees allocated to five departments: the steel mill, billet mill, ring mill, hot rolled tubes mill, and cold rolled tubes mill.

The company was chosen as study context, since it represents a workplace with a variety of internal risks because of the nature of the industrial work. The work is often heavy and demanding on the body, and it is a hot, sweaty, and sooty environment. In some production lines the steel is hot and the risk for burns is present, while in others there is processing of cold steel, and the risk for crushing injuries is present along with a noisier environment. Some blue-collar staff work close to the production line, while others operate in a cockpit, supervising the production line or controlling a crane. Some staff work in maintenance, and are thereby subjected to further risks because of the need to troubleshoot the machines when they fail. Newly invested machines have modern and effective built-in safety procedures, while other machines from, for example, the 1960s involve more risks, since it is easy to access moving parts of the machines because of the way they are constructed. The modern standards for built-in safety in machines, demanded by European (2006/42/EC) and Swedish (AFS 2008:3) safety regulations, are not imposed retroactively, meaning that it is not required to rebuild old production lines.

The company follows Swedish laws and regulations for occupational health and safety (AFS, 2001; SFS, 1977), as well as European (89/391/EC). In accordance with the Swedish regulation AFS, 2001, occupational health and safety (OHS) is managed in a systematic way with regular safety audits and follow-ups, as well as risk analyses. The responsibility for OHS lies with the CEO, but can be delegated to deputy managers. Some white-collar staff at the company work full-time on environment, health & safety (EHS). The company has a close collaboration with the labor organization for workers in steel manufacturing, regarding health and safety issues. Throughout the company there are employees who have the part-time task of being a safety delegate, appointed by the local labor organization. The safety delegates and the workplace section managers conduct safety audits together, normally every second week. Safety delegates within departments have regular meetings. A senior safety delegate at the company works full-time as head of the local labor organization.

If an accident occurs, the company is required to take measures to prevent the event from reoccurring. The company uses a web-based incident reporting system that has been developed by AFA Insurance, an insurance company owned by the Swedish labor market parties (AFA Insurance, 2013). All incidents at work should be reported in the system: near misses, accidents, and work injuries, as well as risk observations. If near misses are repeatedly reported from some part of the production line, the company is required to take measures to make a sustainable change. Every incident case in the system creates some action. If near misses are repeatedly reported from some part of the production line, the company is required to take measures to make a sustainable change. Every incident case in the system creates some action. Every incident case in the system creates some action. Every incident case in the system creates some action.

Considering its occupational health and safety standards, the company sampled was judged as a typical case (Patton, 1990). In other words, it was thought to be quite average among other large Swedish steel-manufacturing companies, and therefore we judged it as an appropriate context to study in order to address the research aim.

2.3. Recruitment strategy and participants

A sample of participants from all five departments at the steel-manufacturing company was used to achieve maximum variation (Patton, 1990). We aimed to get ten focus groups, with about six to eight employees in each group. To help the participants feel comfortable in discussing safety at their own workplace, it was considered important that the participants in each focus group be colleagues from the same department and the same shift team, to share the same frame of reference. Two shift teams per department were randomly selected from staffing-lists, and then employees from these shift teams were randomly selected and invited to the focus group interviews. The department managers and their deputy managers helped to facilitate the recruitment of participants to be interviewed, by informing the selected employees about the study. Written information describing the study was given to potential participants by their deputy managers, and they could agree or decline to participate. If they declined to participate, the next employee on the staffing-list was approached by the deputy manager. The invited employees mainly chose to participate in the focus groups. They were informed about the day and time when the interview was going to take place. The deputy managers then informed the research group when sufficient employees had accepted to participate in each interview. A total of 66 employees participated in ten groups (Table 1). Characteristics of the participants are described in Table 2.

2.4. Data collection

The deputy managers of the departments helped to set up a date for the interview and a meeting room where it could be held. The interviews were held in facilities that varied between departments, mostly a meeting or conference room, but sometimes a lunch room. The semi-structured interviews were conducted by the first author with help from an assistant. The interviewer facilitated the interviews by posing questions and elaborating on the topic when appropriate. The assistant did not participate in the discussions during the interviews but took notes. The interviewer started the interviews by telling the participants about the purpose of the study, hence repeating the information that had been given in the information letter. Thereafter, a written consent of every
participant was collected. During the course of the ten focus group interviews none of the invited participants chose to drop out.

An interview guide was developed for the present study (Appendix A). The three main themes discussed were exemplified by the questions “What is safety like at your workplace?”, “How is safety handled at your workplace?” “What could be improved regarding safety at your workplace?” These themes were rendered on signs on the table, visible to the participants. The interview guide had some subtopics for each of the themes and open questions, where participants could not answer simply “yes” or “no,” were asked at every occasion possible, as well as follow-up questions, for example: “Please explain more; what does that mean?” and “Do you have an example?” Descriptive data of the participants (Table 2) was collected after closing the interview session. For this, they were asked to fill out a short questionnaire. Each focus group interview lasted for about 75 min and was conducted during June, July, and September in 2011. The focus group interviews were recorded digitally and thereafter transcribed verbatim. The interview assistant was present in the first eight interviews and transcribed the recordings afterwards.

2.5. Analysis

The analytic framework of qualitative content analysis according to Graneheim and Lundman (2004) was used in the analysis. The analysis was built on codes, which were sorted into categories and subcategories. Firstly, the interview transcripts were read through by the interviewer while listening to the recordings, to make corrections in the text. Each interview was read at least once without any simultaneous coding. The initial analysis and the coding of data were conducted by the first author, while the co-authors took parts of the material and worked with the analysis during meetings throughout the analytical process. Codes were written as short sentences that mirrored the content of text segments in order not to lose information contained in the text and to maintain fidelity to the material. In the conduct of the analysis, safety culture was considered as consisting of normative beliefs and fundamental values (assumptions, expectations, philosophies, norms, and rules), with regard to safety at a workplace (Mearns and Flin, 1999). Text segments in which it was judged that participants gave descriptions of safety that were normative or based on values were identified as meaning units and coded. Reasons for risk-taking were coded during the analysis, in which text segments with explicit reasons for risk-taking were identified as meaning units and coded. The coding of the data was inductive in the sense that codes and categories were derived from the data and not identified in advance. The codes and categories were shaped and named (abstracted) successively during the analysis and were not based on the questions in the interview guide. The qualitative data analysis software Atlas.ti 6.2 (ATLAS.ti GmbH, Berlin) was partly used in the analysis to code and sort the data.

3. Results

The analysis resulted in five categories (Table 3) that describes the safety culture and reasons for risk-taking, and how they were perceived and experienced by employees at a large steel-manufacturing company. The categories were acceptance of risks, individual responsibility for safety, trade-off between productivity and safety, importance of communication, and state-of-the-day and external conditions. The five categories were in turn based on sixteen subcategories. The categories and subcategories are presented in the following text.

3.1. Acceptance of risks

In the experience of the steel-industry workers, the risks that are present in their work environment have to be accepted, since there is not so much to do about them than to make the best of the situation. The first subcategory was danger tolerance that it is a dangerous work environment and one must accept and handle risks. The workers reported that there are large forces in their workplace, and one cannot completely avoid risks. The following examples illustrate that they consider risks to be everywhere, including outside of the workplace: “There are risks everywhere, driving the car is a risk in itself, but that is not something one thinks about” (CRTM, 5), and “It is actually a heavy industry, it is not possible to ‘bolster’ everything” (SM, 10). The workers use shortcuts on the job that make the work more risky, which is perceived as acceptable, if one masters them. Despite one’s own safety awareness, one is always dependent on others in the workplace, and how they act: “It does not matter how good you are yourself to think of everything; there will always be fools around you” (RM, 6). A stressful work pace is dangerous but hard to avoid, which is accepted and handled: “One should not stress. It should be thought of, and one does stress” (CRTM, 5).

The workers also expressed fatalistic beliefs that one accepts how safety is, and that some things cannot change. The workers did not believe that an accident-free and healthy workplace would ever be achievable. They believed that human errors make it impossible to reach a zero-accident vision, or that poor air conditions could ever be avoided: “It will never be possible to achieve one hundred percent safety; nothing can become one hundred percent” (SM, 10), and “One cannot get away from the fact that human error plays a role sometimes” (BM, 7). The workers experienced, though, that “It is a wonder that so few accidents happen, considering the type of heavy industry that it actually is” (RM, 1). All in
all, they perceived that one needs to accept these conditions, because it is just how it is.

3.2. Individual responsibility for safety

The steel-industry workers expressed that the individual worker, through common sense, has responsibility for safe procedures, since one cannot count on the company for that. The first subcategory was that it is up to the individual to work in a safe manner. The workers stated that one cannot rely on the manager or the company to take responsibility for safety during a work shift; one needs to do that oneself, because safety rests on the judgment and decisions of the individual during a work task: “No one else can take that responsibility, the individual has the largest responsibility” (BM, 4). One’s own common sense was perceived to be crucial: “It is all about knowledge and common sense” (HRTM, 2), and “One has to think before acting” (CRTM, 8). One should come prepared to the workplace (for example, by having had enough rest), and one should take responsibility for one’s own safety during work; no one else can do it for you: “Personal responsibility—everybody needs to see the risks” (HRTM, 2).

Low company commitment was the second subcategory, in that the company does not manage the safety procedures as much as it could. The workers experienced how, if one points out a concern regarding safety, it gets treated nonchalantly by the company: “Sometimes there is nonchalance about what we say and what we think is dangerous” (HRTM, 2), and “They spend more time on finding scapegoats than on fixing problems” (SM, 9). When an agreement for a safety improvement has been settled, it can “take ages” before the company acts to implement the change. The company can as well be reluctant to stop production when it is requested by the employees due to safety concerns. However, if something acute happens concerning safety, a severe near miss or an accident, the company acts quickly to implement improvements. The workers perceived that it is good that the company then acts quickly, but that it is too bad that something needs to happen before measures are taken: “When one reports things that they need to fix, they do not take care of it, and then when something happens, yeah, then they take care of it” (CRTM, 5).

3.3. Trade-off between productivity and safety

The steel-industry workers described that a trade-off exists between productivity and safety—that they are conflicting entities, wanting to produce as well as wanting to work safely, with practical obstacles to working safely sometimes. The first subcategory was management expectations, that one perceives expectations from the management that productivity has priority over safety. The workers perceived that there is an expectation from the management that, even though there is low staffing one day, it should not result in less productivity. The workers’ experiences show that when staffing goes down, accidents go up. The management does not want the production to slow down, and therefore, as the workers explained, they need to find temporary solutions and work with tools that are not appropriate for the job, or to work with equipment that is broken or does not work properly: “The management says that one should use the different aids there are, but if one really would do that to the fullest, then one slows down production, and they do not like that either” (RM, 1). Temporary solutions were perceived as necessary to get the production running again quickly when a stoppage occurs.

The next subcategory was worker expectations, that the workers themselves consider it important to make the production run smoothly, which is the first priority. The workers described that they have their own expectations that production should run smoothly: “We are a bit foolish ourselves, really; one wants to keep the production going, which is how it is” (RM, 1). They feel that they want to keep the production running, as the production is the reason for being there: “One should take care of liquid steel, which is the first priority” (SM, 9). They also expressed that one wants to spare the equipment and save material, when something goes wrong in the production. By doing so, one is subjected to more risk. But apart from avoiding discarding material as scrap, one also minimizes the work effort by having a short interruption instead of a long stoppage of the production.

Practical obstacles, was the third subcategory of this category, that one wants to work in a safe manner, but there are practical obstacles to doing so. The steel-industry workers experienced that there as well are practical difficulties for working in a safe manner, if one would like to do that. The right equipment or tools might not be available, or might have broken down, for example, lift trucks. Therefore inappropriate equipment and tools are used instead: “We can make it easy for us, take the absolutely safest way, but then we will not produce so damn much” (RM, 1).

3.4. Importance of communication

The steel-industry workers experienced that communication is needed for safety actions to be effective, through experience and training, taking responsibility for collaboration, and making sure to communicate incidents that happen. The first subcategory was to think about safety, that it is important to have continuous safety training and to learn how to “think safety” (1.4.1). The workers perceived that safety training is important and that one cannot get too much of it: “One has to know what one is doing” (HRTM, 2). They also perceived that a newly employed person should learn about safety first, before learning the production. They also reported that there is not enough time for introducing new staff to production and safety: “There is a staff shortage, so there is not enough time for them to get the training that really is needed—often it is too short” (HRTM, 2). They stated that newly employed persons create a more dangerous workplace around them, since they are less experienced and take more risks.

Collaboration between colleagues was the next subcategory, that communication and collaboration between colleagues at the workplace is important for safety. The workers experienced the possibility of communicating as very important for safety at the workplace. The use of walkie-talkies is more efficient than using body language and gestures, which often still are used. It is also important to feel comfortable with one another in order to work in a safe manner, to know each other’s personalities and standpoints: “We talk a lot to one another between the cockpits, and then we get the safety to work really well” (BM, 4). They considered that pointing out someone’s risk behavior is the right thing to do, but also a sensitive matter, and that one needs common sense in approaching the colleague who has made a mistake or taken a risk. Otherwise, one can be faced with the attitude that “No one should tell me how to do my job” and “Mind your own business, and I’ll mind mine” (RM, 1). They also emphasized that neglecting safety procedures should be punished, requesting more strict control over violations of safety regulations.

Reporting incidents was the third subcategory, that one should report incidents, even though there may be obstacles to doing so. The workers stated that they know that it is important to report incidents (risk observations, near misses, and accidents), but still, the incident reporting is often ignored. They experienced writing incident reports as time consuming, and there was uncertainty about how to do it. It was related that, “If we were to report everything that happens, we would have to write the whole time” (SM, 10). Embarrassment is another reason not to report incidents, embarrassment about being foolish and making a mistake. They described that it is embarrassing enough that the mistake
happened, and that one is not keen on writing a report describing one’s own mistake.

3.5. State-of-the-day and external conditions

The steel-industry workers described how interplay between one’s state-of-the-day and the external work environment conditions present at the workplace results in the individual taking different risks. The first subcategory illuminating this was that being new at work results in unaware risk-taking. The workers reported that new employees take more risks, because they are less experienced: “Experience is lacking; they just rush in and do not think about where they are going” (HRTM, 3), and “When someone is new, they do not see the dangers, which one learns about over the years” (HRTM, 3). New employees are often told that “You should do what I say, not what I do” (BM, 7).

The next subcategory was tiredness, that being tired results in more risk-taking. The workers described that tiredness can be influenced by amount of sleep, time of the day because of shift work, the hot work environment, and slumberous sounds from machines. This was, for example, described as follows: “We are shift workers, and one can be terribly sleepy sometimes,” and “Four o’clock in the morning, one does not think so damn well” (HRTM, 2), and “Perhaps one is tired and does not think before acting, being poorly prepared for work” (BM, 4).

Nonchalance about the safety risks results in more risk-taking and was the third subcategory. The workers experienced that nonchalance toward risks is a common problem: “A bit of nonchalance is pretty common” (HRTM, 2). A more experienced worker may be more nonchalant, being unobservant or underestimating risks: “One does not think before...” (CRTM, 8). Nonchalance was also described as being present because of laziness or because one wants to minimize the work effort.

Working on routine and being “blind to flaws” results in more risk-taking. The steel-industry workers described being “blind to flaws” as meaning that one follows certain routines during work, becoming blind to risks that one should see: “It is routine. One gets accustomed to being out in production, and one does not think. One does what one should, but does not think about what one is doing” (CRTM, 5). It was described as a risky state of mind that occurs after one gets accustomed to the workplace, which is hard to be aware of: “Maybe someone from the outside comes and sees something, and reacts much more strongly than we do, since we have seen it a hundred times already” (HRTM, 3). They perceived that being blind to flaws is the opposite of being new at work, but that both these states are dangerous.

The next subcategory was low staffing, that too few staff to do the job results in more risk-taking. The workers experienced that low staffing on a shift team is bad for safety, since the workers have to take more risks because of the extra workload: “Even if there is a temporary cut-down of the staff, it is expected that production should not be affected, and one has the mindset to ‘go at it’ and maintain the production, even though that is a bit wrong, since it involves more risk-taking” (RM, 1).

High pace was the sixth subcategory, in that to stress, hurry, and work faster in order to save time results in more risk-taking. The workers cited some examples of how one stresses and works faster to save time when in a hurry: loading transports with more weight than they are intended to carry, in order to finish more quickly; performing maintenance on running machines without stopping the production process, to keep production flowing; forgetting to communicate with colleagues; lifting heavy loads and lifting the wrong way; and using the wrong tools, because the right ones are missing or broken. They described that stressing and being in a hurry might occur because of the demand to meet a deadline, or just to get the work done quickly so that one can get some rest afterwards: “Being under stress is when one starts to use short-cuts” (RM, 6), and “If one can solve it quickly, one gets less work, and one can go and sit down” (HRTM, 2). Colleagues expect the shift team before them not to leave any work behind; therefore, there sometimes is a need to finish the planned production under time pressure.

4. Discussion

As an overall finding, it can be summarized that responsibility and actions for a functioning safety performance was perceived to rest on the individual, whereas the work environment and priority of productivity constitute constant obstacles. This showed to be experiences of the workers that were prominent throughout the analyzed material. The results concerns expectations and boundaries: partly the expectations the workers have of themselves and the expectations they experience from managers, and partly how the organization and the work environment set boundaries as to how it is possible to act in different situations. The results therefore fit rather well with the concept of human-technology-organization (HTO), where there are interactions between each of the three components in systems, as well as mutual interdependence between them (Berglund and Karlsson, 2007; Rollenhagen, 1997).

Thus, our results in relation to the HTO-concept show that the workers (human) operate within the boundaries set by the physical environment and the machines (technology), as well as under the expectations set by managers and conventional working procedures (organization). The experiences of the workers showed that it is partly individual factors (human) and partly external factors (technology, organization) that contribute to risk-taking at work. Workers’ expectations of themselves, and expectations of managers for the workers, constitute a culture that governs how it is possible to act (behavior). That culture matters for behavior in the context of safety has been demonstrated by Watson et al. (2005), in that norms shared by employees predict perceptions of safety as well as risk behavior.

There are different schools of thought on organizational safety and how incidents occur: person as cause, system as cause, or system–person sequence as cause (Brown et al., 2000). The latter is in line with the HTO-concept. The HTO-concept is a variant of classic sociotechnical systems theory that acknowledges that there are interactions between social and technical factors in organizations and thereby a need to review the whole of a system in order to improve performance and ‘joint optimization’ (Cooper and Foster, 1971). An earlier study conducted in the steel industry found support for a sociotechnical model in explaining safe/unsafe work behaviors (Brown et al., 2000). A sociotechnical understanding of safety culture has been suggested by, for example, Grote and Künzler (2000) and Naevstad (2009). The results of the present study are also in line with the HTO-concept and a sociotechnical understanding of safety culture and risk-taking.

Risk-taking and unsafe behaviors in an organization is partly a result of how the culture is shaped, as demonstrated by earlier studies in an industrial manufacturing context (Brown et al., 2000; Canter, 1996; Turtiainen and Vaananen, 2012; Watson et al., 2005). Culture can, of course, contribute to either unsafe or safe behaviors in an organization. Culture is however not behavior per se and should not be confused as such. We agree with Myers et al. (2014) that it is important to distinguish between culture and behavior, and not to oversimplify by saying that culture is ‘the way we do things around here’. It is, however, interesting to discuss how cultural norms are related to behavior since they do specify what kind of behavior is acceptable or wanted. Safety culture is one factor that contributes to behavior, but there are many other factors. The will to comply with the culture of work...
The workers themselves feel it is important to prioritize productivity, property rights, or the institution of marriage. Even though acts. This illustrates the two sides of human innovation, creativity, and problem-solving to perform work tasks, which however, are unwanted features if it results in safety being put aside. At the same time, human innovation, creativity, and problem-solving are often mentioned as important prerequisites for working safely, as they permit the worker to adapt to situational challenges that arise (e.g., Antonsen et al., 2012; Hollnagel et al., 2006; Rasmussen, 1997). This illustrates the two sides of human innovation in safety critical contexts: it can result in safe as well as unsafe acts.

The tension between productivity and safety is an example of how compliance or non-compliance with safety rules become visible (Battmann and Klumb, 1993). The workers of the present study stated that common sense is important during their work. Similarly, in a study of Norwegian fishermen it was shown that instead of complying with safety rules, they rather trusted their common sense to work safely (Thorvaldsen, 2013). The company investigated in the present study, as introduced earlier in the study context section, is compliant with established legislations and standards. However, the company on the one hand and the workers on the other, can be said to have different interests and ideas regarding what a satisfactory performance of productivity and safety is (Targouzidis, 2011). In a study by Blazsin and Guldenmund (2015), workers perceived that safe and relevant working practices preferably should be developed in the field, rather than being imposed on them by corporate rules. Also, similar to the workers in the present study, these workers perceived it to be impossible to achieve complete safety, that individual responsibility is important, and that rules sometimes can be obstacles to working smoothly and efficiently (Blazsin and Guldenmund, 2015). Two different viewpoints can be found in the literature, either to consider that safety rules always must be adhered to and that violations should be suppressed, or that operators are experts and rule violations are a natural and dynamic way to adjust to reality (Hale and Borys, 2013). Either way, the reasons to violate safety rules have been found to be multifactorial (Alper and Karsh, 2009).

It is concerning that safety often seems to have to take a backseat to productivity, and that rules are violated to get the job done. This might be a “cultural universal,” a common feature found in every society (Giddens, 1989), similar to the existence of gift-giving, property rights, or the institution of marriage. Even though the workers themselves feel it is important to prioritize productivity, they also experience expectations from managers that productivity has priority over safety. There are similarities with the present study and Haukelid (2008, p. 421), in that the workers in that study experienced that “Safety rules are ok – but it takes too long time if we always should follow them!” Based on descriptions given by the workers of the present study we would like to sum up a fictional dialogue between the management and the workers:

**The management:** You should use the right equipment and safe procedures when you work.

**The workers:** Ok, but if we do that, we cannot produce as much as you want us to.

**The management:** Now we need you to produce this and this much in order to reach our targets.

**The workers:** Ok, but then we do not have time to use the right equipment and safe procedures, or to rest and take breaks.

The justification for trade-offs between productivity and safety appears to be circular reasoning. The workers may be able to justify trade-offs, but at the same time they also perceive to carry much of the responsibility for safe working procedures.

Second, we would like to discuss the finding that the responsibility for safe procedures rests to the largest extent on the individual. The workers experienced that a functioning safety performance at work is up to the individual, depending on oneself, and that one actually cannot count on either colleagues or the manager when it really comes down to it. Earlier studies have also found the responsibility for safety to rest on the individual (Edwards and Jabs, 2009; Lee, 1998; Walker, 2008). This finding can be explained by the fact that individual responsibility is quite important in shift work, since there are periods during a day when there is no manager present, only workers. Another explanation could be that the organizational structure of the present company is fairly flat and not strictly top-down, and therefore, the responsibilities are divided. It is perhaps counterintuitive to some that the workers actually experience safety as a personal responsibility, rather than believing that safety is something for the management to arrange, which in part is what legislation specifies (AFS, 2001; SFS, 1977: 89/391/ECC). In a quite logical sense the responsibility for safety, of course, rests on the individuals, since they are the ones that perform the work. Lee (1998, p. 236) postulates that a main principle of safety culture is that “the responsibility for safety is devolved to every employee in the organization.” In line with Lee, the company of the present study could be said to have a positive safety culture, since the workers experience safety as their responsibility. On the other hand, the workers also perceived that the management was absent and not responsive to their wishes or concerns regarding safety. This in turn indicate a negative safety culture, since earlier findings have shown the commitment of management to be associated with positive safety culture, positive employee safety behavior, and positive employee safety attitudes (Biggs et al., 2013; Cox et al., 1998; Fernández-Muñiz et al., 2007). The workers interviewed for the present study did at times also express that they would welcome more strict control over safety violations and that the management should care and punish more, but at the same time they also expressed how safety really is the responsibility of the individual—which indicates some ambivalence. The perception that safety is the responsibility of the individual is likely learned and transferred between the workers, and therefore a part of the socialization-process in the workplace.

Third, we would like to discuss the cultural circumstances surrounding the socialization of new employees. According to the workers of the present study, a newly employed person can see the workplace with “fresh eyes” and is not yet “blind,” and can therefore see things that the experienced workers cannot see, which was valued as a good thing. However, as the years pass
by, the newly employed will become “blind to flaws,” just as the others in the organization have. Unfortunately, though, the experienced workers of the staff do not make use of the newly arrived fresh pair of eyes, because there are norms that say that newly employed persons should not point out anything or come with suggestions for improvement, and if they do, they are reprimanded by experienced colleagues right away. This is an interesting paradox: that a fresh view of the organization is a valued matter, but that, at the same time, putting the fresh view to use is considered as an unwanted behavior within the team. This could be explained by underlying status differences between newly employed and experienced workers. Amount of experience matter in the work team, which influences roles and relationships between the workers. A theoretical perspective first introduced by Harris (1970), and later used by Hale (1995), uses the metaphor of parent–child and adult–adult relationships to analyze roles and relationships in jobs. “Parent–child relationships are often immature and disturbed, particularly if one person is unhappy with their (usually) child role. They are characterized by power games and dominance rituals. On the other hand adult–adult relationships are mature and concentrated on mutual support and the achievement of common goals” (Hale, 1995, p. 236). It seems applicable to label the relationship between experienced workers and new workers as a parent–child relationship, with power games and dominance rituals, where the newly employed workers are not permitted to come with improvement suggestions. When the new workers have gained enough experience the roles turn into an adult–adult relationship, but thereto they also unfortunately become “blind to flaws.” The interviewed workers themselves commented on the above-described socialization process for new employees, and noted that such a cultural expression seems a bit foolish and unwise. What also takes place is that new employees are instructed by the experienced workers on how the work should be done, but then the experienced workers do not follow that work protocol themselves, which results in contradictory information to the new workers.

4.1. Methodological considerations

An advantage of using focus group interviews when studying culture is that shared knowledge and experiences can be identified in order to explore cultural values and norms in groups, more than what would be the case with individual interviews (Hughes and DuMont, 1993; Kitzinger, 1995). The dynamics between participants in focus groups is the key to find shared knowledge and experiences. A disadvantage with group dynamics, though, is that the “articulation of group norms may silence individual voices of dissent” (Kitzinger, 1995, p. 300). Individuals in the group may refrain from stating their point of view. In order to encourage the workers to discuss the topic in this study, each focus group consisted of members from the same shift team, which facilitated a familiar and “true” interaction between them.

As it was the deputy managers who approached the workers regarding participation in the study, the workers could have felt coerced to participate, perceiving participating as a work task. Nevertheless, the workers’ voluntariness was secured by informing them that it was fully optional to participate. This was done with the written information letter that the deputy managers handed out, orally on the day on the interviews, as well as printed on the form for their written consent. We do not believe this recruitment strategy was negative for the participants or the study in any way.

In the present study some measures have been taken to address trustworthiness, as described by Graneheim and Lundman (2004). First, to address credibility, we included many participants, a rather large sample, to achieve a rich variation of the phenomena under study, using maximum variation sampling (Patton, 1990). During analysis, the effort to identify appropriate meaning units was as well crucial for credibility. In order to strengthen credibility of the analysis, all authors of this article took part of the material and worked with the analysis during the process, separately and through recurring meetings. The coding of the data was done by the first author. The coding and categorization process was continually discussed within the research group. Any possible differences in opinions among the authors were resolved by discussing the interview source material. For the final results, consensus was reached.

Second, to address dependability (interpreting data differently or making different decisions during the course of analysis), an analysis logbook was kept. The analysis and coding were performed inductively, with the awareness not to base them on the questions in the interview guide. Third, transferability is how well findings can be considered to be applicable to other settings or groups (Graneheim and Lundman, 2004). We therefore made an effort to describe the context of the present study thoroughly, to allow the reader to judge the transferability of the findings to other settings. The findings may be especially applicable to other settings with similar manufacturing, similar national legislation, and similar close collaboration between employer representatives and labor organization representatives.

4.2. Future research

For future research it is suggested that more qualitative descriptive studies of safety culture be undertaken in other occupational contexts. Basic research of this kind can support further development of safety culture theory-building and contribute to refinements of quantitative instruments that measure safety culture. Much of the efforts within the research field, which uses the analytical concept of safety culture, fall back on the striving toward constructing quantitative measures that reliably and accurately can indicate an organization’s proneness to future incidents. We recommend that a sociological definition of safety culture be used in future research (Giddens, 1989; Mearns and Flin, 1999), returning to the roots of the concept of culture (Antonsen, 2009b; Edwards et al., 2013; Haukelid, 2008; Myers et al., 2014). We also propose that, in moving forward, the theoretical development of safety culture should focus more on shared values, norms, and attitudes of safety, than on de facto safety management compliance in organizations.

4.3. Conclusions

An overall finding was that responsibility and actions for a functioning safety performance was perceived to rest on the individual, whereas the work environment and priority of productivity constituted constant obstacles.

The steel-industry workers perceived that the risks that are present in their work environment have to be accepted, since there is not so much to do about it than to make the best of the situation. They also experienced that a functioning safety performance at work is the responsibility of the individual, and that one actually cannot count on either colleagues or the manager when it really comes down to it. The workers reported that there is a constant and ongoing trade-off between productivity, on the one hand, and safety, on the other, and that they are conflicting entities, wanting to produce as well as wanting to work safely, with practical obstacles to working safely sometimes. The workers experienced that the possibility to communicate is very important for safety at the workplace. They also described interplay between one’s state-of-the-day and the external work environment conditions at the workplace, which results in the individual taking different risks. The findings of this study are interpreted to be in
line with the analytical concept of human-technology-organization (HTO), and a sociotechnical understanding of safety culture and risk-taking.

4.4. Recommendations for industry

New employees are acclimatized into a safety culture at work. The workers of this study pointed out how new employees often have a fresh view of the organization, which is quite valuable, but that using these fresh perspectives often is considered as an unwanted behavior by the more experienced workers within the team. Managers in industry could be aware of this and make an effort to put a fresh view of the organization to use before the new employees become “blind to flaws.”

A sociotechnical understanding of safety culture and risk-taking was supported by the present study, it is therefore suggested that companies should consider a holistic approach when designing system improvements (to strengthen company performance jointly with safety and well-being for the workers).

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Appendix A

The interview guide: Was used in a semi-structured manner and had three main themes and some subtopics.

Theme 1: What is safety like at your workplace?
Importance of safety at the workplace, of working safely
How high safety is valued in the organization
Risk-taking at the company—allowed, not allowed

Theme 2: How is safety handled at your workplace?
Safety arrangements at the workplace
Thinking, not thinking, about safety at work
People involved in safety management

Theme 3: What could be improved regarding safety at your workplace?
Improving safety at the workplace
Reasons for work injuries at the workplace
Reasons for risk-taking at the workplace
Missing in safety management
Creating good safety

References